SERVICE AND METERING GUIDE

Version No: 6.0

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FORTIS ALBERTA

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1. Scope

1.1 Overview

1.1.1 This publication covers most of the possible customer projects encountered on the FortisAlberta system. While FortisAlberta will endeavour to follow practices in this guide, these practices will not appropriately cover every situation that may arise, and it may be necessary to apply for special permission.

1.1.2 All customer-supplied electrical equipment shall conform to the Canadian Standards Association (CSA) standards. Customer projects shall comply with the Alberta Safety Codes Act, the Canadian Electrical Code (CEC, Part 1) [B1] and FortisAlberta's "Customer Terms and Conditions for Electric Distribution Service." All metering and service installations shall meet these requirements.

1.1.3 Customer projects that do not meet the requirements covered in this guide shall abide by "Section 6.0, Non-standard Services." Customer service entrance or switch-gear equipment will not be energized until its design, construction, location and application are acceptable to both the local authority having jurisdiction and FortisAlberta.

2. Purpose

2.1 Overview

This publication is for use by FortisAlberta's customers concerned with electrical installations within the FortisAlberta service area. The information within supersedes all information previously provided by FortisAlberta on the subject. Comments and questions can be emailed to the Customer Interaction Group at fortisnewconnects@fortisalberta.com.

2.2 Customer Application

Customers should apply for service early in the planning stage of a project to help ensure that FortisAlberta can meet your project time schedule. Call FortisAlberta toll-free at 310-WIRE (9473) for any inquires related to your project.

3. Disclaimer

3.1 Use of FortisAlberta Engineering and Construction Standards

3.1.1 In accordance with FortisAlberta's Engineering Practices Policy, FortisAlberta Engineering and Construction Standards are developed and used only for FortisAlberta designs and construction and for FortisAlberta distribution facilities only.

3.1.2 FortisAlberta's expectation is that designs and construction by others (third-party) for any electrical system or distribution facilities adjoining, attaching to, or otherwise affecting FortisAlberta distribution facilities shall, as a minimum, meet FortisAlberta Engineering and Construction Standards.

3.1.3 If there is a discrepancy or clarification is required regarding the interpretation of the Canadian Electrical Code, Part 1 [B1], contact the local inspection authority having jurisdiction. FortisAlberta has no authority to police or enforce the requirements of the Canadian Electrical Code, Part 1 [B1] unless there is a clear safety concern regarding the energization of the service.

3.1.4 Use of FortisAlberta Engineering and Construction Standards by any Third-Party is done at the Third-Party's own risk and liability.

3.1.5 Any copies of FortisAlberta Engineering and Construction Standards so provided are copyright protected and no further copies for any other use, modification, amendments or changes are permitted.

FortisAlberta requires that any Third-Party retain the use of a Professional Engineer to assess the completeness of the Third-Party's design and construction to meet the minimum requirements.

3.1.6 Review and or comment by FortisAlberta on any Third-Party design or construction does not relieve the Third-Party from full responsibility and liability for the Third-Party's design and construction.

3.1.7 By requesting and or accepting copies of FortisAlberta Engineering and Construction Standards, the Third-Party automatically accepts the terms and conditions of this disclaimer.

3.2 Modal Verbs Usage and Reference

3.2.1 The word "shall" indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).

3.2.2 The word "unless" indicates an exception to the word "shall" that doesn't compromise to safety or reliability.

3.2.3 The word "must" is used only to describe unavoidable situations. It indicates only statements of fact (e.g., current must go to 0 when the source is removed).

3.2.4 The word "should" indicates that among several possibilities, one is recommended as particularly suitable without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (should equals is recommended that).

3.2.5 The word "may" indicates a course of action permissible within the limits of the standard (may equals is permitted to).

3.2.6 The word "can" indicates statements of possibility and capability, whether material, physical, or causal (can equals is able to).

4. Glossary of Terms

Bonding – A low impedance path obtained by permanently joining all non-current-carrying metal parts to ensure electrical continuity and having the capacity to conduct safely any current likely to be imposed on it.

Bonding conductor – A conductor that connects the non-current-carrying parts of electrical equipment, raceways or enclosures to the service equipment or system grounding conductor.

Cable – An assembly of one or more insulated electrical or optical conductors, or a combination thereof, in a compact form, enclosed in a covering consisting of a combination of metallic, plastic, or other materials used to provide mechanical and electrical protection.

CEC – Canadian Electrical Code, Part One (CSA Standard No. C22.1 – current version adopted in Alberta) [B1]

Cold-Sequence Metering – A metering configuration where the circuit breaker is positioned upstream of the meter. When the breaker is turned off, it de-energizes the meter, ensuring safety during maintenance or emergency situations.

Combination Meter Box – A meter-mounting device that includes a meter socket and a secondary breaker attached to a pole or structure.

Conductor – A material used for the transmission of electrical, electromagnetic, or optical energy. For the purposes of this document, the term "conductor" shall specifically denote a single or bundled insulated or uninsulated wire.

CSA – Canadian Standards Association

CT Cabinet – An enclosure for housing FortisAlberta current transformers, supplied and installed by the customer.

Distribution Connection Point – An electrical line at secondary or primary voltage (120 V to 25 kV) that serves multiple customers.

Farm – These services are generally single-phase, 120/240-volt, self-contained services that supply farming operations in rural areas, contain a residence and where agricultural activities are carried out for revenue.

Ganged Meter Socket – Multi-position sockets. Multiple self-contained sockets and a pull section grouped in a horizontal design, maximum of four positions.

Grounded – Connected effectively with the general mass of the earth through a grounding path of sufficiently low impedance and having an ampacity sufficient at all times, under the most severe conditions liable to arise in practice, to prevent any current in the grounding conductor from causing a harmful voltage to exist:

a) between their grounding conductors and neighbouring exposed conducting surfaces that are in good contact with the earth; or

b) between the grounding conductors and neighbouring surfaces of the earth itself.

Grounding – A permanent and continuous conductive path to the earth with sufficient ampacity to carry any fault current liable to be imposed on it, and of sufficient low impendence to limit the voltage rise above ground and to facilitate the operation of the protective devices in the circuit.

Hazardous Location – Premises, building or parts thereof in which:

a) an explosive gas atmosphere is present, or may be present, in the air in quantitates that require special precautions for the construction, installation and use of electrical equipment.

b) dusts may be present in the form of clouds or layers in quantities to require special precautions for the construction, installation and operation of electrical equipment.

Hot-Sequence Metering – A metering configuration where the circuit breaker is positioned downstream of the meter. Turning off the breaker does not de-energize the meter.

Inspection Authority – Local municipality, the province or an accredited agency authorized to sign off on electrical permits.

Installed Capacity – The rated capacity in kilovolt-amperes (kVA) of the FortisAlberta transformer that supplies the service.

Instrument Meter – A 20-amp meter used in conjunction with instrument transformers.

Instrument Transformers – High-accuracy current or potential transformers approved by Measurement Canada for revenue metering purposes.

Instrument Transformer Enclosure – The enclosure that houses instrument transformers, supplied and installed by the customer.

Line Side – The side of a device or equipment that connects to the incoming power supply and receives electrical energy from the source.

Load Side – The side of a device or equipment that carries electrical energy away to the load or downstream system.

Lot Line Metering – Metering that is located near the front property line on a self-supporting structure.

Meter Center – Two to six vertically stacked, self-contained meter compartments. Meter compartments are commonly bussed with branch circuit protection. Modular in design.

Multiple Meter Installation – Any installation where a building has several meters fed from one service entrance, such as apartment buildings, shopping centres, office buildings, warehouses or light industrial complexes.

Meter Pedestal – A meter mounting device that includes a meter socket and in some cases a breaker that is self-supporting.

Meter Socket – A meter mounting device for the purpose of installing a FortisAlberta meter.

Multiple Customer Metering System (MCMS) – An instrument metering system which can meter eight to twelve customers in large complexes.

Network Meter – A two-element meter designed for use on a 3-wire network service obtained from two-phase wires and a neutral of a three-phase, 4-wire wye system.

Nominal Voltage – A suitable approximate value of voltage used to designate or identify a system.

Padmount Metering – Metering installed on a pad-mounted transformer.

Point of Service Demarcation – The ownership boundary between the public power system and the customer facility. FortisAlberta contractual agreements might specify a different point for delineating voltage responsibility.

Radio Frequency (RF) Meter – Meter enabled with radio frequency mesh or point-to-multipoint communication technology.

Residential – These services are generally single-phase 120/240 or 120/208-volt, self-contained services to individual houses, apartment buildings or condominium complexes.

Self-Contained Meter – A meter rated for carrying the total current (200 amp) and line voltage of the circuit to be metered.

Service Box – An approved assembly consisting of an enclosure that can be locked or sealed, containing either fuses and a switch, or a circuit breaker, and of such design that it is possible to operate either the switch or circuit breaker to the open position by manual means when the box is closed.

Service Connection Point (Service Entry Point) – The point at which the customer's facilities physically connect to FortisAlberta's electrical distribution system. For an underground supply service, this could also be the point where FortisAlberta's civil work ends, and the customers begins.

Service Disconnect and Main – An approved metal box or cabinet with service fuses and a service switch or a circuit breaker. Designed so that either the switch or circuit breaker may be manually operated when the box is closed.

Service Entrance (SE) Cable – Two or more medium- to low-voltage-insulated conductors wrapped in one jacket.

Service Entrance (SE) Wire or Conductor – A single insulated medium- to low-voltage electrical conductor(s).

Service Entrance (SE) – The portion of the customer's installation from the service box or its equivalent up to and including the point at which the supply authority makes connection.

Service, Supply – Any one set of conductors run by a supply authority from its mains to a customer's service.

Service, Temporary – Service for a limited period (generally less than one year). For example, construction sites.

Service, Three-Phase/4-Wire – A three phase, four wire wye service has three phases and a neutral conductor where the phase to neutral voltages are nominally equal, and the phase-to-phase voltage is equal to √3 times the phase to neutral voltage.

Single-phase Commercial – These services are generally single-phase 120/240-volt, self-contained services supplying typical businesses.

Three-phase Commercial and Industrial Services – Commercial and industrial services that use three-phase services, which may use 120/208-volt, self-contained metering or up to 2400/4160-volt instrument metering. Typically supply industrial customers, including oil and gas sites.

Utility Right-of-Way – Land set aside (through registered easement) to allow electricity, gas, water, sewer, telephone and cable companies to provide service. To protect equipment such as underground powerlines, transformers, poles or overhead lines, no obstructions (sheds, foliage, fences, etc.) are permitted on this land. This restriction helps prevent hazards that could cause serious injuries.

Utilization Voltage – The phase-to-phase or phase-to-neutral voltage at the points where utilization equipment is connected to the power supply.

5. FortisAlberta's Requirements

5.1 General

5.1.1 This section covers FortisAlberta's general requirements, which shall be met before electrical service will be provided.

5.1.2 Exceptions to requirements shall be approved in writing by FortisAlberta's Metering Standards, on a site-by-site basis. Failure to comply with these requirements will mean electrical service will not be provided.

FortisAlberta Metering Standards Contact Details
meteringstandards@fortisalberta.com

5.1.3 The customer may be responsible for covering costs incurred by FortisAlberta or a third party to correct service installations that do not meet proper requirements.

5.1.4 The requirements outlined in this document apply to new installations, upgrades and modifications.

5.2 Standard Service

5.2.1 Standard Supply Voltages

5.2.1.1 The following tables presents FortisAlberta's standard overhead and underground voltage, phase and load configurations. Not all standard voltages are available at all service locations.

Table 1 – Standard Overhead, Transformer Sizes and Supply Voltages

Service Voltage	Phase, Wire and Connection	Transformer Load Range (kVA)	Full Load Range Line Amperes (A)	
120/240	Single-phase, 3-wire	15 to 167	@ 120 V 125 to 1,392	@240 V 63 to 696
240/480	Single-phase, 3-wire	25 to 100	@ 240 V 104 to 417	@ 480 V 52 to 208
120/208Y	Three-phase, 4-wire, Grd/wye	30 to 225	83 to *624	
277/480Y	Three-phase, 4-wire, Grd/wye	30 to 150	36 to 180	
347/600Y	Three-phase, 4-wire, Grd/wye	75 to 150	72 to 144	

* Full-load amperes are limited to 430 A by standard overhead conductor sizes (500 kcmil Cu). Customer-owned risers and underground cables to the overhead transformer shall provide full capacity of transformer size.

Table 2 – Standard Underground, Transformer Sizes and Supply Voltages

Service Voltage	Phase and Wire and Connection	Transformer Load Range (kVA)	Full Load Range Line Amperes (A)	
120/240	Single-phase, 3-wire	25 to 167	@ 120 V 208 to 1392	@ 240 V 104 to 696
120/208Y	Three-phase, 4-wire, Grd/wye	30 to 1000	83 to 2776	
277/480Y	Three-phase, 4-wire, Grd/wye	75 to 3000	90 to 3600	
347/600Y	Three-phase, 4-wire, Grd/wye	75 to 4000	72 to 3849	
2,400/4,160Y	Three-phase, 4-wire, Grd/wye	1000 to 10,000	139 to 13,878	

5.2.2 Standard Service Conductors

5.2.2.1 Table 3 below presents the standard overhead service entrance conductor sizes that FortisAlberta will provide from the service transformer to the service connection point or weatherhead. The service entrance conductor sizes provided can be used in accordance with the requirements of the Canadian Electrical Code, Part 1 [B1], where the calculated load is 100 A for a 100 A service and up to 185 A for a 200 A single-phase service. For three-phase services, FortisAlberta will supply service entrance cables sized at 125 A for a 100 A service and up to 255 A for a 200 A service.

5.2.2.2 FortisAlberta does not provide service entrance conductors for services exceeding 200 A. Customers are responsible for supplying both service entrance conductors and connectors for conductors larger than 4/0 AWG AL.

Table 3 – Standard Overhead Service Conductor Sizes, Canadian Electrical Code, Part 1, Table 36A [B1]

Service Voltage (V)	Trade Name	Phase Conductor Size (AWG)	Neutral Conductor Size (AWG)	Type	Ampacity (A) At 75°C
120/240	Caesium	4	6	Triplex NS-75	105
120/240	Indium	2	4	Triplex NS-75	140
120/240	Jasper	1/0	1/0	Triplex NS-75	185
120/208 to 347/600	Capricornus	#2	#2	Quadplex NS-75	125
120/208 to 347/600	Pisces	1/0	1/0	Quadplex NS-75	165
120/208 to 347/600	Gemini	4/0	4/0	Quadplex NS-75	255

5.2.2.3 Table 4 below presents the standard underground cable sizes that FortisAlberta will provide from the service transformer or pedestal to the service connection point or the demarcation point as identified by FortisAlberta (property line for residential customers). The service entrance cable sizes provided can be used in accordance with the requirements of the Canadian Electrical Code, Part 1 [B1], where the calculated load is 100 A for a 100 A service and up to 180 A for a 125 A, 150 A or 200 A single-phase service.

5.2.2.4 For single-phase services exceeding 200 A, customers are responsible for supplying the service entrance cable and, when necessary, connectors. For three-phase services, customers shall supply both the service entrance cable and connectors, as FortisAlberta does not provide these components.

Table 4 – Standard Underground Service Cable Sizes, Canadian Electrical Code, Part 1, Table 4 [B1]

Service Voltage (V)	Phase Conductor Size (AWG) Aluminum	Neutral Conductor Size Equivalent (AWG) Copper	Type	Ampacity (A) At 75°C
120/240	2/C 1/0	#4	USEB	120
120/240	2/C 4/0	#1	USEB	180
120/240	2/C 300 kcmil (MCM)	2/0	USEB	230

5.2.2.5 Cables on all residential and multi-family developments shall be concentric neutral direct-buried type (USEB).

5.2.2.6 Voltage drop calculations are required to verify the suitability of the cable size for the given length.

5.2.2.7 Historically, in underground residential distribution areas, the standard service size is 100 A. The area developer may have installed larger cable (e.g., 2/C, 4/0 AL, USEB 600 V) to compensate for voltage drop. Cable size does not necessarily indicate the size of service that is available. Contact FortisAlberta about connecting services larger than 100 A to ensure there is adequate service supply.

5.2.2.8 Customers are responsible for confirming that the load calculations do not exceed the load capacity of service components (e.g., cable, breaker), as per Canadian Electrical Code, Part 1 [B1] requirements.

5.2.2.9 Service cables shall be sized in accordance with the Canadian Electrical Code, Part 1 [B1]. Permitted conductor sizes for self-contained metering range from 1/0 to 250 kcmil.

Note: FortisAlberta typically supplies 1/0 AL and 4/0 AL USEB 600 V service entrance cables. In some cases, 300 kcmil AL USEB 600 V cable is supplied to account for voltage drop or Canadian Electrical Code, Part 1 [B1] ampacity requirements. In such cases, a connection adapter may be necessary to fit the 300 kcmil cable into meter sockets limited to 250 kcmil.

5.2.2.10 Service cables for multi-family units shall have conductors compatible with pedestal terminations, where applicable. For two to four multi-family units (e.g., a ganged meter socket), service cable sizing requirements may differ from those for a single unit. Pedestal terminations can accommodate cables up to 350 kcmil.

5.2.3 Voltage and Operating Conditions

5.2.3.1 All services use 60-hertz alternating currents. The normal system voltage and voltage limits at the point of connection are as specified in CSA CAN3-C235-19: *Preferred Voltage Levels for AC Systems, 0 to 50,000 Volts*. FortisAlberta maintains the steady-state voltage within the limits stipulated in CSA CAN3 C235-19 [B2].

5.2.3.2 Table 5 specifies the recommended voltage range limits for systems with a nominal voltage of 1,000 V or less at the point of connection.

5.2.3.3 The voltage range limit for systems greater than 1,000 V and up to 50,000 V at the point of connection should be ± 6 per cent of the nominal voltage [B2].

Table 5 – Steady-state Voltage Range Limits for Systems ≤1,000 V at Point of Connection Recommended by CSA CAN C235 [B2]

Nominal Voltage	Minimum	Extreme Operating Range		Maximum
		Normal operating range		
		Minimum	Maximum	
Single-phase systems				
1 Phase, 3-Wire 120/240 V	106/212 V	110/220 V	125/250 V	127/254 V
1 Phase, 2-Wire 240 V	212 V	220 V	250 V	254 V
1 Phase, 2-Wire 480 V	424 V	440 V	500 V	508 V
1 Phase, 2-Wire 600 V	530 V	550 V	625 V	635 V
Three-phase systems				
3 Phase (Wye), 4-Wire 120/208 V	110/190 V	112/194 V	125/216 V	127/220 V
3 Phase (Wye), 4-Wire 277/480 V	245/424 V	254/440 V	288/500 V	293/508 V
3 Phase (Wye), 4-Wire 347/600 V	306/530 V	318/550 V	360/625 V	367/635 V
3 Phase (Wye), 4-Wire 2400/4160 V	±6 per cent of nominal voltage			
3 Phase (Wye), 3-Wire 240 V, 480 V, 600 V	Refer to respective single-phase operating ranges			

5.2.4 Harmonic Loading and Distortion

5.2.4.1 The customer shall notify FortisAlberta when harmonic-generating loads, such as variable frequency drive (VFD) motors, are added to the utility transformer. Harmonic emission limits to the distribution system can be found in the *FortisAlberta Power Quality Specifications*. All customers shall comply with these limits, based on FortisAlberta recommendations and adaptations from the IEEE 519-2022, *IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems* [B3] and CSA 61000-3-6, *Electromagnetic Compatibility, Part 3-6: Limits – Assessment of Emission Limits for the Connection of Distorting Installations to MV, HV and EHV Power Systems* [B4].

5.2.4.2 Depending on the harmonic levels, the utility transformer may have to be de-rated and replaced with a larger transformer to accommodate the additional harmonic emissions. As explained in IEEE C57.110-2018 [B5], under harmonic conditions, transformers experience additional heating and stress, and de-rating may be required. The customer shall be responsible for any incremental costs associated with the change.

5.2.5 Power Factor

5.2.5.1 The customer shall design, install and operate their facilities to maintain a power factor of no less than 0.9. FortisAlberta may require customers who do not meet this requirement to furnish, install and maintain corrective equipment at no cost to FortisAlberta.

5.2.6 Electrical Protection of Customer Equipment

5.2.6.1 FortisAlberta does not assume responsibility for the electrical protection of customer-owned equipment, including single-phasing protection. It is the customer's responsibility to install electrical protection for their facilities in accordance with the Canadian Electrical Code, Part 1[B1].

5.2.7 Electronic Loads

5.2.7.1 The customer is responsible for protecting all sensitive electronic loads from transients caused by events such as lightning strikes or utility switching.

5.3 Alberta Safety Codes Act and Associated Regulations

5.3.1 FortisAlberta designs electrical facilities that comply with requirements set out in the Alberta Electrical Utilities Code (AEUC) [B6], which, in turn, amends the Canadian Electrical Code, Part 3 (CSA C22.3 No.1: *Overhead Systems* and CSA C22.3 No. 7: *Underground Systems*) [B7] [B8].

These facilities shall be under the *care and control* of the electrical utility. Electrical facilities built by a customer, an agent representing the customer or a builder shall comply with the requirements of the Canadian Electrical Code, Part 1: *Safety Standard for Electrical Installations* (CSA C22.1) [B1].

These facilities shall be under the care and control of the customer and are subject to inspection by the local municipality or authority having jurisdiction.

5.3.2 Demarcation

5.3.2.1 The demarcation point refers to the service connection (or entry) interface between FortisAlberta's infrastructure and the customer's installation. This point—defined by physical connection or designated location—shall be established at the sole discretion of FortisAlberta. Typical configurations for residential overhead and underground service demarcation points are illustrated in Figures 11, 12, 14, and 15. Section 7 of this guide details the connection points applicable to FortisAlberta's available service configurations.

5.3.3 Seals and Locks on Supply Equipment

5.3.3.1 To ensure that only authorized personnel have access to critical equipment, seals and locks are placed on components located on the line side of the utility meter. This includes items such as splitters, instrument transformer compartments, meters, metering compartments, conduit fittings, customer service boxes without fuses and both sides of generator transfer devices mounted on the meter socket.

Service boxes containing customer fuses will not be sealed, allowing customers access as needed. Unauthorized removal of a seal or lock is a violation of the Alberta Electric Utilities Act [B9], and penalties may be enforced in accordance with provincial law. If a seal needs to be removed for electrical wiring alterations, FortisAlberta shall either remove the seal or provide authorization

following advance notice. After completing the work, the customer or their representative shall inform FortisAlberta so the service can be resealed.

5.4 Customer Service Connection

5.4.1 FortisAlberta will not connect or allow connection to the electrical utility system unless the following criteria are met:

- The point of attachment for supply or customer service conductors meets the vertical ground clearance requirements specified in the Canadian Electrical Code, Part 1, Rule 6-112, and the applicable rules of Section 12 [B1].
- The metering equipment and location are acceptable to FortisAlberta.
- The customer's service panel covers are in place.
  Note: Covers for electrical service entrance boxes shall be in place to ensure there are no exposed energized conductors or parts.
- The customer's service is grounded as per Section 10 of the Canadian Electrical Code, Part 1 [B1].
- FortisAlberta has assurance from the owner or the owner's agent that the installation is ready for connection and no obvious hazards exist.
- FortisAlberta has received a paper copy of a valid electrical permit or authorization issued by the inspection authority having jurisdiction (see Annex A.1: Electrical Service, Connection Authorization Form).

Note: For existing service re-connections, a re-inspection may be performed at FortisAlberta's discretion.

Note: A valid permit shall include the safety code officer's name, designation number and agency, including the intended purpose (e.g., service connection).

Note: Federal jurisdictions, (e.g., national parks, First Nations, military bases) do not require a permit unless determined by the authority of that jurisdiction. Installations shall still abide by the requirements outlined in this guide.

Note: FortisAlberta will not police or enforce the Canadian Electrical Code, Part 1 [B1], unless the deficiency is an apparent safety hazard to the customer or FortisAlberta employees. The customer may be responsible for covering costs incurred by FortisAlberta or a third party to correct service installations that do not meet proper requirements.

5.5 Safety Requirements

5.5.1 FortisAlberta reserves the right to refuse energizing any service or meter installation if on-site conditions are deemed unsafe or equipment is inaccessible. If a site is deemed unsafe by a FortisAlberta representative, the facility owner shall resolve the safety issues before FortisAlberta will energize the installation.

5.6 Metering Location and Mounting

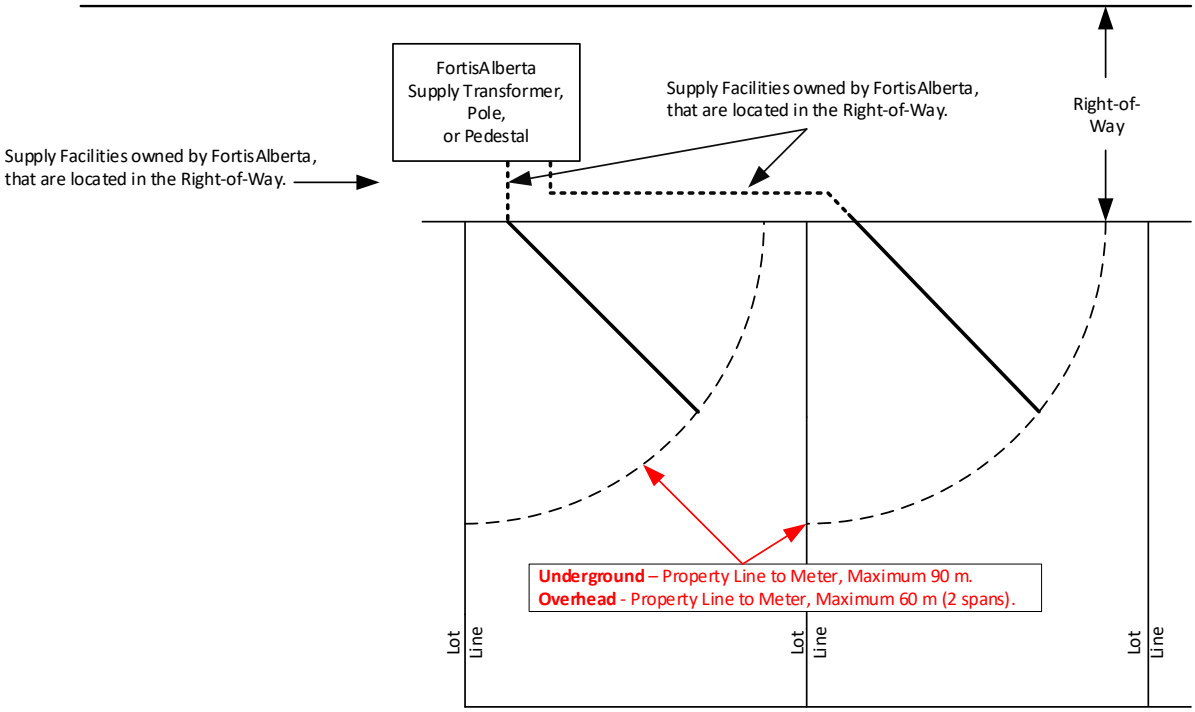
5.6.1 Meters and metering equipment shall be installed in accordance with the Canadian Electrical Code, Part 1: Rule 2-200 [B1].

5.6.2 Customer-owned meter sockets or equipment shall not be mounted on FortisAlberta-owned poles, structures or equipment, nor within a 4-metre (13-foot) radius of any FortisAlberta owned facilities or structures.

5.6.3 The meter shall be located not more than the following distances from the front property line or FortisAlberta supply service transformer if it is located on customer property as shown in Figure 1.

- 60 m (197 ft) for overhead services
- 90 m (295 ft) for underground services

For all residential lots or acreages with service drops exceeding 60 m (197 ft) for overhead services or 90 m (295 ft) for underground services on customer property, Lot Line Metering shall be installed as per Section 5.7.



NOTES:
An additional 5 m of secondary cable is permitted to reach the height of any required connection.

Figure 1 – Meter allowable distance from property line

5.6.4 FortisAlberta meters shall be located upstream from any customer step-down transformer. Exceptions to this rule require written approval, which may be granted for developments that include a mix of commercial and residential services of differing supply voltages, where metering provisions require meters to be installed downstream of a customer-installed step-down transformer.

5.6.5 The meter shall not be located in low areas prone to standing water and the soil shall be compacted to prevent workers from sinking into soft ground.

5.6.6 The meter shall not be located below grade or in areas subject to flooding.

5.6.7 The meter shall be level on both the horizontal and vertical planes.

5.6.8 The meter shall be free from severe or continual vibration.

5.6.9 The meter cannot be recessed into walls, enclosed, boxed in or otherwise obstructed in a way that impedes its installation, removal, reading or testing.

5.6.10 A minimum of 1 m (3.3 ft) working space by 2.2 m (6.6 ft) high, is required in front of all electrical equipment and to the sides and back where access is required (additional requirements are listed in Canadian Electrical Code, Part 1 Rule 2-308, 2-310 and 2-314 [B1]).

5.6.11 FortisAlberta meters shall not be located in carports, breezeways or under sundecks or balconies.

5.6.12 FortisAlberta meters shall be located in clean and easily accessible areas. They shall never be placed in locations that pose hazards to individuals who are installing, maintaining or reading the metering equipment. Hazardous locations are defined as areas that involve moving machinery, dust, vibration, fumes, water or moisture, extreme heat or spaces that are restricted in width or height.

5.6.13 Meters shall be installed in areas within the operating ambient temperature or humidity rating of the equipment.

5.6.14 FortisAlberta metering shall be located at a sufficient distance from biologically sensitive areas, such as poultry or livestock facilities. This is to minimize the risk of infectious diseases being transmitted to or from farms by FortisAlberta employees, contractors, equipment or vehicles, and to reduce exposure to airborne biochemical corrosive agents.

5.6.15 Meters shall be mounted in accordance with the heights outlined in Table 6. The specified minimum height shall be maintained even when a permanent structure, such as a deck, is built in the clear access area of the meter.

5.6.16 Meters shall be located 1 m (3.3 ft) away from any vapour producing outlets, such as natural gas meters (with an ANSI Z21.80/CSA 6.22-certified overpressure protection device or a CSA 6.18-certified LR-OPCO service regulators with limited relief). For natural gas and propane services without overpressure protection or limited relief devices, the distance shall be increased to 3 m (10 ft). For dryer vents, furnace exhaust vents, hot water tank exhaust vents and building openings, such as windows and doors, refer to Drawing SMG 2.16.4 on page 2.

Table 6 – Meter Mounting Height Requirements

Application	Outdoor (Above Final Grade)	Indoor (Above Floor)
* Residential Self-contained Meters	1.5 m (59 in) min. 1.8 m (71 in) max.	0.65 m (25.5 in) min. 1.8 m (7 in) max
*Multi Residential Self-contained Meters (two or more dwelling units)	1.5 m (59 in) min. 1.8 m (71 in) max.	0.65 m (25.5 in) min. 1.8 m (71 in) max.
*Multi Customer Metering System (*Developments must be 24 units or larger*)		1.5 m (59 in) min. 1.8 m (71 in) max.
*Commercial Self-contained Meters	1.5 m (59 in) min. 1.8 m (71 in) max.	0.65 m (25.5 in) min. 1.8 m (71 in) max.

*Measurements are to the centre line of the meter.

5.7 Lot Line Metering

5.7.1 **Overhead service**: Lot Line Metering shall be installed for all residential lots or rural subdivisions where the overhead service drop feeding the meter exceeds 60 m (197 ft) on customer property. The meter shall be mounted on a pedestal or suitable structure within 1.5 m (5 ft) of the front property line and at least 4 m (13 ft) from FortisAlberta's supply service pole. Exceptions may be granted if terrain conditions create installation challenges.

5.7.2 **Underground service:** Lot Line Metering shall be installed for all residential lots or rural subdivisions where the underground service drop that feeds the meter exceeds 90 m (295 ft) from the property line. The meter shall be mounted on a pedestal or suitable structure within 1.5 m (5 ft) of the front property line and at least 4 m (13 ft) from FortisAlberta's supply service pole. Exceptions may be granted if terrain conditions create installation challenges.

This "Lot Line Metering" removes any restrictions on secondary conductor length, but not voltage drop requirements of Section 5.20. A breaker panel is not required at the Lot Line Metering location unless there is a decrease in conductor size or branch circuit(s) are connected at the meter pedestal (refer to Drawing SMG 2.1, page 2 and SMG 2.1, page 3).

5.8 Box Location

5.8.1 Junction boxes or splitter boxes shall not be installed upstream of the FortisAlberta meter or service disconnect for any residential, rural or farm metering installation.

5.8.2 The instrument transformer enclosure **cannot** be used as a splitter box.

5.9 Type LB Fitting

5.9.1 Type LB or similar fittings are not permitted prior to the meter for residential, FortisAlberta-supplied rural pole or farm meter installations. Special permission from FortisAlberta is required before installation and may be subject to specific conditions (see Section 5.27).

5.10 Access to Metering Equipment

5.10.1 FortisAlberta staff shall have reasonable access to all metering equipment for changing, testing and reading. If access is restricted due to locked doors, FortisAlberta may request a key. FortisAlberta

may install a lockbox on site to store the key. FortisAlberta is not liable if the lockbox is damaged or stolen.

5.11 CSA Approved Device and Meter Socket Requirement

5.11.1 Meter sockets and any additions (e.g., isolated neutral blocks, additional lugs) shall be CSA approved. Any additions shall be supplied by the meter socket manufacturer.

5.11.2 Ringless meter sockets and sockets with current bypass switches (automatic circuit closures) are not permitted for metering at any installation.

5.12 Service Entrance Equipment Requirements

5.12.1 All service entrance equipment shall be installed in accordance with Canadian Electrical Code, Part 1, Section 6 [B1], and shall comply with the following requirements:

- Metered and un-metered conductors shall not run in the same conduit or raceway.
- Service entrance equipment shall have hinged doors over all bare electrical parts. Outer and inner doors shall open left or right to at least 90 degrees, unless horizontally mounted splitter boxes are used, where doors must open downward.
- Hinged doors ahead of the metering point require sealing screws. Barriers shall be installed between metered and unmetered conductors and between sections reserved for customer use and those designated for FortisAlberta.
- Approved distribution panels located ahead of FortisAlberta's metering shall have provisions for sealing with a wire seal in opposing corners of each removable cover section.

5.13 Multiple Meters

5.13.1 Under Rule 6-102 of the Canadian Electrical Code, Part 1 [B1], each building shall receive a single supply service of the same voltage. However, under specific circumstances, additional supply services may be approved by the local inspection authority if the following criteria are met.

5.13.2 For commercial establishments where multiple businesses share a building, complex structures or fully self-contained occupancies, each occupancy shall:

- Have a fire separation that meets the Alberta Building Code
- Have a separate entrance with direct ground-level access
- Not be located one above the other

5.13.3 If additional supply services are permitted, all services shall come from the same supply transformer unless they have different voltages or electrical characteristics. See Section 5.14 on Meter Grouping for further guidance.

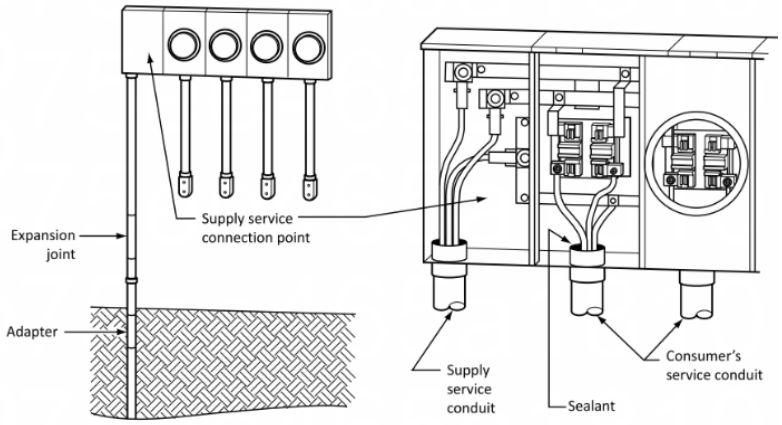


Figure 2 – Example of a consumer's service subdivision from a single supply service (Source: *Canadian Electrical Code, Part 1, Handbook*)

5.13.4 See Section 8.5 for additional requirements on multiple metering for residential services.

5.14 Meter Grouping

5.14.1 To comply with the Canadian Electrical Code, Part 1, Rule 6-104 [B1], the number of consumer services with the same voltage and characteristics terminating at a single supply service on any building shall not exceed four. When multiple meters are installed on a building, they shall be grouped together on the exterior corner closest to the point of supply to facilitate a single supply service connection.

5.14.2 For underground services, multiple meters shall be installed in a duplex, triplex or fourplex meter base. If more than four meters are required, approval is needed from the local inspection authority.

5.14.3 For overhead services, two or more service masts or meter bases may be used to maintain a single service drop supply from FortisAlberta. Multiple service masts shall be approved by the local inspection authority and FortisAlberta for multiple meter base installations.

5.14.4 The design of the service masts shall comply with the Canadian Electrical Code, Part 1 [B1], and service conductors entering each mast shall be identified. A duplex meter base supplied in a single mast is also acceptable. Up to four additional meter bases may be used unless a deviation is approved by the local inspection authority.

5.15 Customer-Owned Secondary Service Poles

5.15.1 For services rated below 200 A and 600 V, FortisAlberta typically supplies, installs and maintains an overhead supply service line up to 60 m (197 ft) in length, or two spans of 30 m (98 ft) each, measured from the front property line or from a service transformer pole if located on the customer's property. This includes any service poles situated upstream of the meter socket. Where the service length exceeds 60 m (197 ft), Lot Line Metering shall be implemented, as specified in Section 5.7.

5.15.2 If continuing from the property line with an overhead supply service line, the customer shall supply, install, and maintain the service poles and overhead service entrance conductors (600 V, type NS-75 or open wire 75^{0}C poly-covered conductors) in compliance with the following requirements:

- Pentachlorophenol, or Penta-treated, brown poles are not acceptable.

- Pole setting depth shall be at least 10 per cent of the pole height plus 0.6 m (2 ft). For example, the top of a 9.15 m (30 ft) pole shall be 7.6 m (25 ft) above grade.
- The service entrance conductors on private property shall maintain adequate clearances from the property line to prevent interference with existing and future development on adjacent properties. Clearances shall meet the Canadian Electrical Code, Part 1, Rules 6-112 and 12-310 [B1].

Farms are considered commercia/industrial premises in this context.

5.15.3 A customer-owned meter socket shall be mounted on a customer-owned pole or structure.

5.16 Electrical Equipment Room Requirements

5.16.1 The preferred location for electrical rooms housing FortisAlberta metering is at ground level, if possible, with outdoor access. In all cases, the following requirements shall be met:

- Working space – A minimum of 1 m (3.3 ft) of working space by 2.2 m (7.2 ft) in height is required in front of all electrical equipment and on the sides and back where access is needed. Additional requirements are outlined in the Canadian Electrical Code, Part 1, Rules 2-308 and 2-314 [B1]). Electrical rooms shall not be located in a bathroom or stairway.
- Entrance and exit – A passageway at least 1 m (3.3 ft) wide by 2.2 m (7.2 ft) high shall be maintained as an entrance or exit from all electrical areas. Additional requirements are outlined in the Canadian Electrical Code, Part 1, Rule 2-310 [B1].
- Proximity to other equipment – Water, sewer, gas or other pipes and equipment unrelated to the electrical installation shall not be mounted directly above electrical equipment or encroach on minimum working space.
- Hazardous locations – Electrical equipment shall not be placed in areas hazardous to workers or the metering equipment. This includes moving machinery, dust, vibration, fumes, water, humidity and H2S.
- Lighting and ventilation – Electrical rooms shall have adequate lighting and ventilation for to ensure safe working conditions, as outlined in the Canadian Electrical Code, Part 1, Rule 2-320 and 2-324 [B1].
- Electrical outlet – A convenience outlet shall be installed and available for FortisAlberta's use during any site work.

5.17 Customer Instrumentation and Protection

5.17.1 All metering circuits, transfer relays, fire alarms and step-down transformers shall be connected on the load side of the FortisAlberta meter. These circuits cannot be connected to FortisAlberta metering circuits, and all equipment shall be mounted separately from the cabinets reserved for FortisAlberta use.

Electronics built into the main breaker, lightning arrestors and passive surge suppressors are permitted in the main breaker section of the customer's switchgear and may be connected ahead of the FortisAlberta meter.

5.18 Service Disconnect and Reconnects

5.18.1 All disconnects and reconnects shall have prior approval of FortisAlberta. If no electrical permit is present, reconnection may proceed after the *Reconnection Authorization Form* (see Annex A.1) has been signed, as required.

Electricians shall print the form and complete three copies—one for the customer, one for the electrician and one for FortisAlberta. The signed copy for FortisAlberta shall be left in the meter socket or in a location agreed upon with FortisAlberta before reconnection.

5.18.2 A qualified electrician may disconnect an existing overhead electrical service only if it does not exceed 200 A and 300 V (L-L). Disconnection requires prior approval from FortisAlberta and must be done by cutting the hot conductors at the weatherhead.

If the meter needs to be removed, only accredited FortisAlberta staff are authorized by Measurement Canada to handle a revenue meter. The reconnection shall be completed by FortisAlberta.

5.18.3 All disconnects and reconnects, except for the overhead service mentioned above, shall be performed only by FortisAlberta.

5.19 Modifications to Existing Services

5.19.1 Customers planning any of the following modifications or additions to their electrical system shall comply with current requirements:

- Increases in load
- Increases in service entrance conductor size
- Installation of backup power supplies
- Installation of a transfer switch

5.19.2 To ensure metering accuracy, only FortisAlberta staff trained under federal regulations S-A-01 [B10] (*Criteria for the Accreditation of Organizations to Perform Inspections Pursuant to the Electricity and Gas Inspection Act and the Weights and Measures Act*) are authorized to install, remove or handle meters.

All meter recertification costs and damages resulting from unauthorized removal, installation or handling of meters shall be covered by the person(s) responsible.

5.20 Customer-Owned Service Entrance Conductor Voltage Drop Requirements

5.20.1 Customers are responsible for voltage drop calculations, which shall comply with the Canadian Electrical Code, Part 1, Rule 8-102 [B1]. For installations where the customer supplies and installs the service entrance conductors, they shall ensure compliance with this rule.

This includes sizing the conductors to limit voltage drop to 3 per cent at the service entrance. The service entrance is defined as the point where FortisAlberta's supply service makes its final connection to the customer's service entrance conductors and the line side of the customer's service box or its equivalent.

5.21 Solidly Grounded Systems

5.21.1 FortisAlberta supply service transformers are equipped for a 4-wire, solidly grounded wye service, in accordance with the Canadian Electrical Code, Part 1, Rules 10-206 and 10-210 [B1].

For a 4-wire solidly grounded system, the grounded conductor shall be connected directly to the supply service transformer X_O bushing—not the grounding bus of the pad-mounted transformer or the case ground of a pad-mounted or pole-mounted transformer.

It shall be a continuous length, run into the meter or main breaker, and be bonded to the ground electrode at a single point at the customer's service, as specified in the Canadian Electrical Code, Part 1, Rule 10-210 [B1].

Any deviation from this requirement shall be prearranged and approved in writing by FortisAlberta. Otherwise, the service will not be energized.

5.21.2 For 3-wire services, the grounded conductor shall be insulated when neutral currents are present (where-line-to-neutral loads are served). If no neutral currents are present, the bare bonding conductor in the armoured cable may be used as the grounded conductor on the line side of the supply service, provided it is sized according to the Canadian Electricals Code, Part 1, Rule 10-208 (2), Rule 10-616 and Table 16 [B1].

In both cases, the grounded conductor (neutral) shall be connected to the X_O bushing of the supply service transformer.

5.21.3 If the customer chooses to use a 4-wire armoured cable with a bare bonding conductor, the bonding conductor shall be cut off and insulated at the supply service transformer end.

5.21.4 In a single-point grounding system, the grounded conductor at the main service disconnect shall not be bonded to any non–current-carrying conductive parts of electrical equipment on either the supply side or the load side beyond the designated grounding point. All neutral conductors shall remain isolated from ground throughout the system.

5.21.5 An isolated neutral block is required at the metering point (self-contained or instrument type), in accordance with the Canadian Electrical Code, Part I, Rule 10-210. The neutral block shall remain isolated unless the metering point is designated as the system's main service disconnect location, in which case bonding to ground is permitted at that point.

5.21.6 Refer to Drawing SMG 2.13.5, page 1 and SMG 2.13.5, page 2 for three-phase overhead oilfield and irrigation service details.

5.22 Impedance Grounded Systems

5.22.1 FortisAlberta provides all three-phase services with a 4-wire, solidly grounded wye service, with each service grounded at the transformer Xo bushing, unless otherwise specified during the application process.

If the customer plans to install an impedance-grounded system, neutral grounding resistor (NGR) or ground detection system, FortisAlberta will not ground the Xo bushing or interconnect the Ho and Xo bushings of the service transformer. Instead, the Ho bushing shall be grounded separately.

This service can be metered as a 3-phase, 4-wire system. The customer shall provide FortisAlberta with the rating and location of the grounding resistor.

5.22.2 NGRs are not permitted on services with self-contained meters without written approval from FortisAlberta Metering Standards.

5.22.3 Refer to Drawing SMG 2.13.1 through SMG 2.13.4 for three-phase underground service details.

5.23 Services That Do Not Require Metering

5.23.1 FortisAlberta requires all services to be metered, except in certain cases such as emergency warning sirens, municipally owned security cameras and small cellular carrier equipment.

5.24 Self-Contained Metering

5.24.1 The maximum limits for self-contained metering are:

- 200 A per phase and/or
- 600 V phase to phase and/or
- 130 HP continuous-duty motor load at 480 V phase to phase (Canadian Electrical Code, Part 1, Rules 28-106 and 28-704 [B1])
- All customers, including microgeneration customers, connecting to FortisAlberta's distribution system shall not exceed a maximum export output of 160 A (80 per cent of 200 A). Any damage caused by overloading, along with associated repair costs, will be charged to the service account holder.

5.24.2 Self-contained metering shall be used for all services wired for a 200-amp service entrance or less, except for services supplied by a dedicated padmount transformer, where the customer has the option to pay for metering attached to the transformer. padmount metering will be quoted as an Optional Facility.

5.24.3 If service requirements exceed the above maximum limits, refer to Section 5.27, *Instrument Metering*. Any service exceeding these limits shall be re-wired to instrument metering at the customer's expense, or the service will be disconnected.

Table 7 – Standard Self-Contained Socket Connections

Self-Contained Meters (Up to 200 A)						
Voltage (V)	**Phase**	**Wire**	**Connection**	**Socket**	**Figure**	**Remarks**
120/240	1	3		4 JAW	Figure 3	
240/480	1	3		4 JAW	Figure 3	
120/208	2	3	Network	5 JAW	Figure 4	5th jaw at 9 o'clock Residential multi-meter sites – Hot-sequence metered
120/208	3	4	Star	7 JAW	Figure 5 Figure 6	Single meter sites (Commercial) – Hot-sequence metered Commercial multi-meter sites – Cold-sequence metered
277/480	3	4	Star	7 JAW	Figure 5	Cold-sequence metered
347/600	3	4	Star	7 JAW	Figure 5	Cold-sequence metered

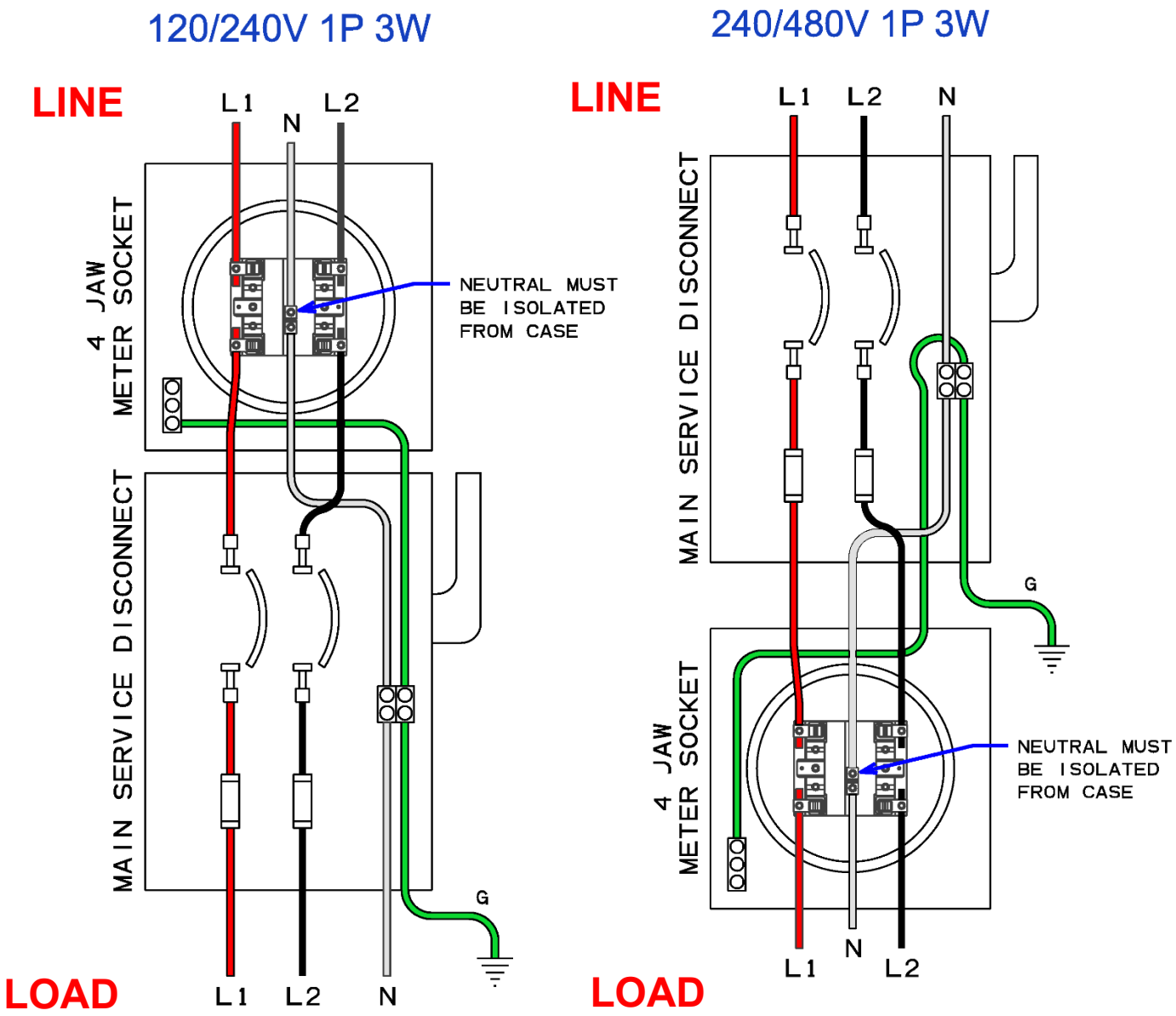


Figure 3 – Single-Phase, 3-Wire Circuit
120/240 V (*left, Hot-sequence metered, commercial or residential*) or 240/480 V (*right, Cold-sequence metered, commercial*) Self-Contained Meter Socket and Service Box Connection

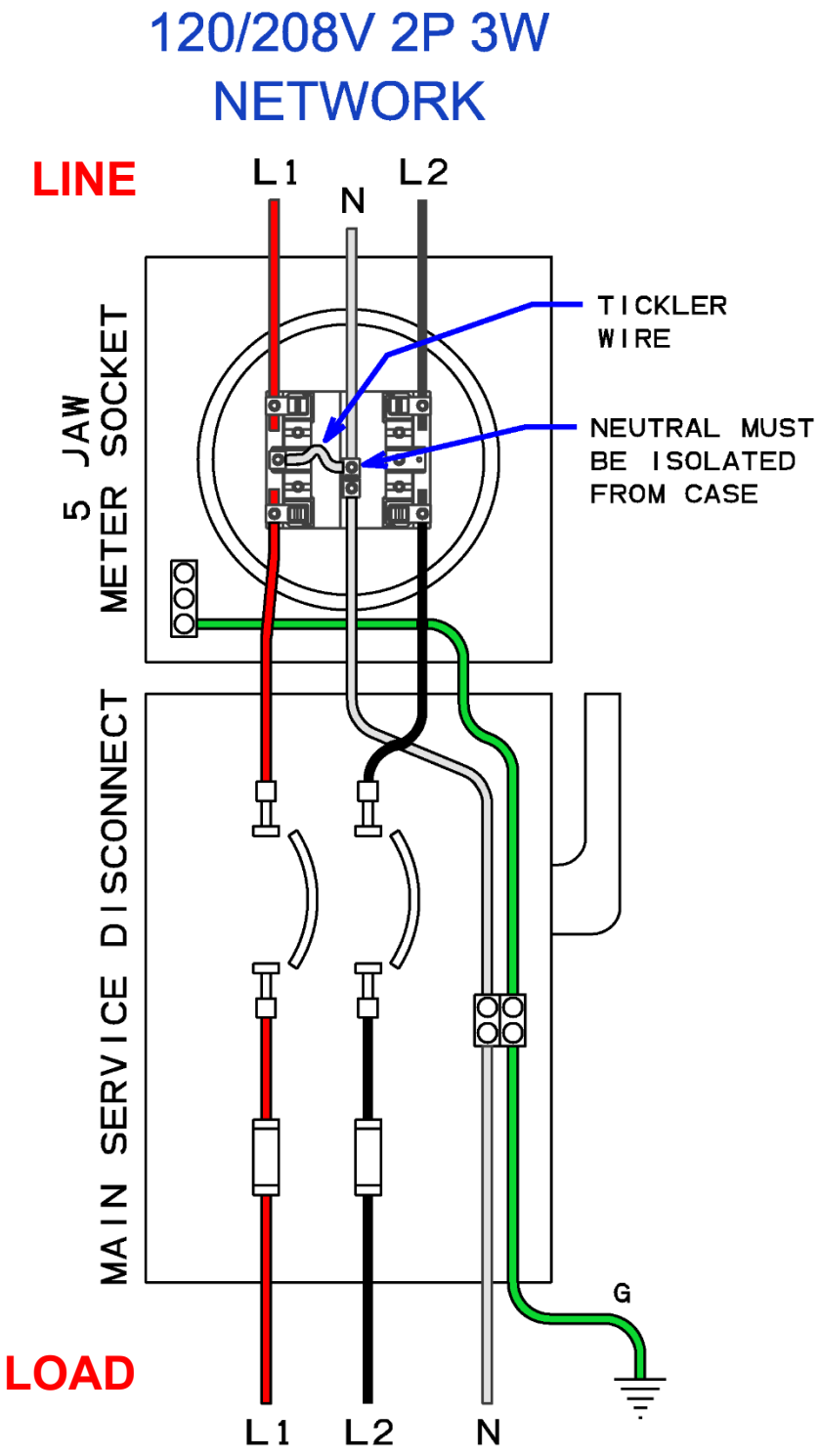


Figure 4 – Single-Phase, 3-Wire Network Circuit, 120/208 V, Self-Contained Meter Socket and Service Box Connection (*Hot-sequence metered, commercial or residential*)

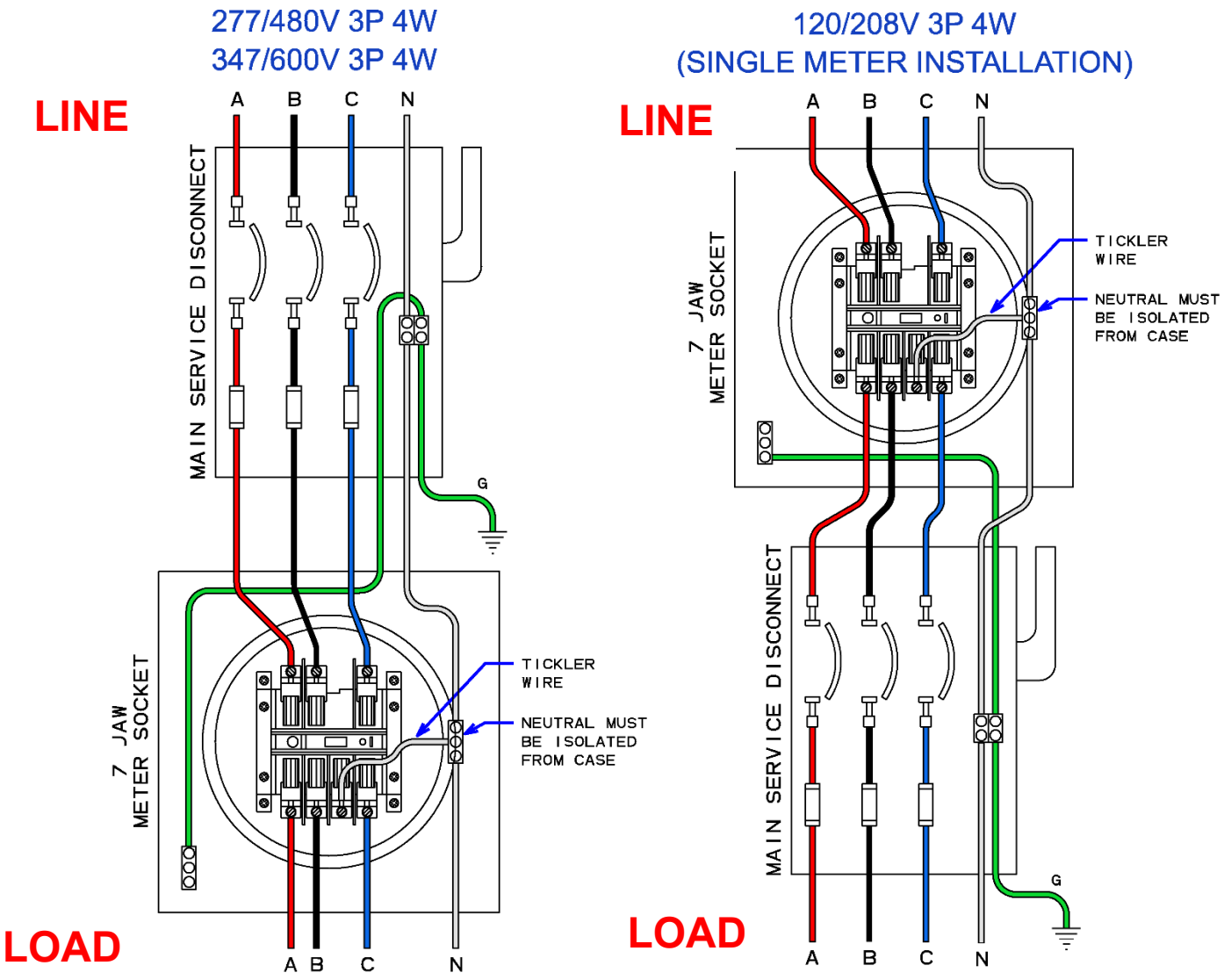


Figure 5 – Three-Phase, 4-Wire Circuit

277/480 or 347/600 V (*left, Cold-sequence metered, commercial*) or 120/208 V (*right, Hot-sequence metered, commercial*) Self-Contained Meter and Service Box Connection

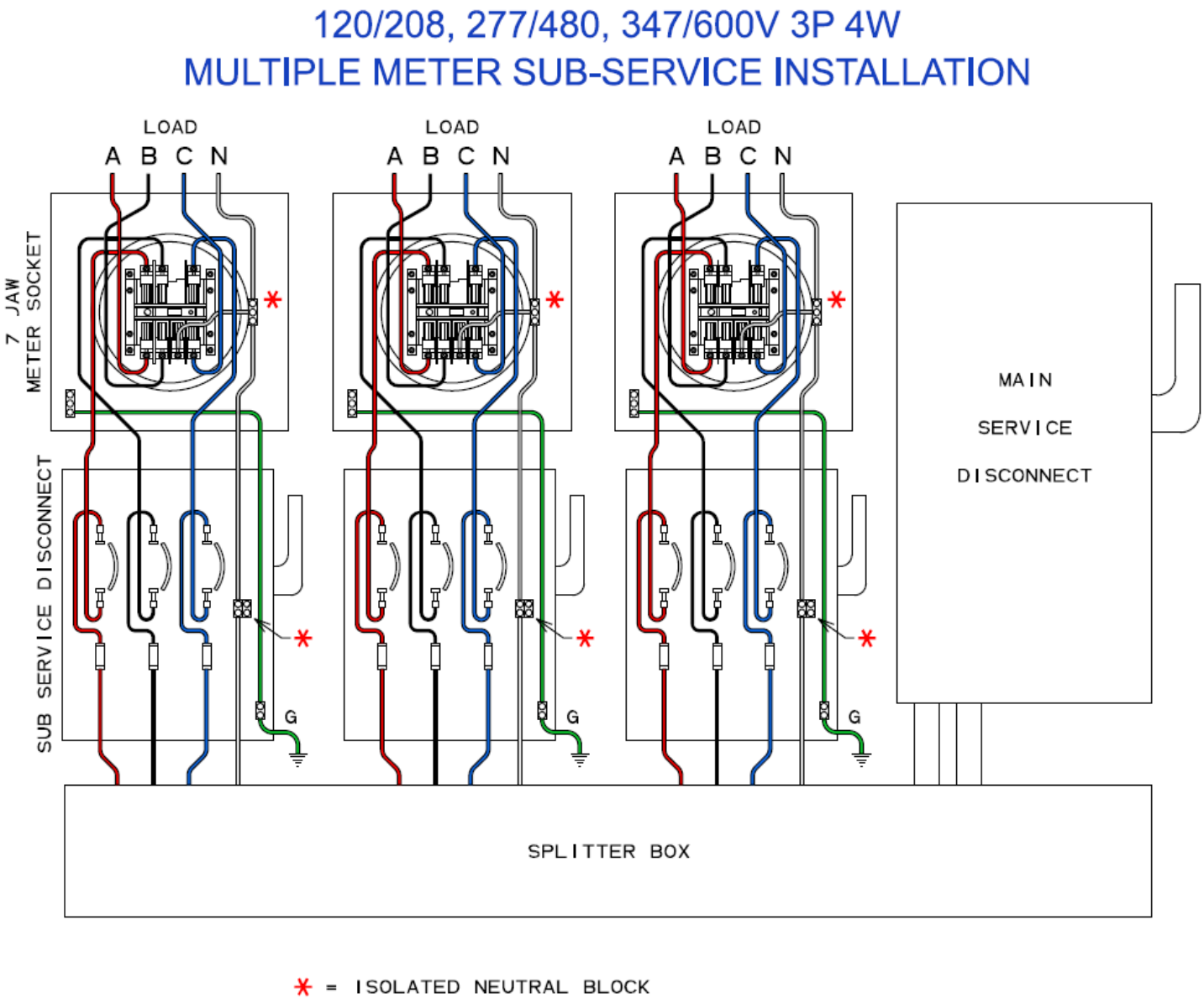


Figure 6 – Three-Phase, 4-Wire Multiple Meter Subservice Installation, Cold-sequence Metered

5.25 Microgeneration

5.25.1 Microgeneration customers with a 200-amp self-contained meter shall not connect generation with a maximum rated output exceeding 160 A (80 per cent of 200 A).

5.25.2 Microgeneration customers shall comply with Rule 64-112 of the Canadian Electrical Code, Part 1 [B1], which governs generation size limitations (e.g., photovoltaic) for interconnection.

5.25.3 Any damage caused by overloading, along with associated repair costs to FortisAlberta's supply system, will be charged to the service account holder.

5.25.4 See Section 13, *Microgeneration,* for additional requirements.

5.26 Self-Contained Metering, Customer Requirements

5.26.1 The customer is required to supply a meter socket complete with a screw-type sealing ring for FortisAlberta' s use. Sockets with bypass switches will not be accepted.

5.26.2 The customer is responsible for making all connections within the meter socket. The main service neutral shall be connected to the neutral socket lug or isolated neutral bock within the meter socket.

5.26.3 All neutral connections after the main service disconnect shall be isolated from ground (Canadian Electrical Code, Part 1, Rules 10-208 and 10-210 [B1]). For meter sockets located after the main disconnect, an isolated neutral block shall be used. NGRs are only permitted on services with a self-contained meter if written permission is obtained.

5.26.4 For single-phase 240/480 V services, the meter socket shall be located after the main breaker, with the neutral brought in and isolated from the case. A bonding conductor shall be connected to the meter encloser.

5.27 Instrument Metering

5.27.1 Instrument transformer-type metering is required for all services exceeding:

- 200 A per phase and/or
- 600 V phase-to-phase and/or
- 130 HP continuous-duty motor load at 480 V phase-to-phase (Canadian Electrical Code, Part 1, Rules 28-106 and 28-704 [B1]).

5.27.2 For services requiring instrument metering and supplied from a dedicated padmount transformer, FortisAlberta will install padmount metering.

5.27.3 Padmount metering (instrument) is standard when a service is supplied by a dedicated padmount transformer. Only one instrument metering setup can be installed on a transformer, and only one additional self-contained service (maximum one 250 kcmil conductor per phase) may be connected before the CTs to supply another service.

5.27.4 For services supplied from a pole-mounted transformer or a shared padmount transformer, instrument metering shall be installed in a location that meets the requirements outlined below.

5.27.5 Both the instrument meter socket and instrument transformer enclosure shall be:

- Either both indoors or both outdoors
- Located in the same room (if indoors)
- Connected by a maximum of 7 m (23 ft) of 31.8 mm (1 ¼ in) conduit between the meter socket and the instrument transformer enclosure.
- Connected using LB type fittings only when no other conduit routing options are available

- The instrument transformer enclosure and meter base shall be installed in the same room as the main disconnect that powers the respective meter. Additionally, the instrument transformer enclosure will be located within 3 m (9.8 ft) of the main disconnect.

5.27.6 Connection of Instrument Metering Equipment

5.27.6.1 The customer shall be responsible for the connection of the primary bars (CT primaries) of the supplied current transformers (CTs).

For service sizes rated at 1,000 A or less, the use of insulated conductors is permitted. Where rigid bus is employed, a short section of bus, complete with appropriately rated insulators, shall be installed on both the line and load sides of the CTs (refer to images in Table 10). The entire assembly, including the rigid bus and insulators, shall be CSA certified.

All electrical connections shall be torqued to the manufacturer's specified values. Conductors shall be shaped, formed and mechanically supported to minimize stress and tension on the CTs. Any CTs found to have bent, or damaged bars shall be replaced at the customer's expense.

5.27.6.2 For switchgear using bus bars, the neutral bus bar shall run from the main service disconnect into the instrument transformer enclosure and have a hole tapped for a #10-32 screw.

If this is not possible, a 25 mm (1 in) wide by 6.3 mm (¼ in) copper extension shall be brought into the instrument transformer enclosure and have a hole tapped for a #10-32 screw.

5.27.6.3 When insulated conductors are used instead of bus bars, an isolated neutral block shall be provided and connected to one or more of the neutral conductors, within the instrument transformer enclosure and have a screw type connection for a 14 AWG potential wire for the metering.

5.27.6.4 Unless an NGR is installed, all three-phase services shall be supplied as 4-wire solidly grounded wye. The grounded conductor, required by Canadian Electrical Code, Part 1 Rule 10-210 [B1] shall be run from the X_O bushing of the supply service transformer to the bonding point at the main service disconnect. When the neutral is not required beyond the bonding point, FortisAlberta will accept a minimum #6 AWG white insulated conductor, run from the bonding point to an isolated neutral block within the instrument transformer enclosure, for all indoor instrument metered installations (refer to Figure 8).

5.27.6.5 FortisAlberta shall make all secondary connections to potential transformers, currents transformers, fuse blocks and instrument meter sockets (refer to Figure 8).

5.27.7 Conduit Requirements

5.27.7.1 A metal conduit, (1 ¼ in) diameter and having a maximum length of 7 m (23 ft), is required between the instrument transformer enclosure and meter socket. This conduit shall be terminated with lock nuts and bushings. If LB's or similar conduit fittings must be used due to tight spaces, they shall be sealable with a wire seal and be clearly visible.

5.27.7.2 The conduit is for exclusive use of FortisAlberta. When it is necessary to route secondary metering conductors through compartments other than those reserved for FortisAlberta's use, a conduit (rigid PVC or EMT) shall run the full length through such compartments.

5.27.8 Grounding of Sockets and CT Cabinets

5.27.8.1 Each meter socket and CT cabinet shall be bonded to the system ground.

5.28 Instrument Meter Socket Specifications

5.28.1 Only FortisAlberta approved instrument meter sockets are permitted. Currently approved meter sockets are:

Table 8 – *Approved Instrument Meter Sockets*

Phase and Dimension	Voltage	Wire Connection	Socket Configuration	Manufacture	Catalogue Number	Figure	Notes
Single-Phase 51 Hx31 W cm (20 H x 12 W) in	120/240 240/480	3-Wire	6 Jaw c/w Test Switch	Thomas & Betts	CT106-SWL		*See Application Note* (a)
				Meter Device	602-C3040C6-953		*See Application Note* (a)
Single-Phase Residential 200 - 400 A $111_H x 33.8_W$ cm $(44_H x 13_W)$ in **Note: Service drop 90 m (295 ft) or less in length.**	120/240	3-Wire Max 1 × 600 kcmil Max 2 × 250 kcmil	6 Jaw c/w Test Switch & CT compartment to mount miniature window CTs only	Thomas & Betts	FA4B-6T "Instrument All-in-One" *No secondary splices or terminations allowed inside this unit. Source Bottom Entry only*		*See Application Note* (b)
Three-Phase $51_H x 31_{W\ cm}$ $(20_H x 12_W)_{\ in}$	120/208, 277/480, 347/600, Over 600	4-Wire, Wye	13 Jaw c/w Test Switch	Thomas & Betts	CT113-SWL		*See Application Note* (c)
	120/208, 277/480, 347/600, Over 600	4-Wire, Wye	13 Jaw c/ w Test Switch	Meter Device	602-C3040C-13-603		*See Application Note* (c)

Application Notes for Table 8

a) Unit is used with an instrument transformer enclosure for residential, commercial, and industrial indoor or outdoor installations.

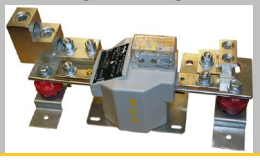
b) Unit is designed to be mounted on the outside of a building, fed underground via bottom entry and short load leads out the back. No splices or terminations are allowed inside this unit. It can be used for Lot Line Metering by using a splitter box mounted on the backside to facilitate connections to an underground service cable drop to a building. It shall be mounted so that the bottom is a minimum of 0.71 m (28 in) to 1.01 m (40 in) above finished grade.

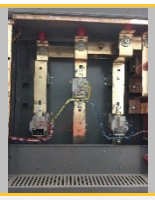
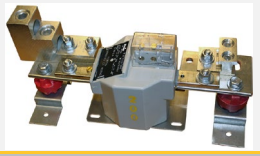
c) Unit is used with an instrument transformer enclosure for commercial and industrial indoor or outdoor installations.

Table 9 – Instrument Meter and CT Cabinet Mounting Heights

	Location	
	Outdoor	**Indoor**
Instrument Meter Socket Height ***(Measured to horizontal center of meter)***	1.5 m (59 in) min. 1.8 m (71 in) max.	0.95 m (37.5 in) min. 1.8 m (71 in) max.
	Outdoor	Indoor
Instrument CT Cabinet Height	0.9 m (35.5 in) Cabinet bottom min. 2 m (79 in) Cabinet top max.	15 mm (6 in) Cabinet bottom min. 2 m (79 in) Cabinet top max.

Table 10 – Required Instrument Transformer Enclosure Size

Type of Service	Service Size	Instrument Transformer Enclosure Size (mm / in) Min. sizes				Current Transformers Supplied by FortisAlberta		Required Design Material
Voltage	Amps	H	W	D	Gauge	Bar Type	Window Type	
120/240V 1-Phase 3-Wire	200-600	914 mm/ 36 in	610 mm/ 24 in	254 mm/ 10 in	16	2-2 Wire		Indoor or Outdoor CT cabinet 
120/240V 1-Phase 3-Wire *Note 1* Lot Line Metering	200-400	914 mm/ 36 in	610 mm/ 24 in	254 mm/ 10 in	18/16	2-2 Wire		NEMA 4 cabinet c/w Continuous Hinge & Pad Lockable Door See SMG. 2.1, page 3 of 3 
120/240V 1-Phase 3-Wire *Note 2* Single-Phase Residential	200-400	Part of FA4B-6T Microlectric Socket 1,111 x 338 x 214 mm/ 43 3/4 x 13 5/16 x 8 7/16 in (h/w/d)			16	_	2	FA4B-6T "Instrument All-in-One" [Note: Service drop 90 m (295 ft) or less in length] 
120/240V 1-Phase 3-Wire	400-800	914 mm/ 36 in	762 mm/ 30 in	254 mm/ 10 in	16	2-2 Wire		Indoor or Outdoor CT cabinet 
120/208Y 3-Phase 4-Wire	200-400	914 mm/ 36 in	760 mm/ 30 in	254 mm/ 10 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 
	600-800	1219 mm/ 48 in	914 mm/ 36 in	305 mm/ 12 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 

Type of Service	Service Size	Instrument Transformer Enclosure Size (mm / in) Min. sizes				Current Transformers Supplied by FortisAlberta		Required Design Material
	1000-1500	Distribution Centers c/w bus bars				3-2 Wire		
277/480Y 3-Phase 4-Wire	200-400	914 mm/ 36 in	762 mm/ 30 in	254 mm/ 10 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 
	600-800	1219 mm/ 48 in	914 mm/ 36 in	304 mm/ 12 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 
	800-2000	Distribution Centers c/w bus bars				3-2 Wire		
347/600Y 3-Phase 4-Wire	200-400	914 mm/ 36 in	762 mm/ 30 in	254 mm/ 10 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 
	600-800	1219 mm/ 48 in	914 mm/ 36 in	254 mm/ 12 in	16	3-2 Wire		Indoor or Outdoor CT cabinet 
	1000-4000	Distribution Centers c/w bus bars				3-2 Wire		

Note: Instrument transformer enclosure size are minimum dimensions.

(1) Lot Line Metering only, used with a CT106-SWL socket.

(2) Designed for residential use (line supply via bottom, load center back into house).

5.28.2 CT Enclosure Doors

5.28.2.1 The instrument transformer enclosure shall be equipped with vertically hinged door(s), which are non-removable in the closed position and equipped with stops to prevent the doors from accidentally dropping off the hinges in the open position.

5.28.2.2 These door(s) shall be equipped with metal latching means and be lockable with a FortisAlberta padlock.

5.28.3 Cover Plates

5.28.3.1 Cover plates are not acceptable on instrument transformers cabinets.

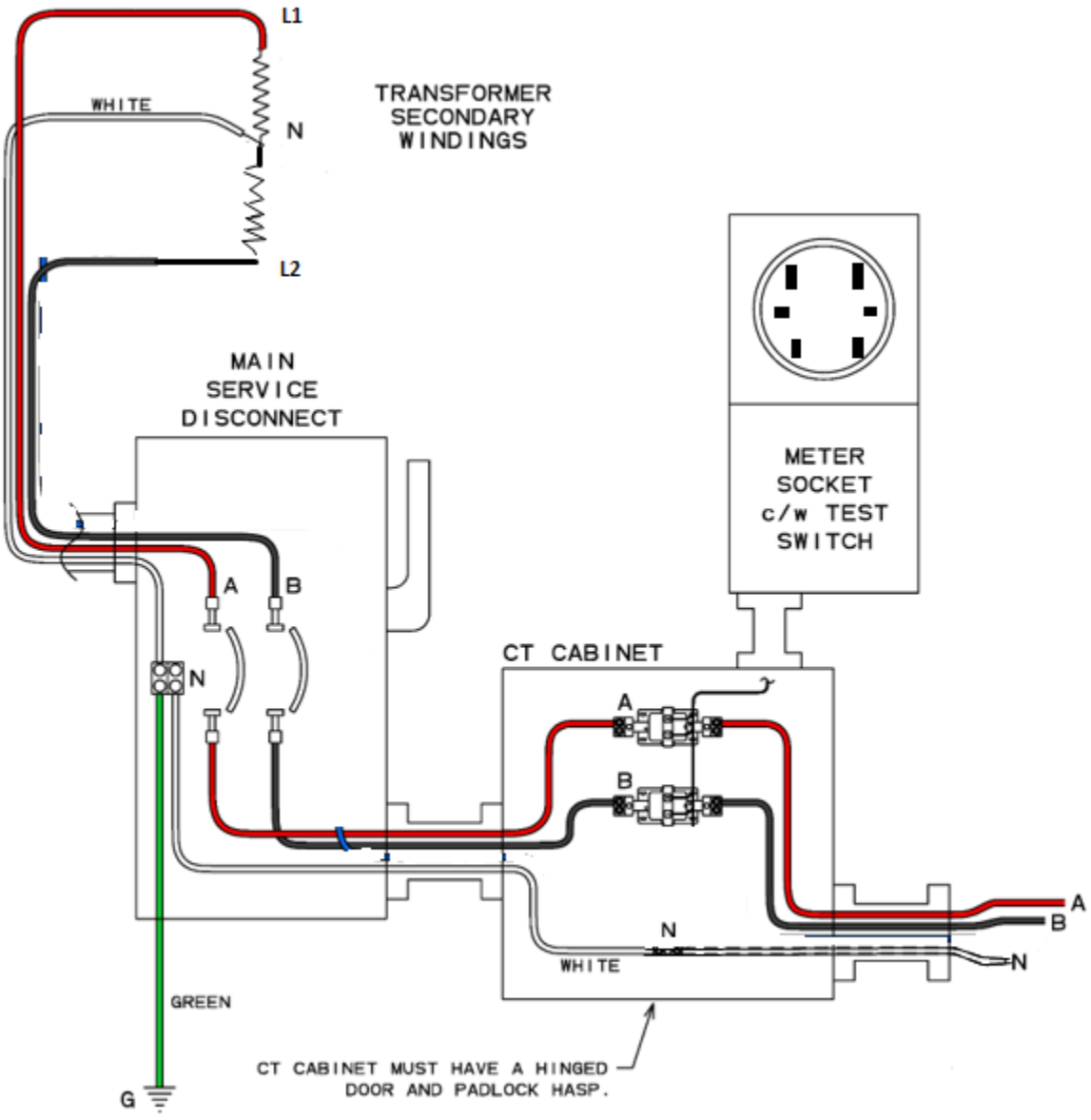


Figure 7 – Single-Phase, 3-Wire Instrument Metering, Non-Residential Wiring Detail. (Residential service will be Hot-sequence metered)

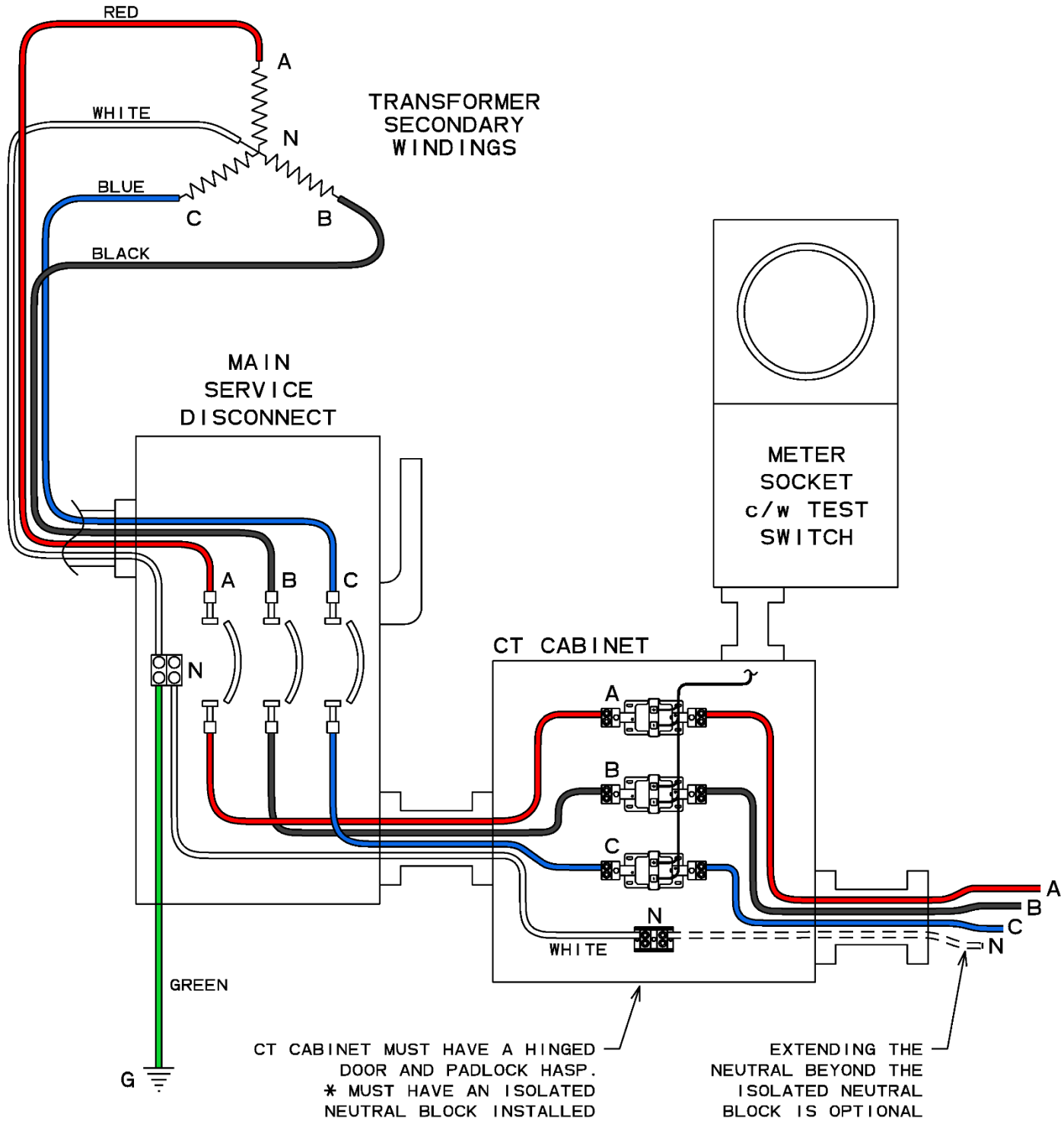


Figure 8 – Three-Phase, 4-Wire Wye Instrument Metering Wiring Detail

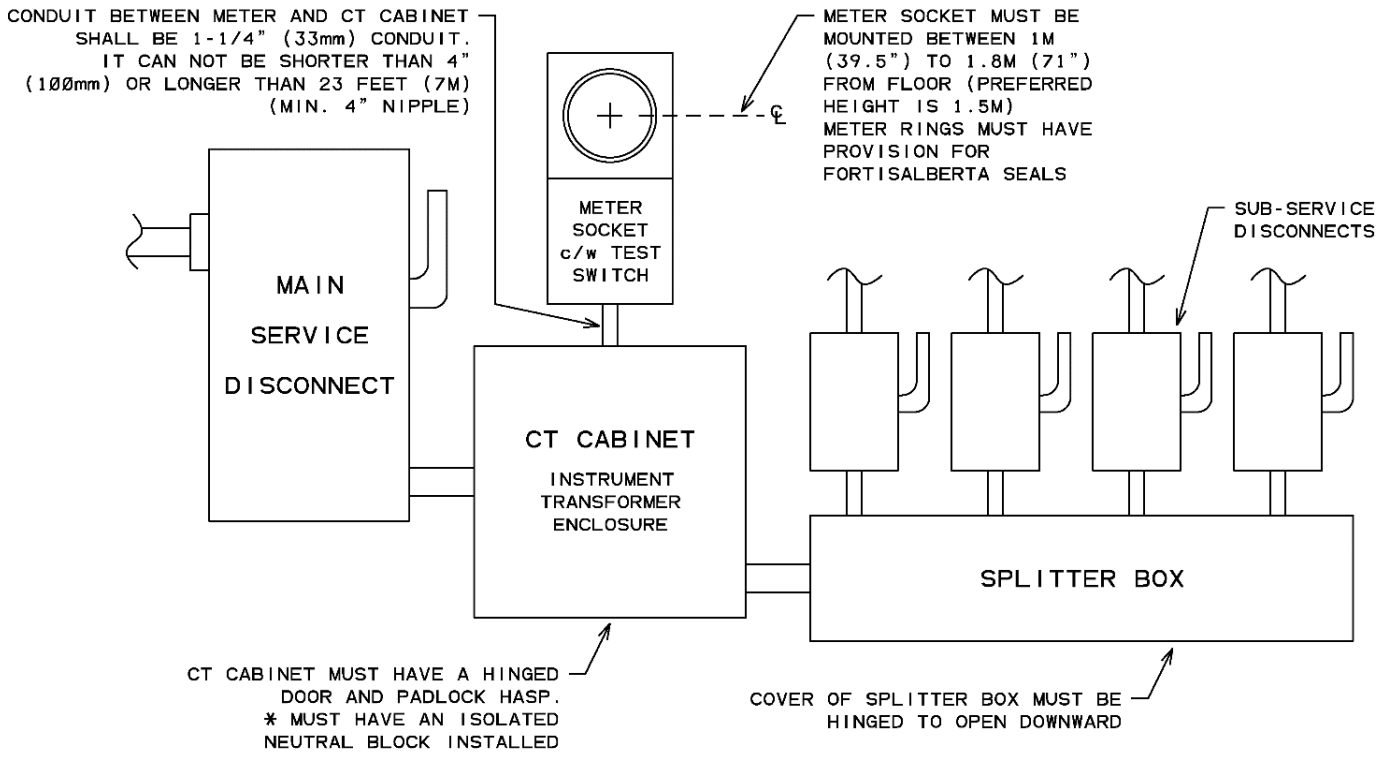


Figure 9 – Instrument Metering Layout

5.28.4 Indoor Instrument Transformer Enclosures

5.28.4.1 Indoor instrument transformer enclosures shall be:

- Mounted so the bottom of the enclosure is a minimum of 1.52 m (6 in) above the floor.
- Mounted so the top of the enclosure is a maximum of 2 m (78 in) above the floor.
- Maintain 112 mm (4 in) vertical separation from the bottom of the meter socket.

5.28.4.2 For instrument transformer cabinet sizes, refer to Table 10.

5.28.5 Outdoor Instrument Transformer Enclosures shall be:

- Mounted so the bottom of the enclosure is a minimum of 0.5 m (20 in) above the final grade.
- Mounted so the top of the enclosure is a maximum of 2 m (78 in) above the final grade.

Refer to Drawing SMG 2.16.4, page 2

5.28.5.1 A separate instrument transformer enclosure is required for each instrument transformer service.

5.28.5.2 For instrument transformer cabinet sizes, refer to Table 10.

5.28.6 Current Transformers (CTs)

5.28.6.1 Refer to Drawing SMG 2.16.5 for 2-wire current transformer dimensions drawings.

6. Non-Standard Services

6.1 Overview

6.1.1 For services where requirements of this guide cannot be met, the customer shall submit equipment drawings, specifications, and site plans to FortisAlberta Metering Standards for approval before ordering and installing service entrance equipment or associated equipment.

6.1.2 Drawings submitted shall include all metering-related equipment, such as service entrance equipment and metering enclosures. These drawings shall clearly indicate elevations and enclosure dimensions. In some cases, a hand-drawn sketch that clearly depicts the layout and dimensions may be acceptable.

6.1.3 FortisAlberta Metering Standards will evaluate the submitted documents and issue a ruling on the non-standard service. An approval letter shall be received before the service can be considered approved.

6.2 Approval

In case of a dispute, FortisAlberta staff will not honour verbal conversations. Prints and/or a letter approved by FortisAlberta Metering Standards are required prior to non-standard services energization. Any approval is only for the service in question and is not a general approval for future services.

FortisAlberta Metering Standards Contact Details
meteringstandards@fortisalberta.com

7. Project Overview

7.1 Overview

Section 7 outlines the general responsibilities and expectations for both the customer and FortisAlberta. Sections 8 to 11 detail the service requirements and responsibilities for various types of service extensions offered by FortisAlberta.

7.2 FortisAlberta Service Options:

a) Overhead Supply Service
b) Underground or Padmount Supply Service
c) Underground Supply (Secondary) Service
d) FortisAlberta-Supplied Rural Pole or Pedestal Meter Service

7.3 Service Types

7.3.1 Overhead Supply Service

Single-phase or three-phase service fed from an overhead power line originating from a supply service pole. Typical installations include residential homes and small commercial applications.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
Complete all work on the customer's property and building, including installation of the weatherhead and service attachment. Supply, install, own and maintain all intermediate poles and associated hardware, including racks, anchors, and downhauls, with only service entrance (secondary) conductors attached. This excludes supply service poles upstream of the metering point.	Complete all work on road and/or Utility Right-of-Way. When required, FortisAlberta will supply, install, own, and maintain an overhead supply service (secondary) powerline up to 60 m (197 ft) in length, on customer property, including any service poles located upstream of the metering point. Make the final connection at the supply service transformer or customer-supplied weatherhead. Supply, install, own and maintain all primary (high-voltage) facilities, including poles, conductors, transformers, and switches on road and/or Utility Right-of-Way.	Low-voltage terminals of the supply service transformer, weatherhead on pole or building.	Low-voltage terminals of the supply service transformer, weatherhead on pole or building.
When required, install instrument transformers and meter socket.	Supply and install revenue metering equipment. When required, supply instrument transformers.		
When required, supply, install and maintain a service entrance power line that exceeds the length of supply service power line provided by FortisAlberta.	Install and maintain all supply service poles, anchors, downhauls, and conductors located on the line side of the point of service.		
	Note: FortisAlberta owns and maintains all facilities including poles, anchors and downhauls on the line side of the point of service with primary conductors attached, overhead supply service conductors and revenue metering equipment.		

7.3.2 Underground or Padmount Supply Service

Single- or three-phase service supplied from a pad or ground mounted transformer located on private property. Typical installations include medium to large commercial applications, large homes, and multi-family sites.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
Complete civil work on the customer's property and, when necessary, on road and/or Utility Right-of-Way under FortisAlberta's supervision (see Annex C.1.1). This typically includes trenching, ducting, installing pull boxes, constructing concrete bases for pad-mounted equipment, grounding, and installing bollards as needed.	Complete all work on road and/or Utility Right-of-Way, and when necessary, supervise the customer's civil work in these areas.	Property line for residential sites.	Property line for residential sites. Low-voltage terminals of the supply service transformer for all other installations.
Supply and install service entrance (secondary) cables. Terminate all service entrance cables at the Low-voltage terminals of the pad-mounted transformer.	Supply, install and terminate all primary (high-voltage) cables. Supply and install all pad-mount equipment.		
When required, install instrument transformers.	Supply and install revenue metering equipment. When required, supply Instrument transformers		
Note: The customer owns and maintains all service entrance works on private property.	*Note: FortisAlberta owns and maintains all facilities including transformers, switching cubicles, primary cables and revenue metering equipment.*		

7.3.3 Underground Secondary Supply Service

Single-phase service supplied from a pad-mounted transformer or pedestal installed within a roadway or Utility Right-of-Way. Typical installations include single-family residential and small to medium commercial applications.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
Complete civil work on private property, and when necessary, on road and/or Utility Right-of-Way under FortisAlberta's supervision (see Annex C.1.1). This typically includes all trenching, ducting, installation of pull boxes, and grounding.	Complete all work on road and/or Utility Right-of-Way, and when necessary, supervise the customer's civil work in these areas.	Property line for residential sites.	Property line for residential sites. Low-voltage terminals of the supply service transformer or pedestal for all other installations.
Supply and install service entrance (secondary) cables.	When conditions dictate, terminate all service entrance cables at the padmount transformer or pedestal.		
When required, install instrument metering.	Supply and install revenue metering equipment. When required, supply instrument metering.		
Note: The customer owns and maintains all service entrance works on private property.	*Note: FortisAlberta owns and maintains all revenue metering equipment.*		

7.3.4 FortisAlberta-Supplied (Rural) Pole or Pedestal Meter Supply Service

A rural single-phase secondary service where the metering point consists of a combination meter/service box mounted on a pole or pedestal. The meter/service box is supplied, installed, and maintained by FortisAlberta. This service can be fed from a pole-mounted or pad-mounted transformer. Typical installations include rural farms and small commercial applications.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
For overhead services: Supply, install and maintain all overhead service entrance (secondary) conductors, hardware and poles on customer's property, from each service entrance to the supply service transformer pole or metering point Terminate the service entrance conductors at the metering point. *Note: The customer owns and maintains poles and anchors with only service entrance conductors attached past the metering point.*	Complete all work on road and/or Utility Right-of-Way. Install and maintain all supply service transformers, poles, anchors and downhauls with primary (high-voltage) conductors attached on the line side of the metering point. Supply, install and maintain the combination meter and service box. Inspect the termination of the customer-installed service entrance conductors at the metering point. Secure the metering point by installing a lock or seal on the service box. *Note: FortisAlberta owns and maintains all poles, anchors, and downhauls on the line side of the metering point with primary conductors attached, overhead service conductors, and revenue metering equipment.*	Load side terminals of the supply service conductors or supply service combination meter box.	Load side terminals of the supply service conductors, or supply service combination meter box.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
For underground services: Complete civil work for service entrance (secondary) cable systems on customer's property. This typically includes all trenching and ducting up to the metering point and, when necessary, on roads and/or Utility Right-of-Way under FortisAlberta's supervision (see Annex C.1.1). Terminate the customers service entrance cables at the metering point. *Note: The customer owns and maintains all service entrance cable and ducting systems on private property after the metering point.*	Complete all work on road and/or Utility Right-of-Way and, when necessary, supervise the customer's civil work in these areas. Supply, install and maintain the primary (high-voltage) service cables-and when required, the secondary supply cables - up to the metering point. Supply, install and maintain the combination metre pedestal. Inspect the termination of the customer-installed service entrance cables at the metering point. Secure the metering point by installing a lock or a seal on the service box. *Note: FortisAlberta owns and maintains all revenue metering equipment.*	Load side terminals of the supply service combination meter box, or pedestal.	Load side terminals of the supply service combination meter box or pedestal.

8. Residential Services

8.1 General Requirements

8.1.1 These requirements apply to single-phase 120/240 V extension of service to any dwelling unit used for domestic purposes on a permanent or seasonal basis, not including commercially operated self-contained rental units in resort areas.

8.1.2 All single residential services shall have the "self-contained" or "instrument" metering located outdoors and:

- Self-contained meters shall be connected to the line side of the supply service disconnect.
- Instrument metering shall be a combination unit (see Table 8 - Approved Instrument Meter Sockets) connected to the line side of the supply service disconnect. Other socket types require special permission.

8.1.3 Metering equipment is required to meet the general requirements outlined in Section 5.0 in addition to the following:

Meters shall be installed on:

- The outside wall of a house or a suitable building nearest to FortisAlberta supply facilities or
- A separate suitable pedestal or treated 6" x 6" post, like for Lot Line Metering (refer to Drawing SMG 2.1, page 2).

8.2 Overhead Service Supplied by a Pole Mounted Transformer

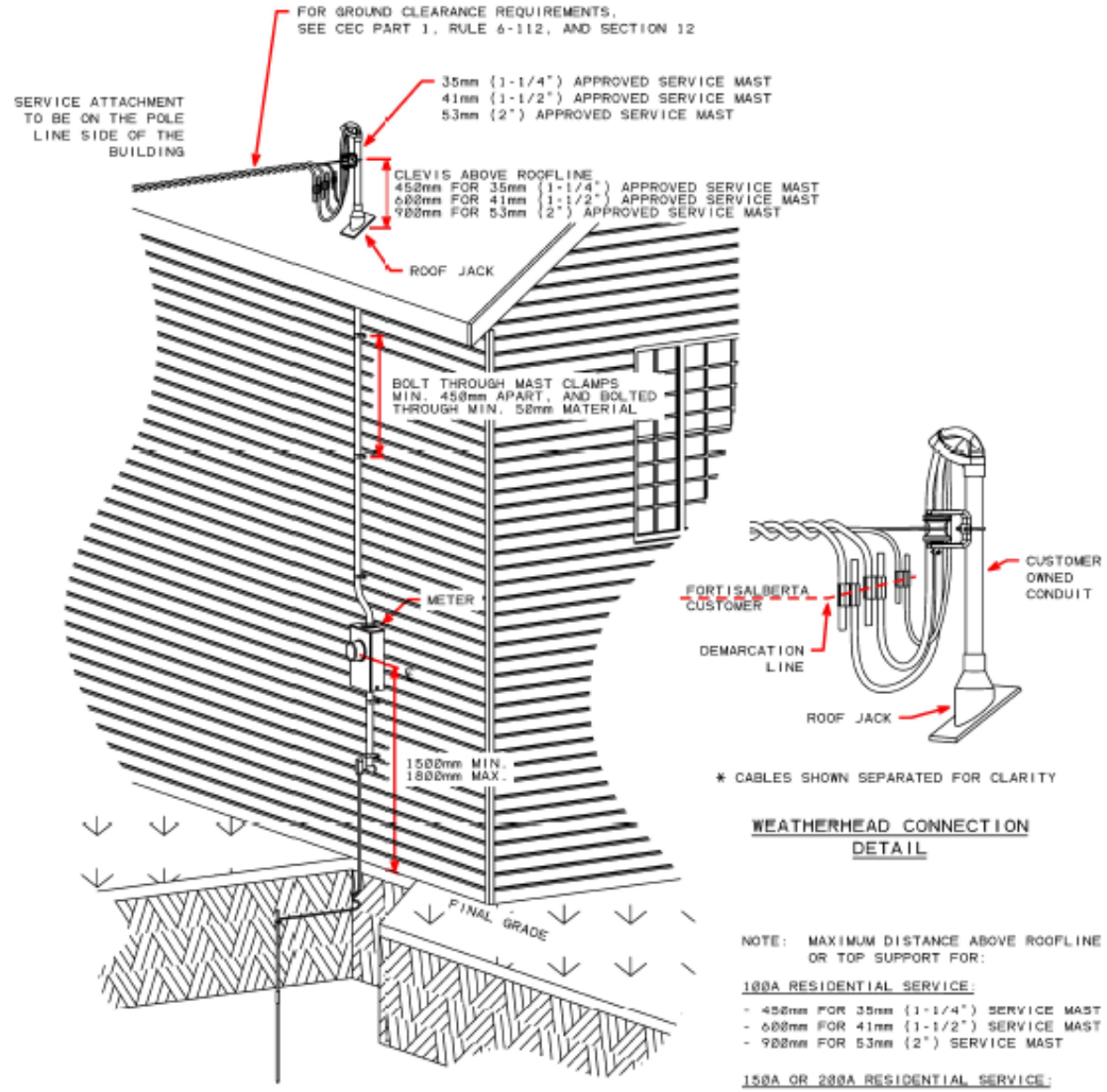
8.2.1 The customer shall:

8.2.1.1 Meter Socket:

- Supply and install a CSA approved meter socket within 60 m (197 ft) of the front property line or supply service transformer pole.

8.2.1.2 Service Entrance Mast:

- Supply and install a rigid metallic service entrance mast complete with weatherhead, clevis insulator, and service entrance conductors.
  - Note: The service entrance mast shall be rigid steel when required to support Neutral Supported conductors (NS-75). If not required to support NS-75 conductors, the mast may be rigid PVC or armored cable.
- Ensure the service mast or clevis insulator, complete with bolt, is securely fastened to the building.
  - Note**:** Screw-type insulators (service knobs) will not be accepted for new or upgraded construction.
- FortisAlberta will not supply connectors for conductors larger than 4/0 AWG.



NOTE:

1 - IN ALL CASES, SERVICE ATTACHMENT TO BE ON THE POLE LINE SIDE OF THE BUILDING

2 - A MINIMUM 4m HORIZONTAL CLEARANCE IS REQUIRED BETWEEN THE SERVICE POLE AND THE BUILDING SERVICE ATTACHMENT POINT

3 - FOR SERVICES THAT DO NOT EXCEED 200A, AND 750V, AND WHERE THE CANTILEVER LOAD DOES NOT EXCEED 270kg, AND WHO'S SUPPLY SERVICE SPAN LENGTH IS LESS THAN 30m. ALL SERVICE MASTS OVER 48 INCHES IN HEIGHT SHALL BE APPROPRIATELY GUYED TO COUNTER STRESSES FROM THE SERVICE DROP

4 - FOR SERVICES THAT EXCEED 200A, OR ARE OVER 750V, OR WHO'S SUPPLY SERVICE SPAN LENGTH IS OVER 30m, OR FOR NON-STANDARD SERVICE MAST INSTALLATIONS (I.E. MULTIPLE MASTS SUPPORTING EACH OTHER) ADDITIONAL ENGINEERING PROVISIONS MAY BE REQUIRED, AND MUST HAVE CONSULTATION WITH AN AUTHORITY HAVING JURISDICTION TO APPROVE THE INSTALLATION

5 - ALL INSTALLATIONS SHALL MEET WITH THE REQUIREMENTS CEC PART 1

SKT 5012

Figure 10 – Example of a typical overhead supply service installation (maximum service span distance: 30 m)

8.2.1.3 Service Pole:

- Where required, supply and install service pole(s) that meet the requirements of Section 5.15 of this document and the Canadian Electrical Code, Part 1 [B1].

8.2.1.4 Pole Metering:

- For customer pole metering, supply and install the metering pole (refer to Drawing SMG 4.1).

8.2.1.5 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request for meter installation and site energization.

8.2.1.6 Ownership and Maintenance:

- Own and maintain all service entrance conductors and facilities necessary for electrical service up to the load side of the final connection to the supply service transformer's low-voltage terminals or to the weatherhead.

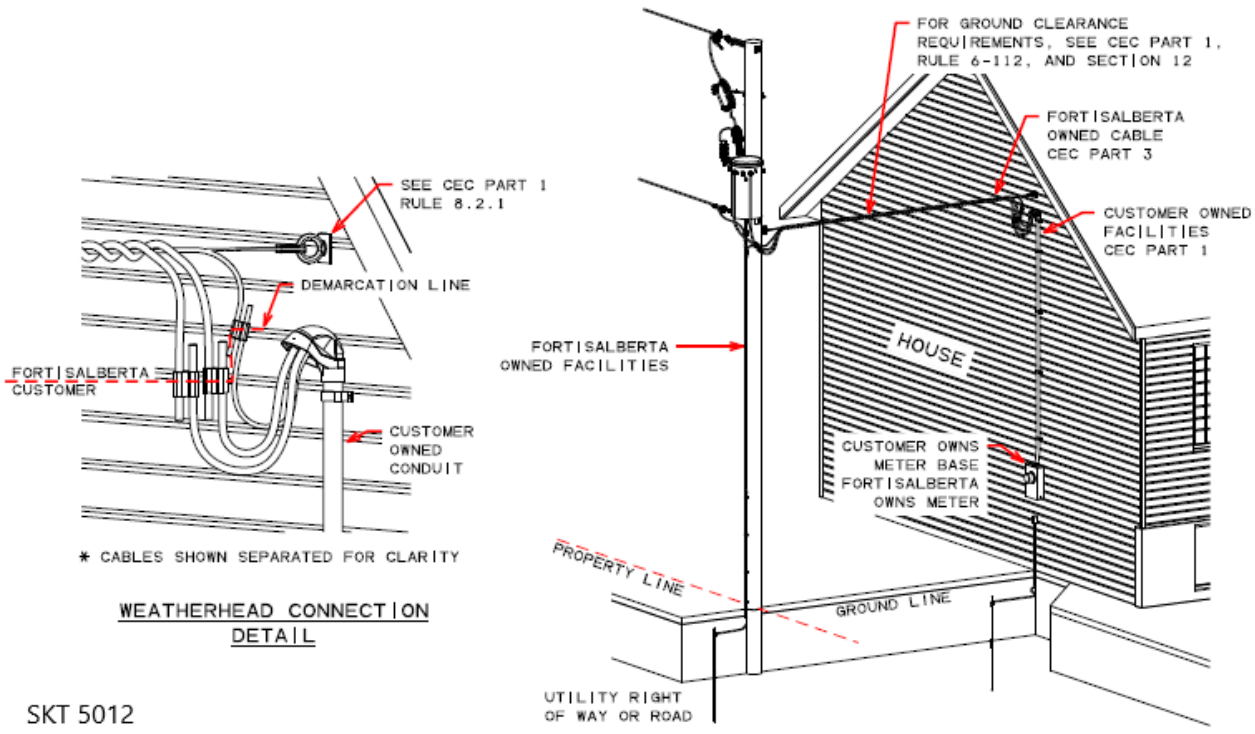


Figure 11 – Example of a typical overhead supply service installation (maximum service span distance: 30m)

8.2.2 FortisAlberta shall:

8.2.2.1 Meter Supply and Installation:

- Supply and install the meter.

8.2.2.2 Supply Service Conductor:

- Supply and install up to 60 m (197 ft) of overhead supply service conductors, with a maximum of 35 m (115 ft) span in between poles. This includes any secondary poles upstream of a customer-owned pole for metering.

8.2.2.3 Service Connection:

- Connect the customer-supplied service entrance conductors to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service conductors at the weatherhead.

8.2.2.4 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

8.2.2.5 Ownership and Maintenance:

- Own and maintain all supply service conductors and facilities required for an electrical supply service up to the line side of the final connection at the supply service transformer's low-voltage terminals or at the customer-owned service entrance conductors.

8.2.3 Additional Information for Rural Residential Services:

8.2.3.1 Pole Metering Option:

- Rural residential services may request pole metering to be supplied and installed by FortisAlberta. The metering pole will be located on or adjacent to (within 1.0 m (3.3 ft)) the customer's property line. This option is only available for rural residential services (refer to Section 9.1 and Section 9.2 for additional requirements).

8.2.3.2 Meter Socket:

- No more than two single meter sockets can be installed on a FortisAlberta owned pole (refer to Drawing 1635).

8.2.3.3 Service Entrance Conductors:

- If the supply service pole is located on the road allowance, the customer-owned service entrance conductors can not cross the adjacent private property.

8.3 Underground Service Supplied by a Pole Mounted Transformer

8.3.1 The customer shall:

8.3.1.1 Meter Socket:

- Supply and install a CSA approved meter socket within 90 m (295 ft) of the front property line or supply service transformer pole.

8.3.1.2 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

8.3.1.3 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

8.3.1.4 Pole-Base Excavation:

- Provide an open trench approximately 1 m (3.3 ft) deep x 1 m (3.3 ft) in diameter at the base of the pole below the supply service transformer for mounting the conduit (refer to Drawings 2624, page 1 and 2624, page 2).

8.3.1.5 Service Entrance Conduit:

- Where required, supply the appropriate length of 2-, 2.5, 3 -, or 4-inch rigid PVC conduit up to the supply service transformer at the service pole. A FortisAlberta representative will advise the customer of the required length.
  - Note: FortisAlberta only accepts 2-, 2.5-, 3-, and 4-inch conduit sizes for underground services. If the customer is running a 3.5-inch conduit (or other sizes) from their service entrance to the service pole, they shall supply and install a rigid PVC reducer coupling (e.g., 4-inch to 3.5-inch) along with a 90-degree elbow to transition to the 4-inch duct at the service pole. If the customer is not running conduit from their service entrance to the service pole (direct buried cable), then a PVC reducer coupling is not required.

8.3.1.6 Service Entrance Riser Way

- Supply and install rigid PVC conduit along the first 3 m (10 ft) of the service pole, including an expansion joint where required. Refer to Section 8.3.2 for guidance on installing service entrance riser assemblies.

8.3.1.7 Service Entrance Cable:

- Supply and install the appropriate length of underground service entrance cable up to the base of the supply service pole, leaving enough cable to reach the transformer's low-voltage terminals. A FortisAlberta representative will advise the customer on the required length. Table 11 outlines the acceptable service entrance conductor sizes by voltage and transformer size.

Table 11 – Single-Phase Transformer Low-Voltage Terminals

120/240 V	240/480 V	Low-voltage Terminals, by Type and Conductor Range
15 kVA	25 kVA	Clamp type terminal for #6 - 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 - 350 kcmil conductor size
50, 75, 100 and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 – 750 kcmil

8.3.1.8 Weatherhead:

- Supply the weatherhead when the conduit is extended to the base of the supply service transformer pole.

8.3.1.9 Backfilling:

- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Annex C.1.4 or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

8.3.1.10 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

8.3.1.11 Ownership and Maintenance:

- Transformer on private property
  - Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service transformer's low-voltage terminals.
- Transformer on road and/or Utility Right-of-Way
  - Own and maintain all service entrance cables and facilities required for electrical service up to the customer's property line.
  - Note: If the supply service transformer is not on the customer's property, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way*.

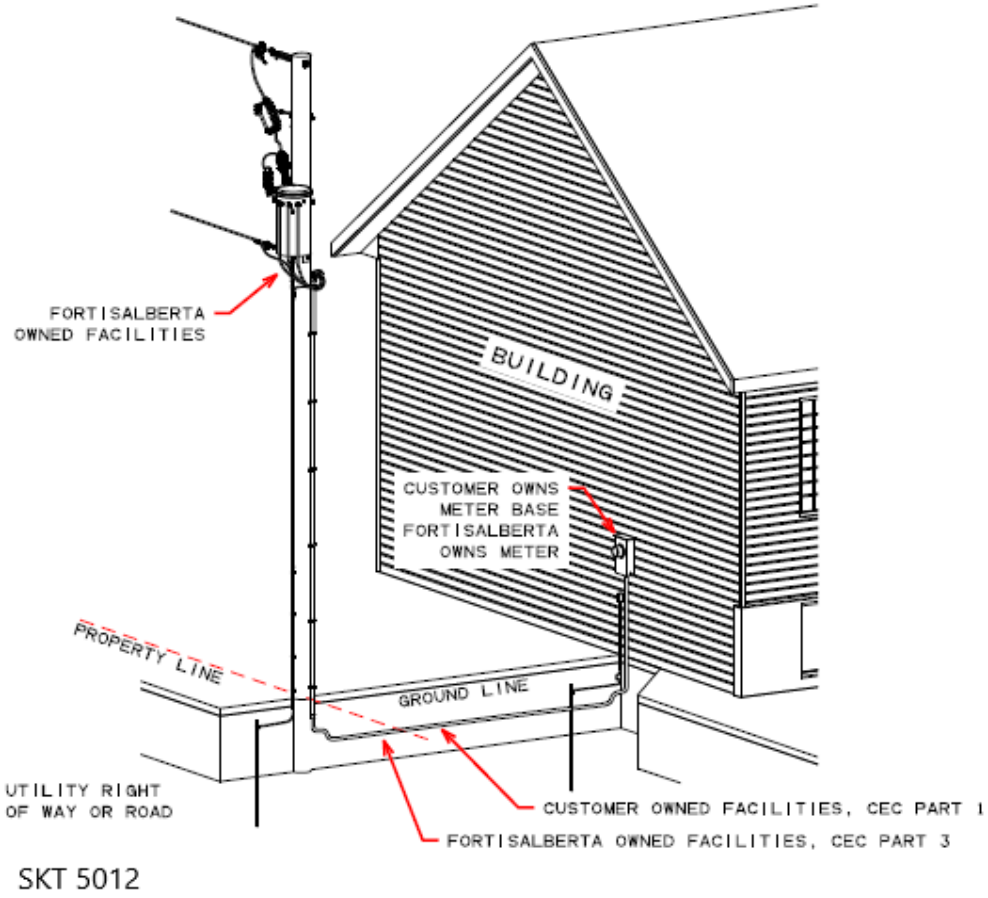


Figure 12 – Example of a typical overhead to underground supply service installation

8.3.1.12 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.

8.3.2 Application of Service Entrance Riser Way and Standoff Brackets

8.3.2.1 For **urban** applications, all customer service entrance cables shall be installed in rigid PVC conduit to the base of the supply service transformer (see Drawings 2624, page 1 and 2624 page 2). The conduit shall be secured to the pole via FortisAlberta-supplied standoff brackets and straps.

8.3.2.2 For **rural** applications where:

- Multiple services will be fed from a single pole mounted supply service transformer, or the customer uses single conductor type USEI service entrance cable, or there is an existing communication conduit sharing the pole, the cable shall be installed in rigid PVC conduit to the base of the supply service transformer. The conduit shall be secured to the pole via FortisAlberta-supplied standoff brackets and straps.
- Type USEB service entrance or armored cable is used and there will only be a single service fed from a pole mounted supply service transformer, the first 3 m (10 ft) of cable will require rigid PVC conduit. The conduit shall be sized appropriately for the installation (this will be the only exception to the 2-, 2.5-,3-, and 4-inch guideline). The customer will pull the cable through

the rigid PVC conduit and secure it to the pole via customer-supplied straps. The remaining service entrance or armored cable shall be coiled and secured to the pole with appropriately sized cable straps (weatherhead is not required), bagged, and secured to the pole.

8.3.2.3 If the customer chooses to use multi-conductor armored cable, then the last 2 m (6.6 ft) of the cable shall be stripped of the armor exposing the PVC inner jacket. The PVC jacket shall then be covered with color coded heat shrink tubing or weatherhead when required.

- The conductor to be used as the neutral shall be clearly identifiable via white vinyl tape or heat shrink tubing.
- WARNING: the PVC colour coded insulation used for TECK90 (copper) cables is not suitable for UV exposure and will deteriorate over time breaking down the insulation and exposing the conductor.

8.3.2.4 No person except FortisAlberta personnel shall climb the supply service transformer pole (or any facilities owned by FortisAlberta).

8.3.2.5 FortisAlberta shall complete the final connection to the supply service conductors or the low-voltage terminals of the transformer.

8.3.2.6 For Lot Line Metering, supply and install Lot Line Metering apparatus (refer to Drawing SMG 2.1, page 2).

8.3.3 FortisAlberta shall:

8.3.3.1 Meter Supply and Installation:

- Supply and install the meter.

8.3.3.2 Work Road or Utility Right-of-Way

- Complete all work on road and/or Utility Right-of-Way and, when necessary, supervise the customer's civil work in these areas.

8.3.3.3 Standoff Brackets:

- Supply and, where required, install standoff brackets and mounting hardware suitable for 2-, 2.5-, 3-, or 4-inch conduit.

8.3.3.4 Conduit Riser Way:

- Assemble the conduit riser, pull in the cable, install the weatherhead and mount the riser as required.

8.3.3.5 Cable Securing:

- Where only 3 m (10 ft) of conduit is required, secure the remainder of the cable to the supply service pole using customer-supplied cable straps.

8.3.3.6 Service Connection

- Connect the customer-supplied service entrance cables to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service cables provided at the property line.

8.3.3.7 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

8.3.3.8 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all supply service conductors and facilities required for electrical supply service up to the line side of the final connection at the supply service transformer's low-voltage terminals or the customer-owned service entrance cables.
- Transformer on road and/or Utility Right-of-Way:
  - Facilities and supply service conductors are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*

8.4 Underground Service Supplied by a Padmount Transformer

8.4.1 The customer shall:

8.4.1.1 Meter Socket:

- Supply and install a CSA approved meter socket (where padmount metering is not opted for) within 90 m (295 ft) of the front property line or supply service transformer.

8.4.1.2 Lot Line Metering:

- Where required, supply and install Lot Line Metering apparatus (refer to Drawing SMG 2.1, page 2).

8.4.1.3 Padmount Metering:

- If a dedicated supply service transformer is provided in accordance with Section 5.27, FortisAlberta will install instrument metering on the transformer.

8.4.1.4 Safety Procedure:

- Contact Utility Safety Partners (formally Alberta One-Call) before starting work.

8.4.1.5 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

8.4.1.6 Service Entrance Conduit:

- Supply and install the service entrance conduit, including an expansion joint where required.

8.4.1.7 Service Entrance Cable:

- Supply and install the appropriate length of underground service entrance cable up to the property line, leaving enough cable to reach the low-voltage terminals of the supply service transformer or pedestal.
- When conditions dictate, FortisAlberta representative will advise the customer on whether they can proceed with installing the service entrance cable on road and/or Utility Right-of-Way.

8.4.1.8 Transformer Low-Voltage Bushing Terminal Connection:

- Supply Requirements - Supply the transformer low-voltage terminal (secondary) connectors.
- Customer Installation - If the customer service is supplied with a dedicated transformer, the customer shall install and connect the underground service entrance cable at the supply service transformer's low-voltage bushing terminals.
  - *Access and Connection* - Access to the padmount transformer is obtained by calling 310-WIRE (9473) to request an open transformer order and schedule a meeting with a FortisAlberta representative for the service connection. Following the site inspection, the customer will either be granted access under an "Advice"-if the transformer is, or can be, connected to the distribution system-or receive verbal approval. The customer may then proceed, under the direction of FortisAlberta, to connect the underground service entrance cable to the supply service transformer's low-voltage terminals (refer to Drawing SMG 4.3). See Section 8.4.2.12 for details on meter installation and site energization.
  - *Transformer Terminals* - Single-phase transformers are equipped with 7-hole straight NEMA spade low-voltage terminals. When instrument metering is required, bushing extenders or bus bars are typically not supplied, as the ½-inch terminal holes provided by the low-voltage terminals are generally sufficient for most applications. Refer to Table 12 for details on the voltage class, kVA rating and the number of ½-inch terminal holes on the low-voltage NEMA spade terminal and bushing extenders supplied by FortisAlberta.
  - *Cable Terminations* - The number of service entrance cables that can be terminated depends on the transformer's kVA rating, voltage class and available space in the low-voltage compartment. *Customer-owned cables are prohibited from entering the transformer's high-voltage compartment.* For safe handling, the recommended limit on service entrance cables is a maximum of 10 runs per low-voltage terminal for single-phase services.

    If additional cables are required, please contact FortisAlberta for approval, ensuring that:

    i. All service entrance cables remain within the low-voltage compartment.

    ii. Minimum clearances are maintained: 89 mm (3.5 in) from an energized conductor to any grounded surface, 165 mm (6.5 in) from phase to phase, and 165 mm (6.5 in) from an exposed terminal to an insulated conductor.

    Refer to Annex D for typical configuration drawings for 25 - 100 kVA, single-phase transformers.
  - *Cable Management System* - When installing more than four cables per terminal, supply and install a cable management system with a clamp and strain relief mechanism compatible with a Unistrut channel or rail located below the low-voltage terminals of the supply service

transformer (see Figure 13). While the use of a cable management system is required when more than four cables per terminal or phase are present, it is also recommended as good engineering practice to support all cables, including armored cables. This system provides strain relief, supports cable weight, facilitates routing, and maintains organization within the vault opening.

Table 12 – Number of holes provided by the Low-Voltage NEMA spade terminals for single-phase transformers

Transformer Rating kVA	Voltage Rating of Transformer	
	120/240 and 240/480	
	No CT Metering	With CT Metering
25-100	7	5

Figure 13 – A single-phase transformer with current transformers (CTs) mounted on the low-voltage bushing terminals and a customer-supplied cable management system at the entrance to the precast vault

8.4.1.9 Pedestal Terminal Connection:

- For services terminating in a secondary pedestal, FortisAlberta will perform the service connection.

8.4.1.10 Clear Operating Area:

- Maintain a clear operating area around the precast concrete base (refer to Drawing SMG 7.1).

8.4.1.11 Backfilling:

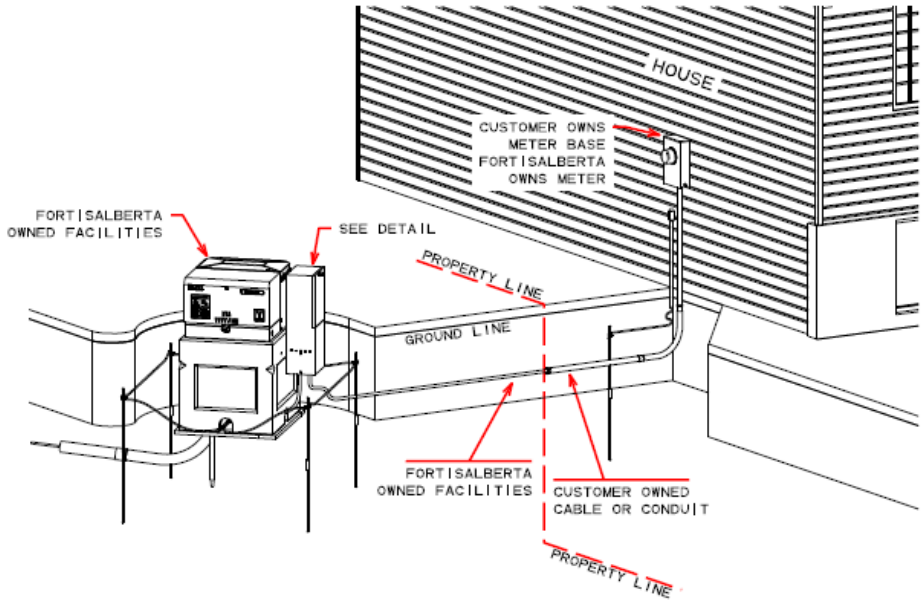
- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Section C.1.4 of Annex C or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

8.4.1.12 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

8.4.1.13 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service transformer or pedestal terminals.
- Transformer on road and/or Utility Right-of-Way:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the customer's property line.
  - Note: If the supply service transformer or pedestal is not located on the customer's property, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way.*



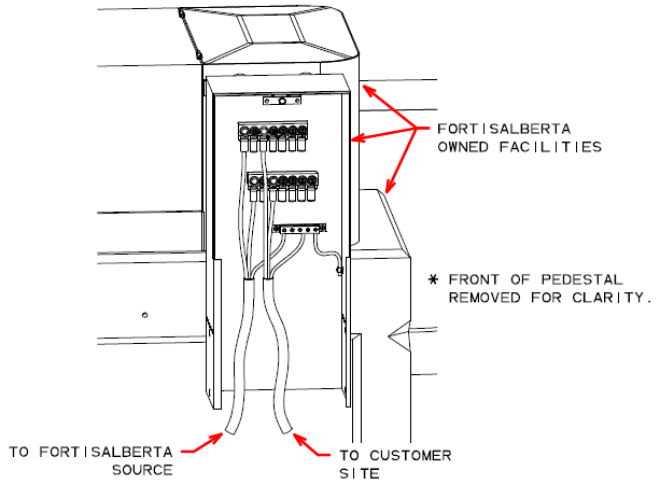


Figure 14 – Example of a typical underground supply service installation where the service transformer and pedestal are located on the road and/or Utility Right-of-Way

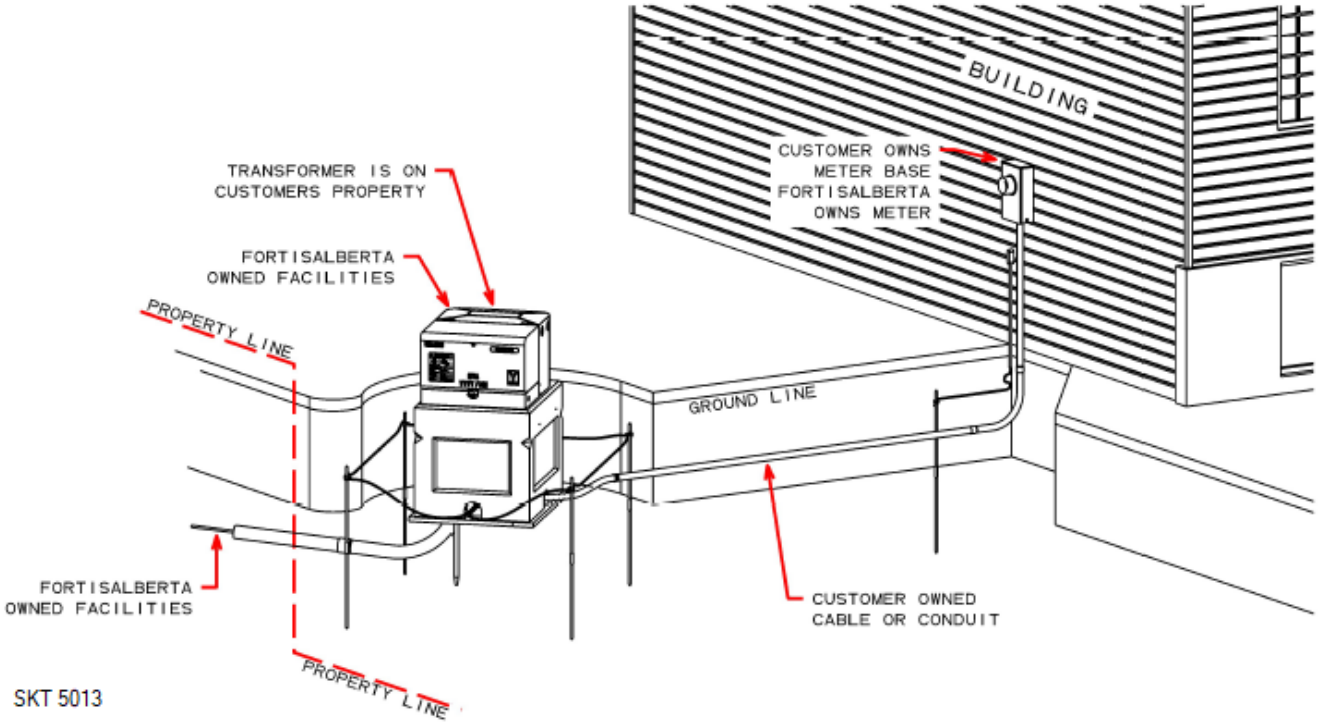


Figure 15 – Example of a typical underground supply service installation where the service transformer is located on property

8.4.1.14 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.

8.4.2 FortisAlberta shall:

8.4.2.1 Meter Supply and Installation:

- Supply and install the meter, except when padmount metering is chosen.

8.4.2.2 Service Connection:

- For single-phase services within the Utility Right-of-Way, connect the customer-supplied service entrance cable to the supply service transformer or pedestal.
- When required, splice the customer's service entrance cable to the FortisAlberta supply service cable stubbed at the property line.

8.4.2.3 Work on Road or Utility Right-of-Way:

- Complete all work on road and/or Utility Right-of-Way, and when necessary, supervise the customer's civil work in these areas.

8.4.2.4 Customer Advice Notification:

- When the customer is ready to terminate their service entrance cables, a FortisAlberta representative will go to the site and make the transformer safe to work in. The FortisAlberta representative will then issue the customer an 'Advice' notice, indicating that the transformer is now safe to work on.

8.4.2.5 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

8.4.2.6 Ownership and Maintenance

- Transformer on private property:
  - Own and maintain all cables and facilities required for electrical supply service up to the low voltage terminals at the supply service transformer or pedestal.
- Transformer on road and/or Utility Right-of-Way:
  - Facilities and supply service cables are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*

8.5 Multiple Residential Service Sites (*Duplex to Sixplex*)

8.5.1 All multiple residential services shall be designed and constructed to accommodate individually metered units and residences. The meters and equipment for these services shall comply with Sections 5.13 and 5.14, the Canadian Electrical Code, Part 1 [B1], and rules 6-102 and 6-104, along with the following requirements:

8.5.2 Meter Location:

- All meter sockets shall be identified by the correct civic address or unit number with a permanent legible label on all meter sockets prior to connection (refer to Section 5.24).
- Shall be part of a certified manufactured assembly. Site fabricated assemblies are not permitted.
- Shall be installed in accordance with Section 5.6.

8.5.3 Duplex to Sixplex (two to six units):

- The meters shall be located outdoors and be connected on the line side of the service disconnect.
- Have a wiring compartment at the service entrance that is separate from all customer compartments.
- A ganged meter socket two to six units shall be used (no splitter boxes allowed) and shall have Lexan barrier shields to protect flash points resulting from misaligning socket covers during insertion. All sections shall be equipped with provisions for FortisAlberta seals to prevent tampering.
- In the event that a resident requires a service upgrade, all associated costs will be the sole responsibility of the resident.
- Four (4) metered units (e.g., fourplex) is the standard limit for a single ganged meter socket serviced by a supply service. A second supply service servicing a second ganged meter socket may be required to serve more than four (4) metered units. Servicing more than four (4) metered units (e.g., fiveplex or sixplex) off the same ganged meter socket or supply service cable can only be acceptable if appropriately designed and allowed by the local inspection authority having jurisdiction. See Canadian Electrical Code, Part 1 [B1] rule 6-102 and 6-104.
  - Figure 16 below is an example of a sixplex service fed from two four-ganged meter sockets.

- Fiveplex and sixplex buildings that do not meet these requirements shall install their meters as per Section 10 Commercial Services.

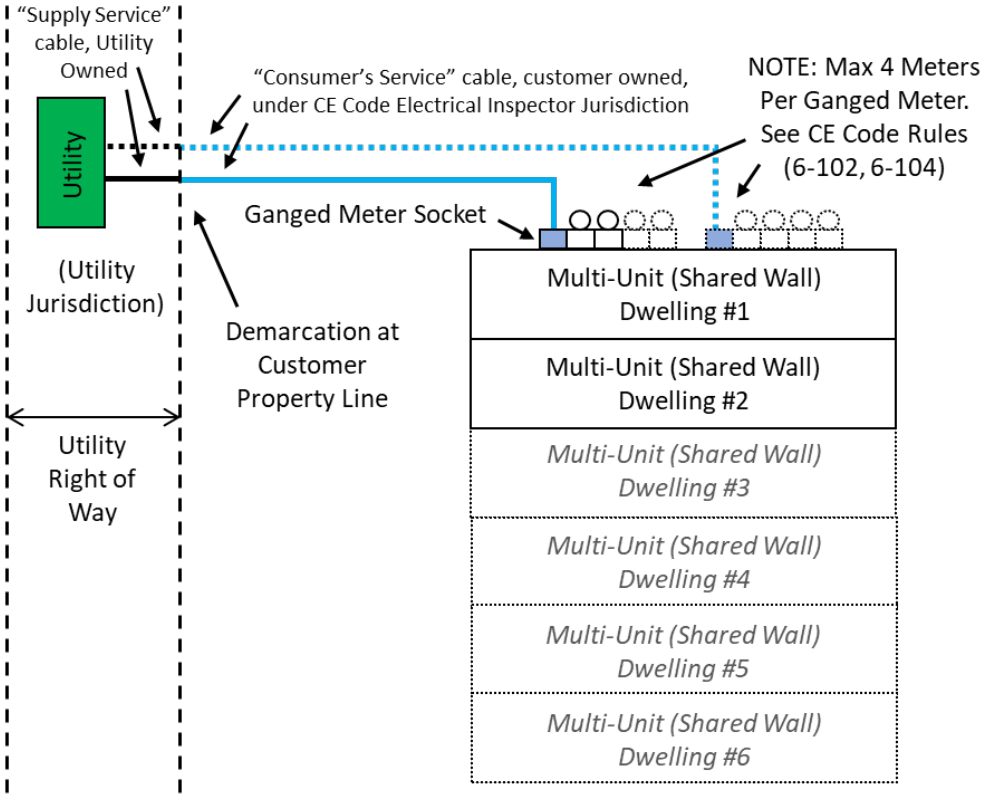


Figure 16 – Servicing Multi-Unit Residential Dwellings with Ganged Meter Sockets

8.6 Meter Centers

8.6.1 Meter Centers shall be certified in accordance with CSA Standard C22.2 No. 229 Switching and Metering Centers [B11].

8.6.2 Meter Centers shall be installed in accordance with Section 5.

8.6.3 Each meter shall be protected by a rated circuit breaker with adequate short circuit interruption capacity. The circuit breaker shall be connected on the line side of the meter (Cold-sequence Metering).

8.6.4 The circuit breaker shall have provision for locking in the open position.

8.6.5 The center-to-center dimension of adjacent meter sockets shall not be less than 220 mm (8.7 in) and the center to any adjacent equipment, structure or obstruction shall be not less than 220 mm (8.7 in).

8.6.6 Prior to the installation of the meters by FortisAlberta:

- Each customer suite address or suite number shall be permanently and legibly marked on the interior of each meter socket and the exterior of each meter socket cover.
  - All suite doors, complete with their permanent address or suite numbers, shall be installed.
  - Meter Centers may be located behind a hallway door provided the door frame does not restrict the required 1 m (3.3 ft) clearance, or access to any of the meter sockets.
  - 250 mm (9.8 in) clearance shall be provided between the closed door and each meter socket cover.

8.7 Surplus Meter Positions

8.7.1 Meter positions that exceed the required number for the completed project are defined as surplus meter positions, (e.g., 47 total units but 48-meter positions supplied because meter center/stacks come in fixed numbers).

8.7.2 New meter center(s) shall have the surplus position(s) removed/disabled and the manufacturer installed metal blanking plate to cover socket opening and breaker section.

8.8 Spare Meter Positions

8.8.1 Meter positions that are required for future additional loads or EV Chargers, whereas already assigned to complete a project, are defined as spare meter positions.

8.8.2 Meter Center shall not have spare meter sockets except where the spare meter socket is assigned to a unit that is in construction and to be completed within 6 - 12 months; or where the spare meter socket is assigned to a parking stall. Contractors are required to supply and install a clear polycarbonate cover plate (e.g., Lexan) with tabs that plug into meter socket jaws and a meter sealing ring.

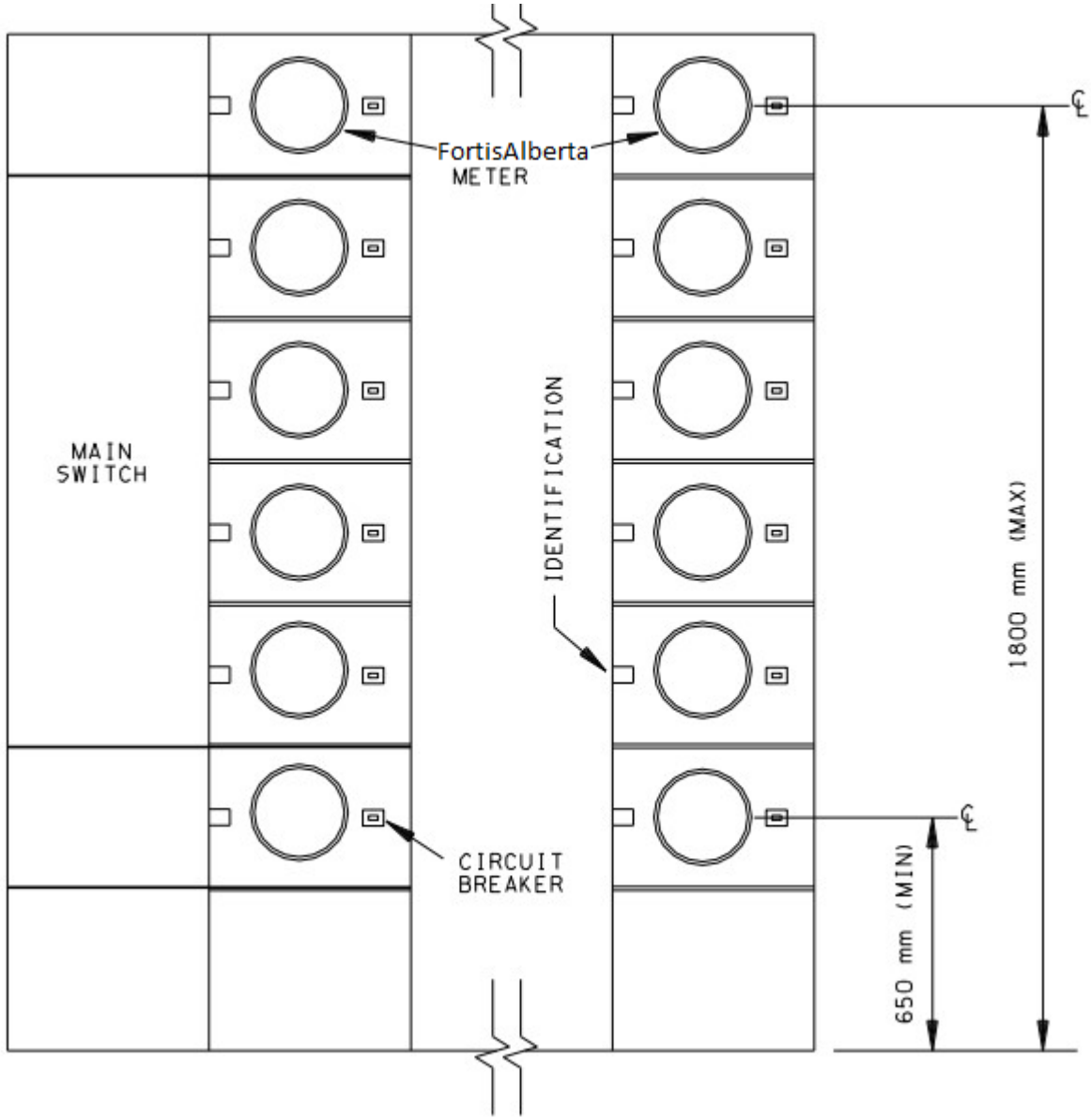


Figure 17 – 120/208 V, Meter Center Installation, Cold-sequence Metered

8.9 Mobile Homes

8.9.1 Within Mobile Home Parks

FortisAlberta will provide service to mobile home parks provided there is a centralized 600 A maximum service location including individual disconnect switches and individual meters for each mobile home pad. The service size will not be increased unless the service is provided from such a centralized location.

8.9.2 Other locations

FortisAlberta will provide service to independent mobile homes provided a structurally sound mast is installed directly on the mobile home. The mast shall be situated within 1 m (3.3 ft) of the corner of the mobile home nearest the point of supply.

An acceptable alternative to the mast is a new utility pole that is commercially treated, a minimum of class 4, a minimum of 9.2 m (30 ft) in length, meeting with the requirements of Section 5.15 of this document and the Canadian Electrical Code, Part 1 [B1]. The customer shall equip the wood pole with a bolted clevis and insulator. In all cases, each meter shall be labeled with the correct civic address prior to connection.

9. FortisAlberta-Supplied (Rural) Pole or Pedestal Meter Supply Services

9.1 General Requirements

9.1.1 FortisAlberta-supplied pole metering requirements apply to the extension of services to single-phase rural establishments, including standard farmsteads, farm irrigation systems, feedlots and other qualified agricultural operations. This includes facilities situated on Indigenous lands and seasonally operated irrigation systems used exclusively for agricultural purposes.

9.1.2 Rural meter service consists of single-phase 120/240 V, services rated at less than 200 A, with the metering point comprising a *combination* pole or pedestal meter (meter/service box) supplied, installed, and maintained by FortisAlberta. This service can be provided via either a pole or pad-mounted transformer.

9.1.3 It's important to note that FortisAlberta will not install a service pole within structures housing livestock or within areas designated for livestock corrals. The point of delivery for these services shall be positioned at least 4 m (13 ft) away from the livestock-containing structure and at least 4 m (13 ft) away from the designated livestock corral area.

9.2 Overhead Rural Service Supplied by a Pole Mounted Transformer

9.2.1 The customer shall:

9.2.1.1 Service Entrance Conductor:

- Supply, install, and maintain all overhead service entrance conductors.

9.2.1.2 Service Pole or Support Structure:

- Where required, supply and install a service pole that meets the requirements of Section 5.15 of this document and the Canadian Electrical Code, Part 1 [B1].
- If branch circuits are required for multiple customer-owned facilities, a support structure shall be provided 4 m (13 ft) away from the FortisAlberta supply service pole.

9.2.1.3 Service Box:

- Supply and install a service box (complete with service entrance single point ground) on a customer-owned building, pole or support structure, which shall be a minimum of 4 m (13 ft) from the FortisAlberta's service pole.
  - Note: The FortisAlberta-supplied pole metering shall not be considered part of the customer service entrance equipment (Canadian Electrical Code, Part 1[B1]).

9.2.1.4 Grounding:

- Ground the service entrance per Canadian Electrical Code, Part 1, Rule 10-210 [B1].

9.2.1.5 Service Entrance Conductor:

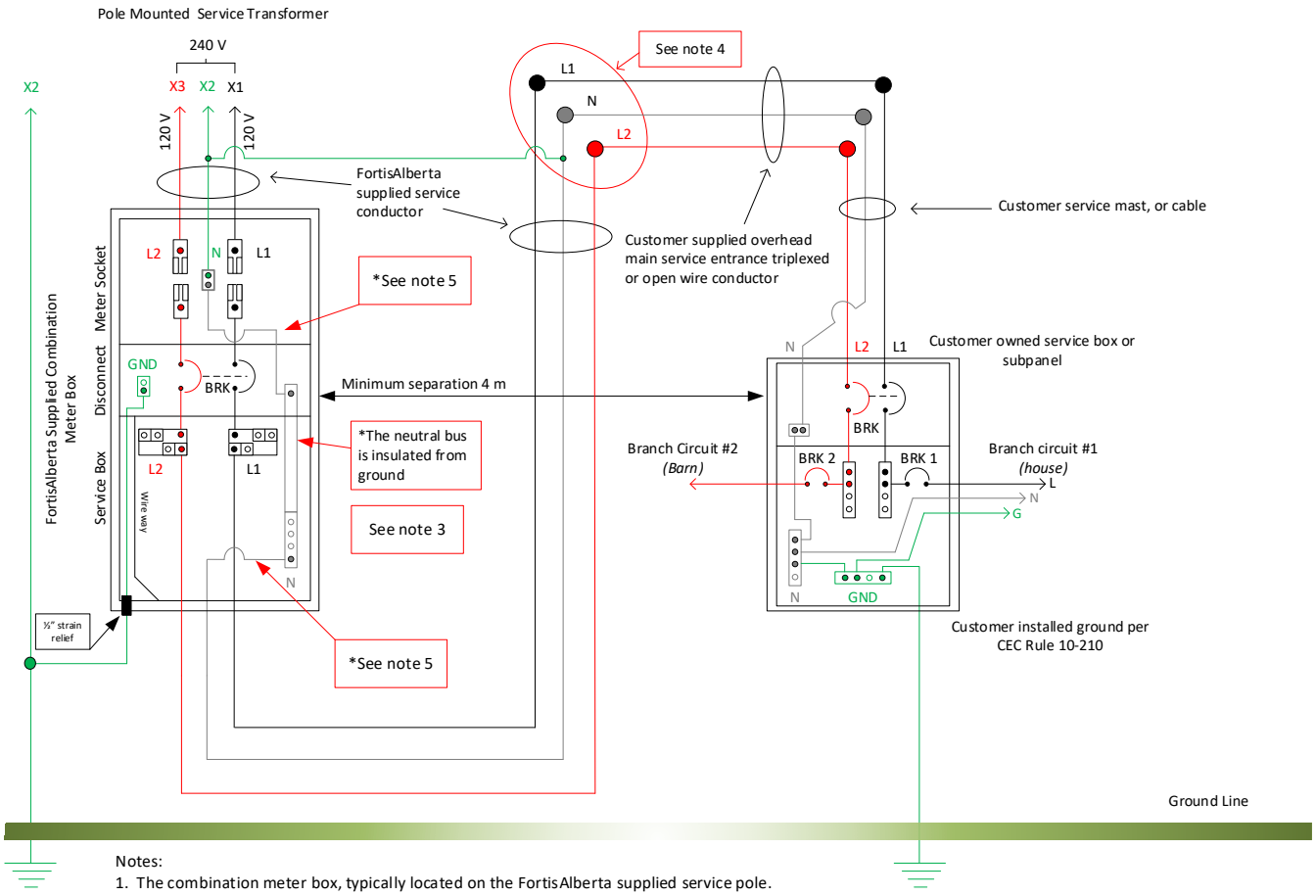
- Supply and install the service entrance conductors to the FortisAlberta-supplied combination meter box or supply transformer pole.
- Coil and leave the customer-owned service entrance conductors at the base of the service pole for connection by FortisAlberta.

9.2.1.6 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

9.2.1.7 Ownership and Maintenance:

- Own and maintain all service entrance conductors and facilities required for electrical service up to the load side of the final connection, either at the supply service low-voltage terminals on the supply service pole or at the supply service combination meter box.



Notes:
1. The combination meter box, typically located on the FortisAlberta supplied service pole.
2. The customer supplied service box or subpanel, typically located on a building or structure.
3. FortisAlberta will allow the customer or electrician to supply and terminate up to four services in the FortisAlberta service box. FortisAlberta will inspect the connection before locking or sealing, and energizing the combination meter box.
4. FortisAlberta will do the final connection of the service drop on the pole. This connection shall be considered the demarcation point for the customer's service.
5. Apply several wraps of white vinyl tape around the bare neutral conductor and ensure that it does not come in contact with the grounded service box.
6. For voltage drop considerations see Section 5.20 of this guide.
7. Service box terminal conductor range, 6 AWG-300 Kcmil.
8. Maximum loading would be limited to 80% of the breaker's name plate rating.

Figure 18 – Example, wiring schematic for a pole mounted 120/240 V, 3-wire, 200 A combination meter service fed from a pole mounted transformer to a customer-owned service box or subpanel

9.2.2 FortisAlberta shall:

9.2.2.1 Supply, Install, and Maintain:

- The service pole(s) meter and the combination meter box.
- When required, provide, and install up to 60 m (197 ft) of overhead supply service conductors with any one span being a maximum of 35 m. This includes any secondary poles upstream of a customer-owned pole for metering.

9.2.2.2 Service Connection:

- Attach and complete all final connections to the customer's service entrance conductors (*including terminations in meter box*).
- No person except FortisAlberta personnel shall climb the supply service transformer pole *(or any facility own by FortisAlberta).*

9.2.2.3 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

9.2.2.4 Ownership and Maintenance:

- Own and maintain all conductors and facilities required for an electrical supply service up to and including the combination meter box.
- Note: The FortisAlberta owned breaker cannot be considered as the customer service disconnect.

9.3 Underground Rural Service Supplied by a Pole Mounted Transformer

9.3.1 The customer shall:

9.3.1.1 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

9.3.1.2 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

9.3.1.3 Service Entrance Conduit:

- Supply and install mechanical protection for the customer's service entrance cable using rigid PVC conduit. Terminate the conduit at the bottom of the FortisAlberta-supplied combination meter box, secure it to the service pole, and extending it 305 mm (12 in) below the ground line for direct buried cable systems. When cables are in a duct system, include an expansion joint where required.

9.3.1.4 Service Entrance Cable:

- Supply and install the customer-owned service entrance cable in the service box section of the FortisAlberta-supplied combination meter box.
- Complete the final connection to the terminal lugs in the service box of the combination meter.

9.3.1.5 Service Pole or Support Structure:

- Supply and install a service pole or support structure 4 m (13 ft) away from the FortisAlberta-supplied service pole if branch circuits are required for multiple customer-owned facilities.

9.3.1.6 Service Box:

- Supply and install a service box (complete with service entrance single point ground) on a customer-owned building, pole or support structure which shall be a minimum of 4 m (13 ft) from the FortisAlberta's service pole.
  - Note: The FortisAlberta-supplied combination meter shall not be considered part of the customer service entrance equipment (Canadian Electrical Code, Part 1 [B1]).

9.3.1.7 Grounding:

- Ground the service entrance in accordance with Canadian Electrical Code Rule Part 1, 10-210 [B1].

9.3.1.8 Backfilling:

- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Section C.1.4 of Annex C or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

9.3.1.9 Meter Installation and Site Energization:

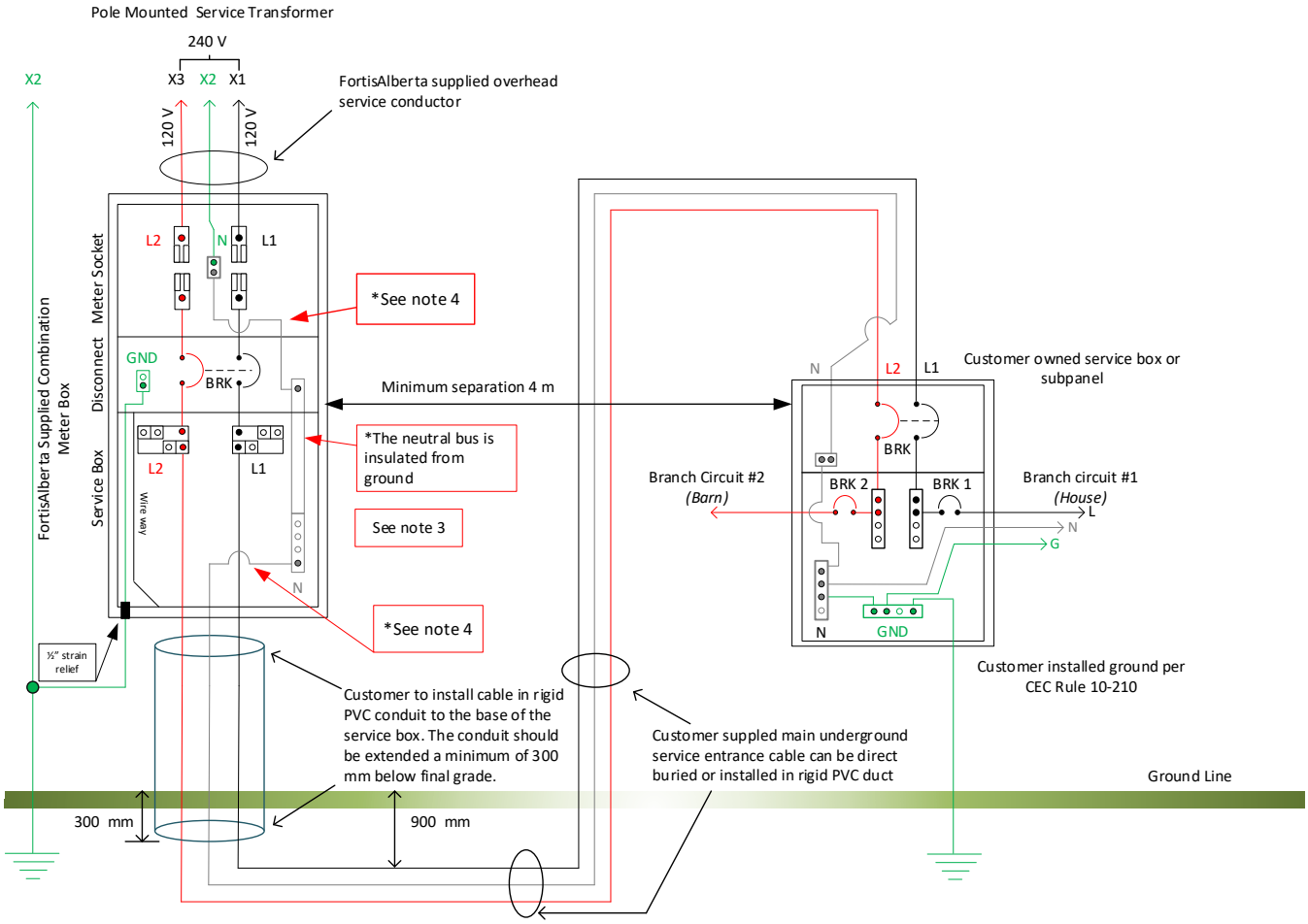
- Contact their chosen electrical energy retailer to request meter installation and site energization.

9.3.1.10 Ownership and Maintenance:

- Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service combination meter box.
  - Note: If a customer-owned branch circuit is not located on the property or if a portion must be on or cross a road and/or Utility Right-of-Way, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way.*

9.3.1.11 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.



Notes:
1. The combination meter box, typically located on the FortisAlberta supplied service pole.
2. The customer supplied service box or subpanel, typically located on a building or structure.
3. For the overhead to underground service, FortisAlberta will allow the customer or electrician to supply and terminate up to four services in the FortisAlberta service box. FortisAlberta will inspect the connection before locking or sealing, and energizing the combination meter box. The customers's connection at the terminals of the service box shall be considered as the demarcation point for the customer's service.
4. Apply several wraps of white vinyl tape around the bare neutral conductor and ensure that it does not come in contact with the grounded service box.
5. For voltage drop considerations see section 5.20 of this guide.
6. Service box terminal conductor range, 6 AWG-300 Kcmil.
7. Maximum number of services fed from the FortisAlberta service box shall be limited to four. Maximum loading would be limited to 80% of the breaker's name plate rating.

Figure 19 – Example, wiring schematic for an underground 120/240 V, 3-wire, 200 A combination meter service fed from a pole mounted transformer to a customer-owned service box or subpanel

9.3.2 FortisAlberta shall:

9.3.2.1 Supply, Install, and Maintain:

- The service pole(s), meter and combination meter box (refer to Drawing SMG 5.2).
- When required, supply and install up to 60 m (197 ft) of overhead supply service conductors, with any one span being a maximum of 35 m.

9.3.2.2 Inspection:

- Inspect the installation and connection of the customer's service entrance cable into the service box of the combination meter.

9.3.2.3 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

9.3.2.4 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all supply service conductors and facilities required for electrical supply service up to and including the combination meter box.
- Customers service entrance cable on road and/or Utility Right-of-Way:
  - Facilities and supply service cables are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*
- Note: The FortisAlberta owned breaker cannot be considered as the customer service disconnect.

9.4 Underground Rural Service Supplied by a Dedicated Padmount Transformer with Pedestal Metering

9.4.1 The customer shall:

9.4.1.1 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

9.4.1.2 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

9.4.1.3 Service Entrance Cable:

- Supply and install the customer-owned service entrance cable up to the FortisAlberta combination pedestal meter.
- Complete the final connection to the terminal lugs in the service box of the combination pedestal meter.

9.4.1.4 Service Pole or Support Structure:

- Where required, supply and install a service pole or support structure 4 m (13 ft) away from the FortisAlberta-supplied combination pedestal meter if branch circuits are required for multiple customer-owned facilities.

9.4.1.5 Service Box:

- Supply and install a service box (complete with service entrance single point ground) on a customer-owned building, pole or support structure which shall be a minimum of 4 m (13 ft) from FortisAlberta's pedestal meter.
  - Note: The FortisAlberta-supplied combination pedestal meter shall not be considered part of the customer service entrance equipment (Canadian Electrical Code, Part 1 [B1]).

9.4.1.6 Grounding:

- Ground the service entrance in accordance with Canadian Electrical Code, Part 1, Rule 10-210 [B1].

9.4.1.7 Backfilling:

- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Section C.1.4 of Annex C or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

9.4.1.8 Meter Installation and Site Energization:

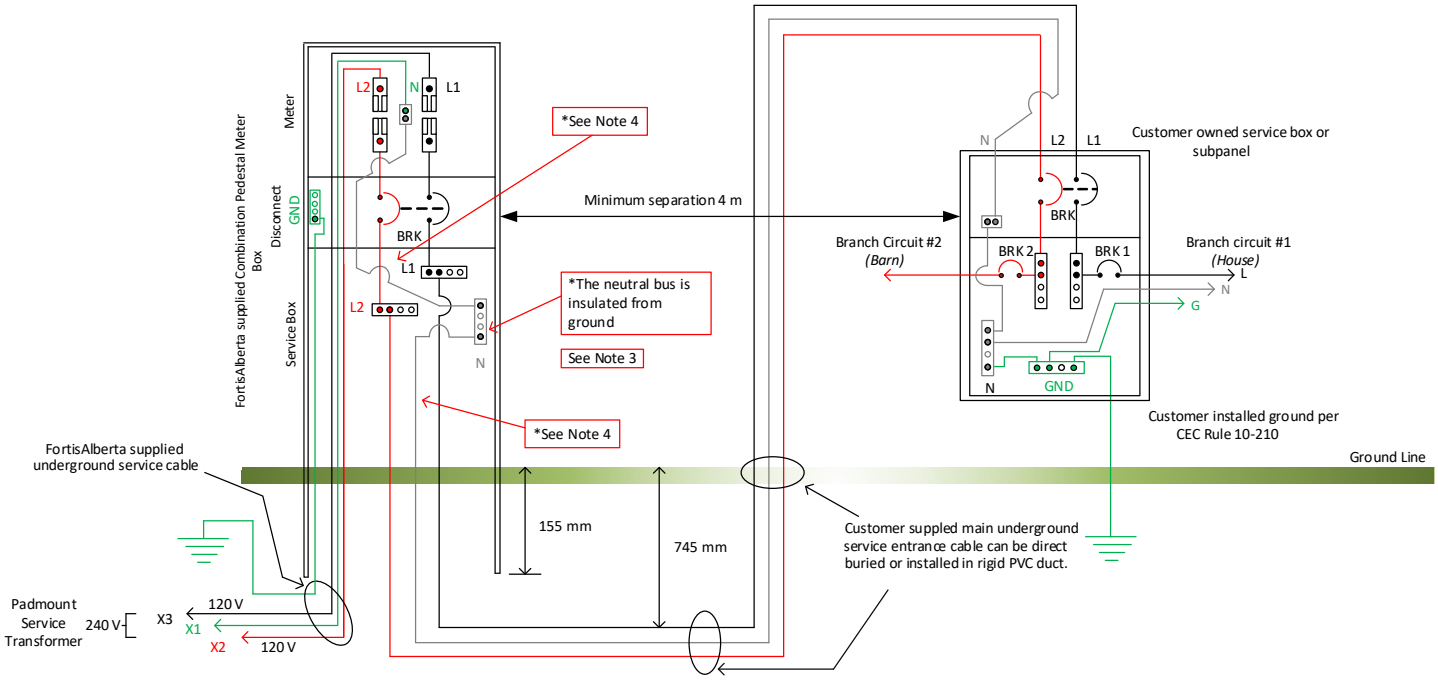
- Contact their chosen electrical energy retailer to request meter installation and site energization.

9.4.1.9 Ownership and Maintenance:

- Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service combination pedestal meter.
  - Note: If a customer-owned branch circuit is not located on the property, or if a portion must be on or cross a road and/or Utility Right-of-Way, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way*

9.4.1.10 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.



Notes:
1. FortisAlberta can supply the customer with either a combination pedestal meter or padmounted meter.
2. The customer supplied service box or subpanel, typically located on a building or structure.
3. FortisAlberta will allow the customer or electrician to supply and terminate up to four services in the FortisAlberta service box. FortisAlberta will inspect the connection before locking, or sealing and energizing the combination meter box. The customer's connection at the terminals of the service box shall be considered as the demarcation point for the customer's service.
4. Apply several wraps of white vinyl tape around the bare neutral conductor and ensure that it does not come in contact with the grounded service box.
5. For voltage drop considerations see Section 5.20 of this guide.
6. Service box terminal conductor range, 6 AWG – 250 kcmil.
7. Maximum loading would be limited to 80% of the breaker's name plate rating.

Figure 20 – Example wiring schematic for an underground 120/240 V, 3-wire, 200 A service fed from a combination pedestal meter to a customer-owned service box or sub panel

9.4.2 FortisAlberta shall:

9.4.2.1 Supply Install and Maintain:

- Supply and install the meter and the combination pedestal meter.

9.4.2.2 Work on Road or Utility Right-of-Way:

- Complete all work on road and/or Utility Right-of-Way, and, when necessary, supervise the customer's civil work in these areas.

9.4.2.3 Inspection:

- Inspect the installation and connection of the customer-supplied underground service entrance cable into the service box of the combination pedestal meter (refer to Drawing SMG 2.1, page 1).

9.4.2.4 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

9.4.2.5 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all supply service cables and facilities required for electrical supply service up to and including the combination pedestal meter.
- Customer facilities on road and/or Utility Right-of-Way
  - Facilities and supply service cables are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*
- Note: The FortisAlberta owned breaker cannot be considered as the customer service disconnect.

10. Commercial Services

10.1 General Requirements

10.1.1 The following requirements apply to the extension of services to single- and three-phase Commercial, Industrial, Oil and Gas, Irrigation, Bare land, and Apartment Building services.

10.1.2 FortisAlberta will not install a service pole within a structure used to contain livestock or within an area used to corral livestock. The point of delivery for these services shall be at least 4 m (13 ft) from the structure containing livestock and at least 4 m (13 ft) from the area used to corral livestock.

10.1.3 Self-contained meters shall be connected on the line side of the supply service disconnect for 120/240 or 120/208 V services (hot-sequence metered). Self-contained meters shall be connected on the load side of the supply service disconnect for 277/480 V and 347/600 V services (cold-sequence metered) (refer to Table 7).

10.1.4 For services greater than 200 A, instrument metering shall be installed in an instrument-rated meter socket and CT cabinet, as specified in Table 8, and connected on the load side of the supply service disconnect.

10.1.5 Metering equipment is required to meet the general requirements outlined in Section 5.0, in addition to the following.

10.1.6 Meters shall be installed on:

- A suitable wall (exterior or interior), nearest to FortisAlberta supply facilities or
- A separate suitable pedestal or treated 6” x 6” post, as in the case of Lot Line Metering (refer to Drawing SMG 2.1, page 2).

10.2 Overhead Services Supplied by a Pole Mounted Transformer

10.2.1 The customer shall:

10.2.1.1 Meter Socket:

- Supply and install a CSA approved meter socket within 60 m (197 ft) of the front property line or supply service transformer pole.

10.2.1.2 Service Entrance Mast:

- Supply and install a rigid metallic service entrance mast complete with weatherhead, clevis insulator, and service entrance conductors.
  - Note: The service entrance mast shall be rigid steel when required to support Neutral Supported conductors (NS-75). If not required to support NS-75 conductors, the mast may be rigid PVC or armored cable.
- Ensure the service mast or clevis insulator, complete with bolt, is securely fastened to the building.
  - Note: Screw type insulators (service knobs) will not be accepted on new or upgraded construction.

10.2.1.3 Service Pole:

- Where required, supply and install service pole(s) that meet the requirements of Section 5.15 of this document and the Canadian Electrical Code, Part 1 [B1].

10.2.1.4 Pole Metering:

- For customer pole metering, supply and install metering pole (refer to Drawing SMG 4.1).

10.2.1.5 Supply Service Conductor:

- FortisAlberta will supply, install, and maintain up to 60 m (197 ft) of overhead supply service conductors for services up to 600 V and 200 A. For services that exceed these criteria, the customer shall supply, install, and maintain the connectors and appropriate length of service entrance conductor to terminate at the wire harness of the supply service transformer. A FortisAlberta representative will advise the customer of the required length. Refer to Table 13 and Table 14 for acceptable service entrance conductor sizes by voltage class and transformer size.

10.2.1.6 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

10.2.1.7 Ownership and Maintenance:

- Own and maintain all service entrance conductors and facilities necessary for electrical service up to the load side of the final connection to the supply service transformer's low-voltage terminals or at the weatherhead.

10.2.2 FortisAlberta shall:

10.2.2.1 Meter Supply and Installation:

- Supply and install the meter.

10.2.2.2 Supply Service Conductor:

- For services less than 600 V and 200 A, supply install and maintain up to 60 m (197 ft) of overhead supply service conductors with a maximum of 35 m (145 ft) span in between poles. This includes any secondary poles upstream of a customer-owned pole for metering.
  - Note: FortisAlberta will not supply any service pole(s) for commercial, industrial, oil and gas, irrigation, bare land and apartment building services.

10.2.2.3 Service Connection:

- Connect the customer-supplied service entrance conductors to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service conductors at the weatherhead.
- When required for single-phase services, supply and install a combination rural meter box (refer to Drawing SMG 5.2).
- Connect the customer-supplied service entrance conductors at the pole metering point.

10.2.2.4 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

10.2.2.5 Ownership and Maintenance:

- Own and maintain all supply service conductors and facilities required for electrical supply service up to the line side of the final connection at the supply service transformers low-voltage terminals or at the customer-owned service entrance conductors.
- Where required, own and maintain all supply service conductors and facilities required for electrical supply service up to and including the FortisAlberta-supplied combination meter box.

10.3 Underground Service Supplied by a Pole Mounted Transformer

10.3.1 The customer shall:

10.3.1.1 Meter Socket:

- Supply and install a CSA approved meter socket (where padmount metering is not opted for) within 90 m (295 ft) of the front property line or supply service transformer.

10.3.1.2 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

10.3.1.3 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

10.3.1.4 Pole Base Excavation:

- Provide an open trench approximately 1 m (3.3 ft) deep x 1 m (3.3 ft) diameter at the base of the pole located below the supply service transformer for mounting the conduit (refer to Drawings 2624, page 1 and 2624, page 2).

10.3.1.5 Service Entrance Conduit:

- Where required, supply the appropriate length of 2-, 2.5-, 3-, or 4-inch rigid PVC conduit up to the supply service transformer at the service pole. A FortisAlberta representative will advise the customer of the required length.
  - Note: FortisAlberta only accept only 2-, 2.5-, 3-, and 4-inch conduit sizes for underground services. If the customer is running a 3.5-inch conduit (or other size) from their service entrance to the service pole, they shall supply and install a rigid PVC reducer coupling (e.g., 4-inch to 3.5-inch) along with a 90-degree elbow to transition to the 4-inch duct at the service pole. If the customer is not running conduit from their service entrance to the service pole (direct buried cable), then a PVC reducer coupling is not required.

10.3.1.6 Service Entrance Riser way:

- Supply and install rigid PVC conduit along the first 3 m (10 ft) of the service pole, including an expansion joint where required. Refer to Section 10.3.2 for guidance on installing service entrance riser assemblies.

10.3.1.7 Service Entrance Cable:

- Supply and install the appropriate length of service entrance cable up to the base of the supply service pole, leaving enough cable to reach the transformer's low-voltage terminals. A FortisAlberta representative will advise the customer on the required length. Table 13 and Table 14 outline the acceptable service entrance conductor sizes by voltage class and transformer size.
- When conditions dictate, a FortisAlberta representative will advise the customer on whether they can proceed with installing the service entrance cable on road and/or Utility Right-of-Way.

Table 13 – Single-Phase Pole Mounted Transformer Service

120/240 V	240/480 V	Low Voltage Terminal
15 kVA	25 kVA	Clamp type terminal for #6 - 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 - 350 kcmil conductor size
50, 75, 100 and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 – 750 kcmil

Table 14 – Three-Phase Pole Mounted Transformer Service

Transformer size	Low Voltage Terminals	
	347/600Y	277/480Y
30 kVA	Clamp type terminal for #6 – 1/0	Clamp type terminal for #6 – 1/0
45 kVA	Clamp type terminal for #6 – 1/0	Clamp type terminal for #6 – 1/0
75 kVA	Clamp type terminal for #2 – 3/0	Clamp type terminal for #2 – 3/0
112 kVA	Clamp type terminal for 1/0 – 600 kcmil	Clamp type terminal for 1/0 – 600 kcmil
150 kVA	Clamp type terminal for 1/0 – 600 kcmil	Clamp type terminal for 1/0 – 600 kcmil

10.3.1.8 Weatherhead:

- Supply the weatherhead when the conduit is extended to the base of the supply service transformer.

10.3.1.9 Backfilling:

- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Section C.1.4 of Annex C or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

10.3.1.10 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

10.3.1.11 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service transformer's low-voltage terminals.
- Transformer on road and/or Utility Right-of-Way:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the customer's property line.
  - Note: If the supply service transformer is not located on the customer's property, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way*.

10.3.1.12 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.

10.3.2 Application of Service Entrance Riser Way and Standoff Brackets

10.3.2.1 For **urban** applications, all customer service entrance cable shall be installed in rigid PVC conduit to the base of the supply service transformer (see Drawings 2624, page 1 and 2624 page 2). The conduit shall be secured to the pole via FortisAlberta-supplied standoff brackets and straps.

10.3.2.2 For **rural** applications where:

- Multiple services will be fed from a single pole mounted supply service transformer, or the customer uses single conductor type USEI service entrance cable, or there is an existing communication conduit sharing the pole, the cable shall be installed in rigid PVC conduit to the base of the supply service transformer. The conduit shall be secured to the pole via FortisAlberta-supplied standoff brackets and straps.
- Where type USEB service entrance or armored cable is used and there will only be a single service fed from a pole mounted supply service transformer, the first 3 m (10 ft) of cable shall require rigid PVC conduit. The conduit shall then be sized appropriately for the installation (this will be the only exception to the 2-, 2.5-, 3-, and 4-inch guideline). The customer will pull the cable through the rigid PVC conduit and secure it to the pole via customer-supplied straps. The remaining service entrance or armored cable shall be coiled and secured to the pole with appropriately sized cable straps (weatherhead is not required), bagged, and secured to the pole.

10.3.2.3 If the customer chooses to use multi-conductor armored cable, then the last 2 m (6.6 ft) of the cable shall be stripped of the cable armor exposing the PVC inner jacket. The PVC jacket shall then be covered with color coded heat shrink tubing or weatherhead when required.

- The conductor intended to be used as the neutral shall be clearly identifiable via white vinyl tape or heat shrink tubing.
- WARNING - the PVC colour coded insulation used for TECK90 (copper) cables is not suitable for UV exposure and will deteriorate over time breaking down the insulation and exposing the conductor.

10.3.2.4 No person except FortisAlberta personnel shall climb the supply service transformer pole *(or any facilities owned by FortisAlberta)*.

10.3.2.5 FortisAlberta shall complete the final connection to the supply service conductors or transformer.

10.3.2.6 For Lot Line Metering, supply and install Lot Line Metering apparatus (refer to Drawing SMG 2.1, page 2).

10.3.3 FortisAlberta shall:

10.3.3.1 Meter Supply and Installation:

- Supply and install the meter.

10.3.3.2 Work on Road or Utility Right-of-Way:

- Complete all work on road and/or Utility Right-of-Way and, when necessary, supervise the customer’s civil work in these areas.

10.3.3.3 Standoff Brackets:

- Supply and, where required, install standoff brackets and mounting hardware suitable for 2-, 2.5, 3-, or 4-inch conduit.

10.3.3.4 Conduit Riser Way:

- Assemble the conduit riser, pull in the cable, install weatherhead, and mount the riser as required.

10.3.3.5 Cable Securing:

- Where only 3 m (10 ft) of conduit is required, secure the remainder of the customer-supplied service entrance cable to the supply service pole using customer-supplied cable straps.

10.3.3.6 Service Connection:

- Connect the customer-supplied service entrance cables to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole, or
  - the supply service cables provided at the property line.

10.3.3.7 Completion Notification:

- Notify the customer of the completion of the final connection and energization of the service.

10.3.3.8 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all supply service conductors and facilities required for electrical supply service up to the line side of the final connection at the supply service transformer's low-voltage terminals or the customer-owned service entrance cables.
- Transformer on road and/or Utility Right-of-Way:
  - Facilities and supply service conductors are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*

10.4 Underground Service Supplied by a Padmount Transformer

10.4.1 All underground primary cable installations shall follow the procedures and requirements outlined in the FortisAlberta "Customer Installed Pre-cast Bases, Grounding, and Ducting" standard. The application of ducting systems for primary cables is beyond the scope of this document. For general information on the installation of ducting systems, refer to Annex C.

10.4.2 The customer shall:

10.4.2.1 Pre-Construction Coordination:

- Contact FortisAlberta to arrange an on-site meeting with a FortisAlberta design representative prior to any construction.
- Provide the FortisAlberta representative with a preliminary site plan that includes building locations, transformer location and duct location.
- Notify the FortisAlberta design representative if there will be requirements for impedance grounding from the 4-wire solidly grounded system, see Section 5.22.
- FortisAlberta shall review the site plan and approve the utility service details before constructions begins.

10.4.2.2 Soil Bearing Capacity:

- Conduct a soil bearing capacity calculation to ensure that the combined weight of the supply service transformer and concrete pad does not cause the precast concrete base to slump.

10.4.2.3 Meter Socket:

- Supply and install a CSA approved meter socket, (where padmount metering is not opted for) within 90 m (295 ft) of the front property line or supply service transformer.
  - Note: When a padmount transformer is equipped with metering installed on it, only one additional 200 A (max) service can be connected before the CTs.

10.4.2.4 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

10.4.2.5 Trench and Excavation:

- Provide the following requirements:
  - *All Excavations* - on customer and lease property, and, when conditions dictate, on road and/or Utility Right-of-Way with the approval and supervision of FortisAlberta.
  - *Marker Tape Installation*
  - *Electronic Marker Balls (if required)* - Install 4-inch red electronic marker balls tuned to 169.8 kHz at splices, buried service drops or crossings of underground facilities located on:
    i. Customer property
    ii. Lease Property
    iii. When required on road and/or Utility Right-of-Way.
- See Annex C.1.1 for additional information

10.4.2.6 Service Entrance Conduit:

- Supply and install the service entrance conduit, including an expansion joint, where required. Refer to Section 10.3.2 for guidance on installing service entrance riser ways.

10.4.2.7 Service Entrance Cable:

- Supply and install the appropriate length of underground service entrance cable up to the property line, leaving enough cable to reach the low-voltage terminals of the supply service transformer or pedestal.
- When conditions dictate, a FortisAlberta representative will advise the customer on whether they can proceed with installing the service entrance cable on road and/or Utility Right-of-Way.

10.4.2.8 Transformer Low-Voltage Bushing Terminal Connection:

- Supply Requirements - Supply the transformer low-voltage terminal (secondary) connectors, bushing extenders or bus bars, as required.
- Customer Installation - If the customer service is supplied with a dedicated transformer, the customer shall install and connect the underground service entrance cable at the service transformer's low-voltage bushing terminals.
  - *Access and Connection* - Access to the padmount transformer is obtained by calling 310-WIRE (9473) to request an open transformer order and schedule a meeting with a

FortisAlberta representative for the service connection. Following the site inspection, the customer will either be granted access under an “Advice”-if the transformer is, or can be, connected to the distribution system-or receive verbal approval. The customer may then proceed, under the direction of FortisAlberta, to connect the underground service entrance cable to the supply service transformer’s low-voltage terminals (refer to Drawing SMG 4.3). See Section 10.4.2.12 for details on meter installation and site energization.

- *Transformer Terminals* - Transformers are equipped with 4- to 8-hole low-voltage NEMA spade terminals, depending on their kVA rating. When pad-mounted instrument metering is required, bushing extenders or bus bars are supplied to accommodate current transformers (CTs). These extenders may provide additional terminal positions for service cable connections. Refer to Table 15 for details on the voltage class, kVA rating, and the number of ½-inch terminal holes provided by the low-voltage NEMA spade terminals and bushing extenders supplied by FortisAlberta.
- *Cable Terminations* - The number of service entrance cables that can be terminated depends on the transformer’s kVA rating, voltage class and available space in the low-voltage compartment. *Customer-owned cables are prohibited from entering the transformer’s high-voltage compartment.* For safe handling, the recommended limits on service entrance cables are:

  i. *Single-phase services:* Maximum of 10 runs per low-voltage terminal.

  ii. *Three-phase services:* Maximum of 12 runs per phase.

  If additional cables are required, please contact FortisAlberta for approval, ensuring that:

  i. All service entrance cables remain within the low-voltage compartment.

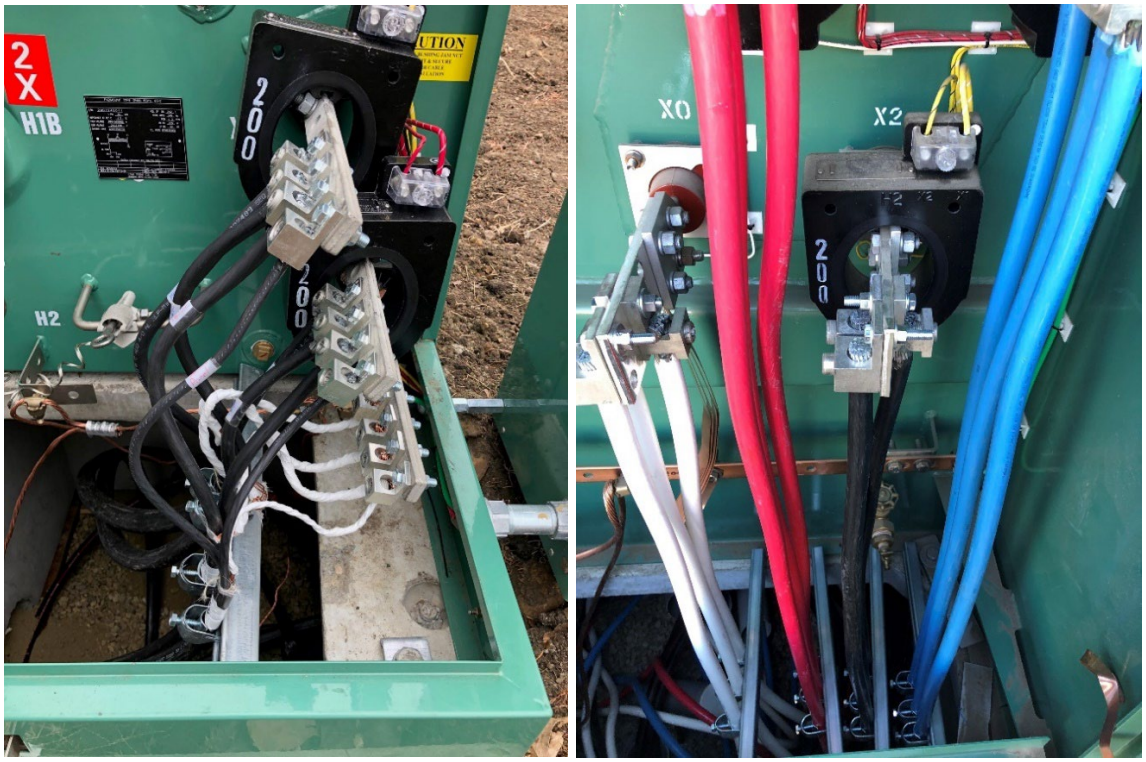
  ii. Minimum clearances are maintained: 89 mm (3.5 in) from an energized conductor to any grounded surface, 165 mm (6.5 in) from phase to phase, and 165 mm (6.5 in) from an exposed terminal to an insulated conductor.

  Refer to Annex D for typical configuration drawings for 25 - 100 kVA single-phase and 75-3000 kVA, three-phase transformers. For transformers with 2400/4160Y secondaries, contact FortisAlberta for a specific drawing.
- *Cable Management System* - When more than four cables per terminal or phase are installed, supply and install a cable management system with a clamp and strain relief mechanism compatible with a Unistrut channel or rail located below the low-voltage terminals of the supply service transformer (see Figure 21). While the use of a cable management system is required when more than four cables per terminal or phase are present, it is also recommended as good engineering practice to support all cables, including armored cables. This system provides strain relief, supports cable weight, facilitates routing, and maintains organization within the vault opening.

Table 15 – Number of holes provided by the low-voltage NEMA spade terminals for singe and three-phase transformers

Transformer Rating kVA	Voltage Rating of Transformer									
	2400/4160Y		347/600Y		277/480Y		120/208Y		120/240 and 240/480	
	No CT Metering	With CT Metering	No CT Metering	With CT Metering	No CT Metering	With CT Metering	No CT Metering	With CT Metering	No CT Metering	With CT Metering
25-100									7	5
167									8	8
75-300			4	6	4	6	4	6		
500-1000*	4	6	4	6	4	6	8	12		
1500-2000	4	6	6	6	8	12				
2500-3000	4	6	8	12	8	12				
10,000	4	6								

*Minimum kVA size for transformers with 2400/4160Y V secondaries



(a) (b)

Figure 21 – Transformers with a cable management system:
(a) a single-phase transformer with current transformers (CTs) mounted on the low-voltage bushing terminal; and
(b) a three-phase transformer with CTs mounted on the phase X1, X2, and X3 low-voltage bushing terminals, featuring FortisAlberta-supplied bushing extenders on all phases and customer-supplied cable support at the entrance to the vault

10.4.2.9 Pedestal Terminal Connection:

- For services terminating in a secondary pedestal, FortisAlberta will perform the service connection.

10.4.2.10 Clear Operating Area:

- Maintain a clear operating area around the precast concrete base (refer to Drawing SMG 7.1).

10.4.2.11 Backfilling:

- Fill in all trenches or open excavations on property, leased property, and, when required, on Utility Right-of-Way. Perform all backfilling to meet the compaction requirements of Section C.1.4 of Annex C or, when on road and/or Utility Right-of-Way, the standards of the local road authority. Upon notification from FortisAlberta, this work shall be completed and inspected by a FortisAlberta representative prior to energization.

10.4.2.12 Meter Installation and Site Energization:

- Contact their chosen electrical energy retailer to request meter installation and site energization.

10.4.2.13 Ownership and Maintenance:

- Transformer on private property:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the load side of the final connection at the supply service transformer or pedestal terminals.
- Transformer on road and/or Utility Right-of-Way:
  - Own and maintain all service entrance cables and facilities required for electrical service up to the customer's property line.
  - Note: If the supply service transformer or pedestal is not located on the customer's property, the customer shall contact FortisAlberta and their municipality to determine whether they are permitted to install underground service entrance cables beyond their property line. *If permitted, the customer will be responsible for maintaining the service entrance cable within the Utility Right-of-Way*.

10.4.2.14 Additional Information:

- Refer to Annex C for information regarding underground construction and duct systems.

10.4.3 FortisAlberta shall:

10.4.3.1 Point of Entry:

- Determine the location of point of entry to customer's property.

10.4.3.2 Site Plan Review:

- Review the customers site plans related to the utility service and provide approval for construction.

10.4.3.3 Facility Requirements:

- Determine the offsite facilities needed based on the preliminary plan. FortisAlberta shall also provide the type of grounding system that is required (single ring or three ring) and, when required, make provisions to accommodate impedance-grounded systems.

10.4.3.4 Work on Road or Utility Right of Way:

- Complete all work on road and/or Utility Right-of-Way and, when necessary, supervise the customer's civil work in these areas.

10.4.3.5 Cable Installation:

- Pull primary cables through duct from property line to transformer location.

10.4.3.6 Transformer Installation:

- Install transformer on the pad and perform all primary connections.

10.4.3.7 Meter Supply and Installation:

- Supply and install the meter.

10.4.3.8 Lot Line Metering:

- For Lot Line Metering, supply, install and terminate the underground service entrance cable in the Utility Right-of-Way.

10.4.3.9 Inspection Rights:

- Reserve the right to inspect any customer-installed facilities required for the service entrance, including civil and electrical work, in proximity of the supply service transformer pad and ground grid.

10.4.3.10 Inspection:

- Inspect the installation and connection of the underground service entrance cable into the transformer secondary compartment.

10.4.3.11 Ground Testing

- If ground testing and the corresponding report were not completed by the customer, FortisAlberta shall perform the ground testing and upgrade grounding system, if necessary, at the customer's expense.

10.4.3.12 Customer Advice Notification:

- When the customer is ready to terminate their service entrance cables, a FortisAlberta representative will go to the site and make the transformer safe to work in. The FortisAlberta representative will then issue the customer an 'Advice' notice, indicating that the transformer is now safe to work on.

10.4.3.13 Completion Notification:

- Notify the customer upon completion of the final connection and energization of the service.

10.4.3.14 Ownership and Maintenance:

- Transformer on private property:

- Own and maintain all supply service cables and facilities required for an electrical supply service up to the low-voltage terminals at the supply service transformer or pedestal.

- Transformer on road and/or Utility Right-of-Way:
  - Facilities and supply service cables are owned and maintained by FortisAlberta unless the municipality grants approval for the customer to install service entrance facilities within the Utility Right-of-Way. *If such approval is granted, the customer is responsible for maintaining the service entrance cable within the Utility Right-of-Way.*

10.5 Multiple Customer Metering System

10.5.1 Historically, FortisAlberta has required the installation of standard electricity meters in multiple customer units to measure electricity usage of individual suites. However, advancements in technology have led to solutions that occupy less space than traditional meter installations. In cases where standard meter bases are challenging to install in retrofit installations or where the electrical secondary distribution room is already allocated for existing electrical equipment, FortisAlberta offers two options for multiple customer metering:

i. *Meter Centers:* Traditional socket meters may be used to meter the individual residential or commercial suites requiring 200 A services or less.

ii. *Multi-Customer Metering Systems (MCMS):* Alternatively, the building owner can opt for FortisAlberta's MCMS solution to meter the individual suites.

10.5.2 A Multi-Customer Metering System can be used in apartment and condominium and small commercial buildings where the developer decides not to use the traditional self-contained meters for the building.

10.5.3 Each unit consists of a main meter head and shorting box connected to "mini" window-type current transformers on the branch circuits to the suites.

10.5.4 The customer may make the request for Multi-Customer Meter System installation with FortisAlberta early in the project. FortisAlberta will consider the customers request, with approval granted on a site-specific and case by case basis.

10.6 Metering Requirements for Services less than 300 V

10.6.1 All single meter services rated less than 300 V (L-L) are required to meet the following:

- Meter shall be located outdoors on either:
  - the outside wall of a suitable building with a clear area free of vents (refer to Drawing SMG 2.16.4, page 2), or
  - a separate suitable stand-alone metering structure located a minimum distance of 4 m (13 ft) from the supply service transformer pole or concrete pad.
- Meter shall be connected on the line side of the service disconnect.
- Meter shall be mounted with the centre line of the meter at a height specified in Table 6. The minimum height as specified shall be maintained when final grade is reached.

10.7 Metering Requirements for Greater than 300 V Services

10.7.1 The metering equipment for services exceeding 300 V (L-L) are required to meet the following:

- Located indoors; except for oilfield and irrigation services, where the meter may be located on the outside wall of a suitable building with an clear area free of vents (refer to Drawing SMG 2.16.4, page 2), and connected downstream of the main breaker, or outdoors on a stand-alone metering structure 4 m (13 ft) minimum away from the supply service transformer pole (refer to Drawing SMG 2.13.5, page 1 and SMG 2.13.5, page 2).
- For irrigation services, the metering shall not be located on the irrigated land area and shall have a service disconnect located ahead of the meter on all services (refer to Drawing SMG 2.13.5, page 1 and SMG 2.13.5, page 2).
- Mounted with the centre line of the meter at a height specified in Table 6.
- Equipped with provisions for FortisAlberta to seal all service entrance equipment ahead of the metering point.

10.8 Instrument Metering Requirements

10.8.1 The customer shall supply:

- A CSA approved instrument meter socket or combination unit as specified in Section 5.28.
- An instrument transformer enclosure size referenced in Table 10, Instrument Transformer Enclosures (Indoor and Outdoor) and mount it as per Table 9 for Indoor and Outdoor applications.
- A 35 mm (1 ¼ in) conduit between the instrument transformer enclosure and the meter socket complete with lock nuts and bushings. If metallic (rigid or EMT) conduit is used, the socket requires a bond wire.
- Maintain a minimum vertical separation between the bottom of the socket and the top of the instrument transformer of 80 mm (3 1/8 in) by using a 102 mm (4 in) nipple, when the socket is directly above the instrument enclosure.
- Install an isolated neutral block in the instrument transformer enclosure (three-phase services only and only one parallel conductor needs to be attached).
- All hardware, bus work, terminations and/or cable required for primary connections to the current transformers.
- Plywood shall be installed 19 mm (3/4 in) behind all instrument transformer enclosures which do not have an interior plate or back pan, when mounted on cement or block wall.

10.8.2 The customer shall mount and install:

- All current transformers, in the following manner:
  - Screwed to the back panel of the instrument enclosure using #10 or #12 self-tapping screws such that the nameplates can be easily read.
  - All four (4) mounting holes on the instrument transformer base shall be used so that the nameplates are clearly visible when the enclosure is open.
  - Positioned with the primary polarity mark toward the source of supply and in an arrangement that will not obstruct access to the secondary terminals (refer to “Single-Phase instrument Transformer Enclosure Layout” – Drawing SMG 7.6.1 and “Three-Phase Instrument Transformer Enclosure Layout” – Drawing SMG 7.6.2).

- The potential screw on the line side of the CT shall not be covered with customer secondary connection and shall be accessible for FortisAlberta employee to use for metering wire potential connection.
- Instrument transformers shall not be mounted with bolts unless holes are threaded.

10.8.3 FortisAlberta shall supply:

- Current transformers
- Potential transformers (services over 600 V)
- Fuse blocks and fuses for the potential circuit

10.8.4 FortisAlberta shall:

- Mount the fuse block and fuses.
- Wire out the instrument transformer secondaries to the meter and fuse blocks.
- Supply and install the meter.

10.8.4.1 The instrument transformers will be made available to the customer by contacting FortisAlberta toll-free at 310-WIRE (9473). Instrument transformers will be shipped to the customer via courier. The meter, fuses and fuse blocks will be the responsibility of FortisAlberta personnel.

Note: CTs and meters remain the property of FortisAlberta, and the customers shall provide FortisAlberta with reasonable access to such equipment for meter reads and maintenance.

11. Metering Signal Service Offer

11.1 Disclaimer

11.1.1 We are upgrading our metering technology in all parts of our service territory through our Next Generation Advanced Metering Infrastructure (AMI) Program. Due to this transition, KYZ metering signals are changing from our current offering.

11.1.2 We understand the importance of tracking your electricity usage and apologize for any inconvenience caused by the transition to new technology.

11.1.3 FortisAlberta will continue to support the current technology for new customer requests, and maintenance until December 31st, 2027.

11.1.4 As of January 1st, 2028, all applications quoted will be based on the latest offerings.

11.1.5 Transition to a new platform will be required by December 31st, 2028.

11.2 Availability of Metering Signals

11.2.1 FortisAlberta shall provide metering signals to customers, upon request. These signals are in the form of energy (kWh) and/or reactive energy (kVARh) pulses for use with an energy management system. Any incremental costs incurred by FortisAlberta for providing these signals will be the responsibility of the customer. Under no circumstances shall FortisAlberta supply an End-of-Interval (EOI) pulse.

11.3 Specification

11.3.1 Please note that the specifications of this offering are subject to change due to ongoing product advancements. For the most current and detailed information, please contact the FortisAlberta Metering Standards:

FortisAlberta Metering Standards Contact Details
meteringstandards@fortisalberta.com

11.4 Process

11.4.1 Upon receipt of a formal request for a metering signal quote at 310-WIRE (9473), FortisAlberta shall develop a cost breakdown for the Metering Signal Service Offer. The quote will clearly outline technical issues, specifications and any other additional cost factors, which will be at the customer's expense.

11.4.2 Once all the technical issues are addressed, FortisAlberta shall forward the offer to the customer. This will include the quotation letter, a copy of "Conditions for Metering Signals" and a site schematic (if applicable).

11.4.3 Upon receipt of the customer's acceptance and payment, FortisAlberta shall install the service.

11.4.4 The signal will be terminated in a junction box to be in or attached to the metering equipment. All equipment up to, and including this termination, will remain the property of FortisAlberta.

11.5 Non-billing Metering Signals for Internal Customer Monitoring Only

11.5.1 The customer acknowledges that the metering signal(s) provided pursuant to the agreement are not used for measuring the customer's electricity consumption or calculating charges for the customer's electricity consumption. The metering signal(s) are provided solely for the customer's internal use to assist in monitoring their energy consumption. The customer further acknowledges that FortisAlberta assumes no liability whatsoever for any inaccuracies in the information obtained from the metering signal(s) or for the customer's use of the metering signal(s).

11.5.2 FortisAlberta has no influence over a retailer's decision to reduce higher registered demand peaks or higher energy consumption that may be inadvertently caused by metering signal equipment failure.

12. Temporary Services

12.1 Overview

The following requirements apply to extensions for Residential, Single- and Three-Phase Commercial, Industrial, Oil and Gas, Irrigation, Bare Land and Apartment Building developments requiring temporary services. Temporary service typically refers to a service required for two years or less; however, in some cases, a longer duration may be permitted if acceptable to FortisAlberta, the customer, and the local inspection authority having jurisdiction. For example, oilfield construction camps may require service for up to three years during project construction.

12.2 Qualification

To determine whether a service qualifies as temporary, contact 310-WIRE (9473) and the local inspection authority having jurisdiction.

12.3 General Requirements

12.3.1 The customer shall:

- Supply, install and maintain all equipment and facilities required for a temporary service up to the load side of the final connection to the supply service transformer or pedestal low-voltage terminals.
- Supply and install a meter socket.
- Provide protection for their electrical facilities, including grounding.
- Provide a valid electrical permit or a signed Connection Authorization Form.
- These requirements are in addition to the standard requirements for each type of service.

12.4 Overhead Services Supplied by a Pole Mounted Transformer

12.4.1 The customer shall:

12.4.1.1 Meter Socket:

- Supply and install a CSA approved meter socket.

12.4.1.2 Service Pole:

- Supply and install the temporary pole or stub.

12.4.1.3 Service Entrance Mast:

- Supply and install a metallic service entrance mast complete with weatherhead, clevis insulator, and service entrance conductors, ensuring the mast or clevis insulator with bolt is securely fastened to the service pole or structure. The mast shall be rigid steel when required to support Neutral Supported (NS-75) conductors; otherwise, rigid PVC or armored cable may be used.

12.4.1.4 Service Entrance Conductor:

- Supply and install the customer-owned overhead service entrance conductors from the temporary pole or stub to the supply service transformer or supply service conductors. Do not connect to the service transformer. Coil the customer-owned conductors and leave at the base of temporary pole or mast.

12.4.2 FortisAlberta shall:

12.4.2.1 Meter Supply and Installation:

- Supply and install the meter.

12.4.2.2 Service Connection:

- Connect the customer-supplied service entrance conductors to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service conductors at the weatherhead.

12.4.2.3 Ownership and Maintenance:

- Own and maintain all service entrance conductors and facilities required for an electrical supply service up to the line side of the final connection at the supply service transformer's low-voltage terminals or the customer-owned service entrance conductors.
- Refer to Drawing SMG 9.2.

12.5 Underground Services Supplied by a Pole Mounted Transformer

12.5.1 The customer shall:

1.1.1.1. Meter Socket:

- Supply and install the meter socket and conduit.

12.5.1.1 Service Pole:

- Supply and install the temporary pole or stub.

12.5.1.2 Safety Procedure:

- Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.

12.5.1.3 Service Entrance Cable:

- Supply and install the underground service entrance cable from the temporary stub pole to the supply service transformer pole.

12.5.2 FortisAlberta shall:

12.5.2.1 Meter Supply and Installation:

- Supply and install the meter.

12.5.2.2 Service Connection:

- Connect the customer-supplied service entrance cables to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service cables provided at the property line.

12.5.2.3 Ownership and Maintenance:

- Own and maintain all supply service conductors and facilities required for an electrical supply service up to the line side of the final connection at the low-voltage terminal of the supply service transformer, pedestal, or the customer-owned service entrance cable.
- Refer to Drawing SMG 9.3.

13. Microgeneration

13.1 Overview

The following requirements apply to customers applying to connect their microgeneration systems to FortisAlberta's electrical network.

13.2 Microgeneration Rules

13.2.1 The customer shall follow the applicable Microgenerator interconnection process as outlined on the FortisAlberta website, in accordance with Alberta Utilities Commission Rule 024: Rules Respecting Microgeneration [B12].

13.2.2 FortisAlberta will evaluate the customer application based upon the service qualifying as a Microgenerator under Alberta Utilities Commission Rule 024: Rules Respecting Microgeneration [B12].

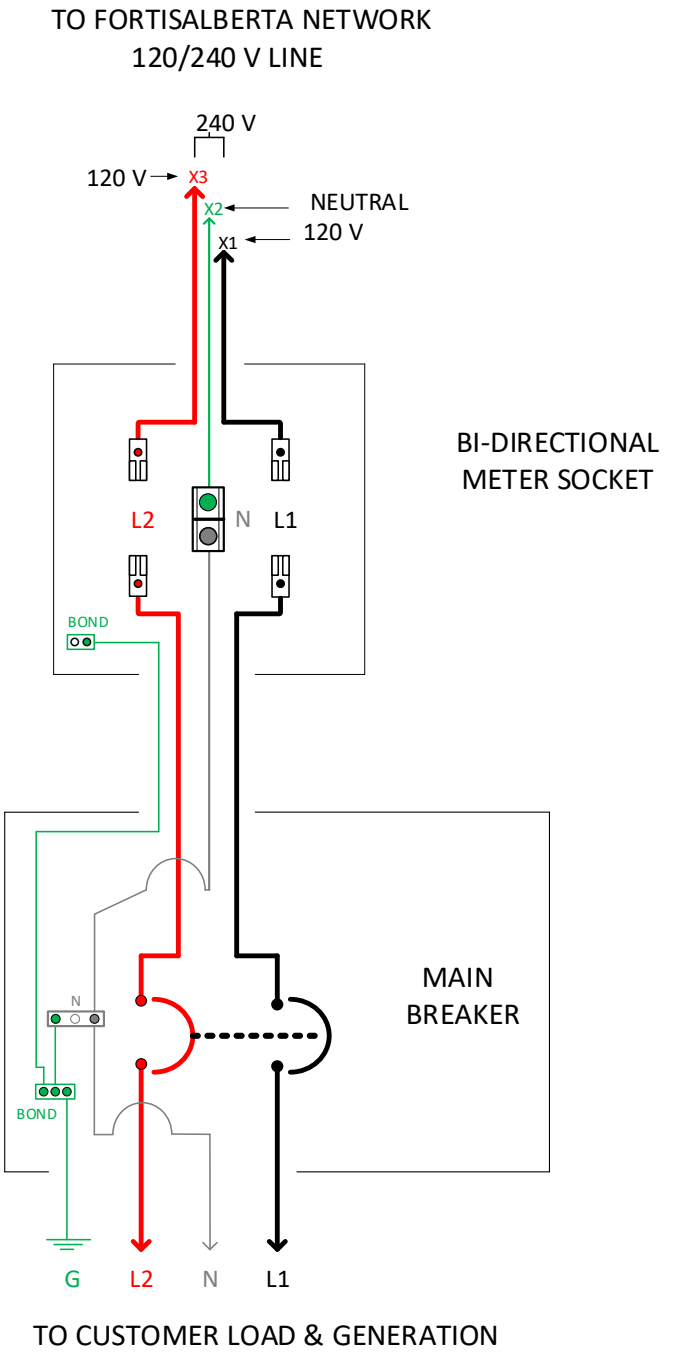
13.2.3 The customer shall comply with FortisAlberta's technical interconnection requirements for a Distributed Energy Resource (DER) as per FortisAlberta Technical Interconnection Requirements for DER less than 150 kW (DER-01) [B13] and FortisAlberta Technical Interconnection Requirements for DER 150 kW and Greater (DER-02) [B14] as applicable.

13.2.4 For new services, the customer shall supply and install their service equipment according to all relevant sections of this publication. For existing services, the customer is typically not required to modify their metering equipment.

13.2.5 Microgenerators can be connected between the meter and the main load service disconnect, only if there is a utility-accessible visible disconnect within sight and within 1 m (3.3 ft) of the meter socket enclosure.

13.2.6 Once all Microgenerator requirements are met, FortisAlberta shall supply and install a bi-directional meter to measure service load and exported power.

120/240 V, 3-WIRE SINGLE PHASE (OVERHEAD OR UNDERGROUND) MICROGENERATION METER SOCKET CONNECTIONS



Note:

1. The meter socket must be grounded.

Figure 22 – 120/240V 3-Wire Single-Phase (Overhead or Underground) Microgeneration Meter Socket Connections

TYPICAL SLD FOR A MICROGENERATION SITE

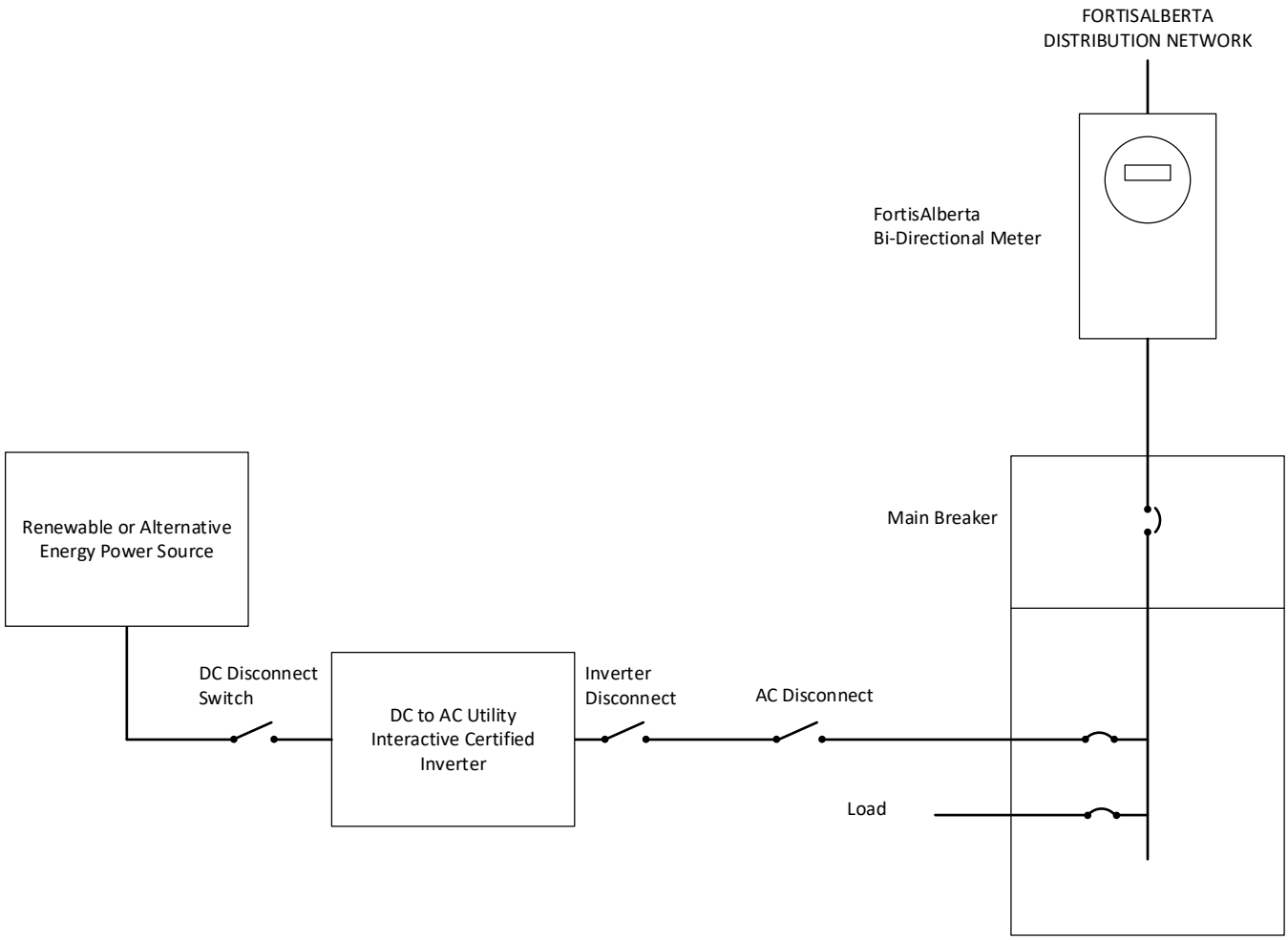


Figure 23 – Typical SLD for a Microgeneration Site

14. Transfer Switches and Standby Generators

14.1 General Requirements

14.1.1 Standby generation designed to operate in parallel with the distribution system (even briefly during the operation of a transfer switch) shall be the customers responsibility and shall meet the following requirements in addition to the standard requirements for each type of service. These requirements apply to all services with a standby generator.

- Closed transition transfer switches shall be:
  - CSA or UL approved, and
  - Momentary transition, and
  - Complete operation in under 300 ms in all cases, and
  - Do not energize the FortisAlberta's line with no voltage present, and
  - Do not export power onto FortisAlberta's system.

- Open transition switches are acceptable and preferred.
- Supply circuit from the standby plant to the transfer switch cannot be run overhead to the pole where the switch is mounted. It is to be either an underground circuit or a plug-in type of connection.
- Service entrance conductors on the load side of the generator cannot be attached to the supply service transformer pole.
- The standby service structure and the generator shall not be installed within a 4 m radius of the supply service transformer pole. No generator cables shall be attached to the FortisAlberta owned supply service pole.
- If a transfer switch is comprised of two molded case breakers they shall be tied together mechanically (inter-locked) to prevent both breakers from being closed at the same time.
- The size and type of switch shall not have an ampacity rating less than the transformer rating.
- The enclosure shall have provisions for a FortisAlberta padlock.
- The double-throw transfer switch shall be attached to the standby service structure and shall never be installed on FortisAlberta's pole or equipment.
- Source circuits from FortisAlberta and the customer's standby generator shall be run in separate conduits.
- An electrical permit for the installation is required before FortisAlberta can complete the connection.

14.1.2 GenerLink

- GenerLink is a device that attaches to the meter base, allowing the connection of a stand-by generator directly at the meter. It automatically disconnects from the utility's power supply when the generator is supplying power, ensuring safety. To connect a GenerLink, the available fault level at the meter shall be below the device's rated capacity.

14.1.3 The customer shall:

- Supply, install, and maintain all equipment and facilities necessary for electrical service up to the load side of the final connection to the supply service transformer or pedestal low-voltage terminals.
- Supply and install weatherproof double-throw transfer switch, and
- Supply and install the standby service structure (e.g., pole stub or building) to support the double-throw transfer switch.

14.1.4 FortisAlberta shall:

- Verify all connections in the double-throw transfer switch (refer to Drawing SMG 6.0.1 and SMG 6.0.2).
- Install warning sticker (item no. 491-1925) on transfer switch and warning label (item no. 491-0315) on the combination meter box, indicating the presence of a standby plant.
- Lock the customer-supplied weatherproof double-throw transfer switch door.

14.2 Overhead Standby Generator Service Supplied by a Pole Mounted Transformer

14.2.1 The customer shall:

14.2.1.1 Service Entrance Conductors:

- Supply and install the service entrance conductors from the standby service up to the supply service transformer low-voltage terminal.

14.2.1.2 Connections

- Make the connection at the standby service structure.

14.2.2 FortisAlberta shall:

14.2.2.1 Service Connection:

- Connect the customer-supplied service entrance conductors to one of the following:
  - the low-voltage terminals of the transformer;
  - the wire harness at the supply service transformer pole; or
  - the supply service conductors at the weatherhead.

14.2.2.2 Ownership and Maintenance:

- Own and maintain all supply service conductors and facilities required for electrical supply service up to the line side of the final connection at the supply service transformer's low-voltage terminals or the customer-owned service entrance conductors.

14.3 Underground Standby Generator Service Supplied by a Pole Mounted Transformer

14.3.1 The customer shall:

14.3.1.1 Service Entrance Conduit:

- Supply and install the conduit up the supply service pole to the metering point, including the service entrance conduit and expansion joint where required.

14.3.1.2 Service Entrance Cable:

- Supply and install the service entrance cable from the supply service transformer pole to the standby service structure.

14.3.1.3 Connections:

- Connect the service entrance cable at the standby service structure.

14.3.2 FortisAlberta shall:

14.3.2.1 Meter Supply and Installation:

- Supply and install the meter and where required a combination meter box (refer to Drawing SMG 5.2).

14.3.2.2 Service Connection:

- Connect the customer-supplied service entrance cable to the metering point.

14.3.2.3 Ownership and Maintenance:

- Own and maintain all supply service conductors and facilities required for an electrical supply service up to the line side of the final connection at the supply transformer's low-voltage terminals and, where required, at the combination meter box.

14.4 Underground Standby Generator Service Supplied by a Padmount Transformer

14.4.1 The customer shall:

14.4.1.1 Service Entrance Conduit:

- Supply and install the service entrance conduit, including expansion joint, where required.

14.4.1.2 Service Entrance Cable:

- Supply and install the underground service entrance cable from the metering point to the double-throw transfer switch.

14.4.1.3 Connections:

- Connect the underground service entrance cable at the double-throw transfer switch.

14.4.2 FortisAlberta shall:

14.4.2.1 Meter Supply and Installation:

- Supply and install the meter and, where required, the combination pedestal meter.

14.4.2.2 Inspection:

- Inspect the installation of the service entrance cable into the metering point and when installed the secondary compartment of the combination pedestal or pole meter (refer to Drawing SMG 2.1, page 1 or SMG 5.2).

14.4.2.3 Service Connection:

- Connect the customer suppled service entrance cable to the metering point.

14.4.2.4 Ownership and Maintenance:

- Own and maintain all supply service cables and facilities required for electrical supply service up to the low-voltage terminals at the supply service transformer, the metering point or, where required, the combination pedestal meter.

15. Material Specifications

15.1 Single-Phase Pre-Cast Concrete Bases

15.1.1 Pre-cast concrete bases are used for mounting padmount transformers. These bases shall meet the following requirements:

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
Precast concrete base for single-phase padmount transformer *(FortisAlberta item # 755-0505)*		IT-755-0505
	D&M Concrete	BIP A3500 TB1
	Eagle Builders	TF1001-L1
	H.O. Concrete	MK101A
	Knelsen Precast	TB0693-01A-R0
	LaFarge	9218

15.2 Three-Phase Pre-Cast Concrete Bases

15.2.1 Pre-cast concrete bases are used for mounting padmount transformers. These bases shall meet the following requirements:

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
Pre-cast concrete base for three-phase padmount transformers for all 500 kVA and below radial and loop feed *(FortisAlberta item # 755-0507)*		IT 755-0507
	D&M Concrete	IT 755-0507
	Eagle Builders	IT 755-0507
	Knelsen Precast	TB0697-01A-R0
	LaFarge	9219
	Proform	IT 755-0507
	Westcon Precast	W2-02
Pre-cast concrete transformer pad for three-phase 750 kVA to 3000 kVA radial and loop feed *(FortisAlberta item # 755-0512)*		IT 755-0512
	D&M Concrete	BIP.A3500.TB5
	Eagle Builders	IT 755-0512
	Knelsen Precast	TB0699-01A-R0
	LaFarge	9214
	Westcon Precast	W2-04
Pre-cast concrete transformer pad for 1000 kVA to 20,000 kVA with 4.16 kV secondary and 4,000 KVA, 600 V secondary *(FortisAlberta item # 755-0516)*		IT 755-0516
	Lafarge	9213

15.3 Pre-Cast Bumper Post

15.3.1 Pre-cast concrete bumper posts are used to protect pad-mounted equipment from vehicular damage. These posts shall meet the following requirements.

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
Pre-cast bumper post, 16 in x 16 in x 27.5 in precast concrete base, 4 in I.D. x 6.5 ft galvanized concrete filled steel pipe, complete with yellow PVC protective sleeve, two red reflective warning stripes and ½ in x 2 in grounding stud *(FortisAlberta item # 515-0802)*	Knelsen Precast	GP0981-01B-R0
	Lafarge	9340
	D & M Concrete	BIP.A3500.GP1

15.4 Conduit Materials

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
*Pipe, nominal size 2-inch, rigid PVC, belled end, per CSA Standard C22.2 No. 211.2 latest revision.	Any electrical distributor	
*Pipe, nominal size 4-inch, rigid PVC, belled end, per CSA Standard C22.2 No. 211.2 latest revision.	Any electrical distributor	
Pipe, corrugated, High Density Polyethylene, coloring shall be UV stable red, per CSA Standard C22.2 no 327 latest revision, This product can be used as an alternative to DB2 PVC. *(FortisAlberta item #632-2804)*	Dura-Line	
For use on road crossings: *Pipe, High density polyethylene 4 in IPS SDR 11. Pipe coloring shall be UV stable red coloring or red with black striping are acceptable, per CSA Standard C22.2 no 327 latest revision, *(FortisAlberta item # 632-3008)* Or Pipe, trenchless raceway, 4 in, PVC, 20 ft*(FortisAlberta item # 632-3015)*	IPEX Dura-Line United Poly Systems Polytubes	
	Carlon	BG440SP-020
Bracket, Standoff, multipurpose, for mounting multiple conduits on a pole, aluminum. *(FortisAlberta item # 589-0450)*	Aluma-Form Hubbell Orbis	6B-CSO-P13/16 CBCSOP1316 SB6-1316-L
Bracket, 4 way “T-slot”, 12-inch-long (*FortisAlberta item # 589-0455)*	Aluma-Form	4WT-12
	Hubbell	C4WT-12
	Orbis	OM4WT12
Strap kit, 2-inch *(FortisAlberta item # 631-1108)*	Aluma-Form	STK-2
	Hubbell	CSTK2
	Orbis	S200
Strap kit, 2.5-inch *(FortisAlberta item # 631-1114)*	Aluma-Form	STK-2.5
	Hubbell	CSTK25
	Orbis	S250
Strap kit, 3-inch *(FortisAlberta item # 631-1109)*	Aluma-Form	STK-3
	Hubbell	CSTK3
	Orbis	S300

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
Strap kit, 4-inch *(FortisAlberta item # 631-1110)*	Aluma-Form	STK-4
	Hubbell	CSTK4
	Orbis	S400
Adaptor, coupler, mechanical, 4-inch, for corrugated, to schedule 40 HDPE, PVC, or steel duct. *(FortisAlberta item # 632-3764)*	Dura-Line	
Adaptor, coupler, mechanical, 4-inch, for corrugated .to DB2 PVC duct. *(FortisAlberta item # 632-3774)*	Dura-Line	
Coupler, mechanical, 4-inch, for corrugated duct. *(FortisAlberta item # 632-3094)*	Dura-Line	

** It is important to use the proper adhesive when bonding HDPE (High-Density Polyethylene) to PVC conduit.* ***Do not use solvent weld cement designed exclusively for bonding PVC to PVC****, as it will not form a reliable bond with HDPE. When PVC is glued to HDPE using standard PVC cement, the joint will degrade and fail over time. It is recommended to use a* ***two-part epoxy or resin-based adhesive*** *formulated for bonding dissimilar materials such as HDPE, PVC, fiberglass, or metal.*

15.4.1 Customers have the choice to opt for Direct Burial (DB2) or ES2 conduit for direct burial or encasement in concrete or masonry applications based on economic considerations. However, based on FortisAlberta's extensive experience with these products, it is recommendation to use rigid schedule 40 PVC for the following reasons:

- *Superior Strength and Durability* - For underground installations without concrete encasement, rigid PVC offers exceptional strength and durability.
- *Enhanced Protection* - In high-traffic areas, both underground and above ground, rigid PVC provides increased protection against shattering due to its robust construction.
- *Resistance to Environmental Factors* - It's important to note that using DB2 conduit for above-ground installations, particularly where exposed to sunlight, is not recommended. Over time, exposure to sunlight will cause DB2 conduit to become brittle and prone to cracking even with minimal impact.
- For further information regarding duct installation, see Annex C for duct systems installation.

15.5 Underground Utility Marking

Metallic and non-metallic marking tapes are used to warn contractors of buried utility lines below. Electronic marker systems, such as marker balls, are designed to facilitate the precise location of underground facilities. These devices shall meet the following requirements.

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
Tape, Marker, “CAUTION BURIED ELECTRIC LINE BELOW” or similar, red, 6-inch wide, polyethylene or detectable metal	Any eletrical distributor	
Ball marker, 4-inch, color coded red for power, tuned to 169.8 khz, suitable for locating underground facilities.	Any eletrical distributor	

15.6 Grounding Material

15.6.1 The following material is required to install the ground grid around padmount transformers:

Description	Approved Suppliers	FortisAlberta Drawing No. or Catalogue No.
#4 AWG bare copper conductor, stranded (FortisAlberta item # 531-0220)	Any electrical distributor	
#2/0 AWG bare copper conductor, stranded (FortisAlberta item # 531-0202)	any electrical distributor	
For use on transformer grounding: • Sectional ground rods, copper clad, ¾ in x 4 in, tapered at both ends (FortisAlberta item # 557-1421) • Coupling for sectional, copper clad ground rods (FortisAlberta item # 557-1525)		SKT 1499
	Nvent/Erico Southern Grounding Axis	613440 C344 GR3404CB
	Nvent/Erico Axis	CC34 GRCC34CU-CUL-COUPLINGS
Ground rod connector, copper clad, for use with sectional ground rods (FortisAlberta item # 557-1311)		SKT. 1499
	Axis	GRC3426
Ground connector for padmount transformers (FortisAlberta item # 553-0611)	Burndy/Hubbell	EQC26CG14
	H-J International	AS1358-001
	Penn-Union	HGSE020-SBHL1
Connector, parallel grove, compression type, copper, for #4 AWG copper str. conductor (FortisAlberta item # 553-0152)	Burndy/Hubbell	YC4C4
	Homac	CC44
	Ilsco	ULT-5
	Kearney/Eaton	302-82
Connector, parallel grove, compression type, copper, for #2/0 AWG copper str. conductor (FortisAlberta item # 553-0155)	Burndy/Hubbell	YGHC26C26
	Ilsco	ELT-2
	Thomas and Betts	CTP2020

Annex A Drawings (Normative)

A1. Basic Drawing Requirements (applies to all drawings)

A. Title block (name building owner, date, drawing/project number, drawing revision number, civic address of building).

B. Name and phone number of the Project Manager for the specific application.

C. Language: English.

D. Scale or Dimensions (where applicable): Metric.

E. Scale Size (where applicable): Riser drawing is a single line schematic and is normally not to scale.

F. Legend of symbols, line style and weights, color, and nomenclature.

G. Two-dimensional format that minimizes the number of crossovers of lines representing the electrical circuits.

H. Text size and style: when printed/plotted to designed paper size, the font is a minimum of 10 points and is a common legible font style.

I. Appropriate line style and thickness to clearly illustrate different objects and areas of interest.

J. Line and text color: colors should not be confusing and clearly illustrate different objects and areas of interest. Note that color schemes shall be clearly legible when the drawing is printed/plotted out on white paper in black ink.

K. White space management: the drawing objects and text shall have enough space between the different objects and areas of interest so as not to compress or clutter the drawing.

L. Produced in a CAD software with a final non-secure PDF format output.

M. Certified standards that have been applied.

N. Drawings issued for FortisAlberta Review

O. Shall be stamped “issued for Review (IFR)” and signed by an Engineer.

NOTE: IFR documents should be reviewed and signed by an Engineer to help ensure completeness and compliance of submission and help avoid delays due to multiple submissions and reviews.

P. Drawings Issued for FortisAlberta Acceptance:

- Shall be Authenticated and shall be stamped “Issued For Construction (IFC)”; and
- Shall include signing block or stamp indicating FortisAlberta’s Review and Acceptance of the electric distribution system.

NOTE: once FortisAlberta has accepted the engineering drawings these plans are deemed “final” and frozen.

A2. Project Specific Drawing Orientation Requirements

A. Building elevation separation from bottom to top of the drawing with each floor clearly labelled.

B. Separate buildings separated horizontally across the drawing with each building clearly labelled.

C. Common electrical wiring raceways/risers kept together on the drawing and uniquely identified.

D. Each electrical panel clearly identified.

E. Each room clearly identified.

F. Electrical schematic captures all the electrical branches and their unique nomenclature with their main control points (switches, circuit breakers, fuses, transformers, existing meters) for the building electrical service entrance to each end load/generator to be metered.

G. Correct electrical connectivity and topology with source, loads and generators.

H. Electrical control points (switches, circuit breakers, fuses, transformers, existing meters) ampacity rating, operating voltage, phasing and circuit wiring configuration (e.g., 100 A, 347/600 V, three-phase, 4-wire, grounded wye).

I. Generators and large motors (>3 HP).

J. Location of known hazardous materials within the building is clearly identified.

A.3 Forms

Title	# of pages	Attachment
Form – Connection Authorization Form	1	Connection Authorization Form
Form - Reconnection Authorization Form	2	Reconnection Authorization Form, page 1 of 2 Reconnection Authorization Form, page 2 of 2

A.4 Placement of Facilities

Title	# of pages	Attachment
Drawing – Commercial Service Location of Padmount Transformers	1	SMG 7.1
Drawing – Service Guard Post and Rail Bill of Material for Above-Noted Drawing	3	1302, page 1 of 2 1302, page 2 of 2 1302 BOM
Drawing - Secondary Conduit Standoff Bracket	2	2624, page 1 of 2 2624, page 2 of 2

A.5 Pre-Cast Concrete Bases

Title	# of pages	Attachment
Drawing – Precast Concrete Pad for Single-Phase Padmount Transformer Up to 167 KVA	1	Item 755-0505
Drawing – Precast Concrete Base for Three-Phase Transformer for All 500 kVA and Below	1	Item 755-0507
Drawing - Precast Concrete Transformer Pad for 3-Phase 750 kVA to 3000 kVA	1	Item 755-0512
Drawing - Precast Concrete Transformer Pad for 1000 kVA to 20,000 kVA	1	Item 755-0516

A.6 Material

Title	# of pages	Attachment
Drawing – 2-Wire Current Transformer Dimension Specification	1	SMG 2.16.5
Drawing – Service Secondary Connectors	1	SMG 4.3
Drawing - Sectional Ground Rods and Associated Material	1	SKT 1499

A.7 Padmount Transformer Civil and Grounded

Title	# of pages	Attachment
Bill of Material – Padmount Transformer Civil and Grounding	1 1	Transformer Civil & Grounding: 1526, Single-Phase Transformer 1515, Three-Phase Transformer
Drawing – 1 PH Low Profile Padmount Transformer General Arrangement	3	1226, page 1 of 2 1226, page 2 of 3 1226, page 3 of 3
Drawing – Three-Phase Radial Feed Transformer General Arrangement and Grounding Detail	4	1315, page 1 of 3 1315, page 2 of 4 1315, page 3 of 4 1315, page 4 of 4

A.8 Single-Phase Service

Title	# of pages	Attachment
Drawing – Customer-Owned Pole Mount To Underground Service	1	SMG 4.1
Drawing – Single-Phase Rural Underground Service	1	SMG 5.2
Drawing – Single-Phase Metering Pedestal	1	SMG 2.1, page 1 of 3
Drawing – Lot Line Metering (Self-Contained 200 A)	1	SMG 2.1, page 2 of 3
Drawing – Lot Line Metering (Instrument Type 400 or 600 A)	1	SMG 2.1, page 3 of 3
Drawing - Outdoor Instrument Type 1 Phase, 3 Wire, 400A	1	SMG 2.16.4, page 1 of 2
Drawing - Outdoor Instrument Type 1 Phase, 3 Wire, 400A	1	SMG 2.16.4, page 2 of 2
Drawing – Single-Phase Standby Overhead Service	1	SMG 6.0.1
Drawing – Single-Phase Standby Underground Service	1	SMG 6.0.2
Drawing – Single-Phase Instrument Transformer Enclosure Layout	1	SMG 7.6.1
Drawing – Customer-Owned Temporary/Permanent Overhead Service Structure	1	SMG 9.2
Drawing – Customer-Owned Temporary/Permanent Underground services Structure	1	SMG 9.3
Drawing – Single-Phase Pole Dual Metering For Two Services Bill of Material for Above-Noted Drawing	2	1635 1635 BOM

A.9 Three-Phase Service

Title	# of Pages	Attachment
Drawing – 3 Phase Service (Padmount Metering)	1	SMG 2.13.1
Drawing – 3 Phase Padmount Metering With Outdoor NGR	1	SMG 2.13.2
Drawing – 3 Phase Padmount Metering and Indoor NGR	1	SMG 2.13.3
Drawing – 3 Phase Service With Indoor Metering and NGR	1	SMG 2.13.4
Drawing – Three-Phase Oilfield and Irrigation Overhead Service	2	SMG 2.13.5, page 1 of 2 SMG 2.13.5, page 2 of 2
Drawing – Three-Phase Instrument Transformer Enclosure Layout	1	SMG 7.6.2

Annex B Bibliography (Informative)

[B1] Canadian Electrical Code, Part One (CSA Standard No. C22.1 - 2021)

[B2] CSA CAN3-C235-19 Preferred voltage Levels for AC Systems, 0 to 50,000 volts

[B3] IEEE 519-2022 “IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems

[B4] CSA 61000-3-6, Electromagnetic Compatibility (EMC) Part 3-6: Limits – Assessment of Emission Limits for the Connection of Distorting Installations to MV, HV and EHV Power Systems

[B5] C57.110-2018 - IEEE Recommended Practice for Establishing Liquid-Immersed and Dry-Type Power and Distribution Transformer Capability When Supplying Nonsinusoidal Load Currents

[B6] Alberta Electrical Utilities Code (AEUC)

[B7] Canadian Electrical Code Part 3, CSA C22.3 No.1 “Overhead systems

[B8] Canadian Electrical Code Part 3, CSA C22.3 No. 7 for “Underground systems

[B9] Province of Alberta Electric Utilities Act

[B10] Federal Regulations S-A-01

[B11] Canadian Electrical Code C22.2 NO. 229, Switching and metering centers

[B12] AUC Rule 024: Rules Respecting Microgeneration

[B13] FortisAlberta Technical Interconnection Requirements for DER less than 150 kW DER-01

[B14] FortisAlberta Technical Interconnection Requirements for DER 150 kW and Greater DER-02

[B15] ASTM D 1556, Standard Test method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

[B16] C227.3, Low-profile single-phase, pad-mounted distribution transformers with separable insulated high-voltage connectors

[B17] CSA C227.4, Three-phase, pad-mounted distribution transformers with separable insulated high-voltage connections

Annex C Duct Systems (Informative)

C1. Duct Systems

C.1.1 Pre-Installation Preparation:

- Approval - All proposed cable routing and duct work for primary (high-voltage) cable installations on behalf of FortisAlberta are subject to written approval by FortisAlberta prior to construction.
- Orientation - An on-site orientation is required for the customer or their contractor to review routing plans and discuss the specifics of trenching activities. This includes addressing any safety hazards, concerns, coordination, or shared civil work between the customer and FortisAlberta when installing electrical facilities on roads and/or Utility Right-of-Way, ensuring compliance with all safety requirements.
- Safety Procedure - Contact Utility Safety Partners (formerly Alberta One-Call) before starting work.
- Property Rights - Underground service lines shall be kept a minimum of 1.0 m (3.3 ft) from the edge of the property line.

  As a customer, you are not permitted to perform excavation work in the Utility Right-of-Way without approval from the local road authority, however, you are required to complete all trenching on your property.

C.1.2 Trenching and Excavation:

- Route - Ensure the trench takes the most direct route to the meter base location.
- Depth – Under standard conditions, the top of the duct shall be 1,000 mm (33 in) to 1,200 mm (48 in) below finished grade for normal trenching, and 1,200 mm (48 in) to 1,500 mm (60 in) for road crossings. Trench depths exceeding these values require approval from FortisAlberta.
- Facility Location - Some tasks may necessitate work above energized primary (high-voltage) or secondary (low voltage) utility owned cables, potentially involving crossing or trenching over these cables. Mechanical excavation is permissible up to 3.0 m (10 ft) from the energized facilities, such as switching cubicles or riser poles. Typically, FortisAlberta will handle the remainder of the trenching process. However, under specific conditions, FortisAlberta may permit the customer or contractor to complete the work.

  Before determining the boundaries of mechanical excavation, it is imperative to locate the facilities accurately using hydro excavation or hand digging methods.
- Clearance – Contractors working on behalf of the customer are prohibited from trenching within the following distances without prior consultation with FortisAlberta:
  - 1.0 m (3.3 ft) radius of any FortisAlberta wood pole
  - 2.5 m (8.2 ft) from the point of entry of an anchor or guy into the ground
  - 3.0 m (10 ft) from an existing energized padmount transformer, switching cubical, pedestal, or energized cable.

  To ensure the safety and integrity of FortisAlberta's infrastructure, it is mandatory to locate these facilities accurately before determining the limits of mechanical excavation. This can be achieved through hydro excavating or hand digging methods.

Furthermore, any trenching activities that may encroach upon the specified clearance parameters require an on-site meeting with FortisAlberta's personnel (FortisAlberta Power line Technician) to discuss and assess the situation thoroughly. See Section C.1.1 regarding Orientation.

C.1.3 Cable or Duct Installation:

- Bedding - Service cable shall be set on undisturbed soil that is free from rocks, debris, and sudden grade changes. If large lumps of clay and soil have hardened due to drying or freezing, and when a backhoe has been used for electrical service installation, a 100 mm (4 in) layer of sand shall be placed below the cable.

  For duct installation in native soil, the duct can be set at the bottom of the trench without additional bedding.

  When installing duct in locations with rock or shale, excavate 76 mm (3 in) below the desired depth and bring the trench back to grade with sand or fill material. This will provide the duct with a uniform bedding surface.
- Sand Layer - Place a 200 mm (8 in) layer of sand above the cable or duct.
- Marker tape - Install marker tape above the sand bed.
- Marker Ball - Install a color-coded Red (Electrical) 4-inch marker ball tuned to 196.8 khz at splices, buried service drops or were crossing underground facilities.

C.1.4 Backhoe Trenching and Backfilling:

- Trench Bottom - Should provide a continuous firm and uniform support for the duct bank construction. Care should be taken to avoid lumps, ridges, depressions, organic material (tree roots) and stones causing "point" contact or uneven bearing.
- Unstable Soils - Conduct tests to establish the soil strength in marsh or swamp areas. It may be necessary in these conditions to dig deeper and refill with crushed stone or gravel, or to employ mats, timbers or concrete base.
- Backfill Material - Can be the material trenched with a mechanical trencher if the inspector deems it suitable. Soil with high thermal resistivity that contains large amounts of organic, peat, black loam, sod, hardened clay, stones, straw, snow, or frozen material will not be acceptable. All backfill material is subject to the inspectors' approval. Sand or clean backfill material shall be substituted if the native backfill is unusable.
- Backfill Compaction - Compact backfill in uniform lifts not exceeding 305 mm (12") to specified densities 95 per cent of (SPD) for silty and clay soils, 70 per cent relative density for sands and gravels- ASTM D1556 [B15].

C.1.5 Direct Buried Duct Bank Installation:

- See Section C.1.3 duct installation and C1.4 for backhoe trenching and back filling details along with the following additions:
- Placement of Duct - After the first tier of duct is installed, backfill and compact as outlined below. If wood steaks are employed for spacing, remove them as the backfill is placed and tamped. Then begin the next tier.
- Initial Backfilling - Install backfill along the side, between and at the top of the duct. Use a hand tamper only to tamp firmly.

Backfill over the duct to the required thickness (see Final Backfilling) and tamp firmly, using a hand tamper.

All “initial backfilling” material shall pass the following gradation:

Table C1 – Aggregate gradation table.

Sieve Size	Percentage Passing Sieve	Plastic Index
1.5-inch	100	Max. 8
1-inch	90-100	
No. 8	35-80	
No. 200	0-8	

- Final Backfilling - When the last tier is placed, hand-place the backfill to 200 mm (8 in) over the cable or duct with soil that does not contain stone larger than 9.5 mm (3/8 in).

  From this point, backfill may be completed by hand or by pneumatic tamping in layers from 200 mm (8 in) to 305 mm (12 in).

  The backfill material shall be placed in a manner that will not damage the duct, its structure, or allow future settling of the trench or substructure.

  When placing backfill by machine, avoid the use of large rocks until a protective layer (minimum of 305 mm (12 in)) is established.

  Backfill thickness between duct is usually between 51 mm (2 in) to 71 mm (8 in) see Figure C-1.

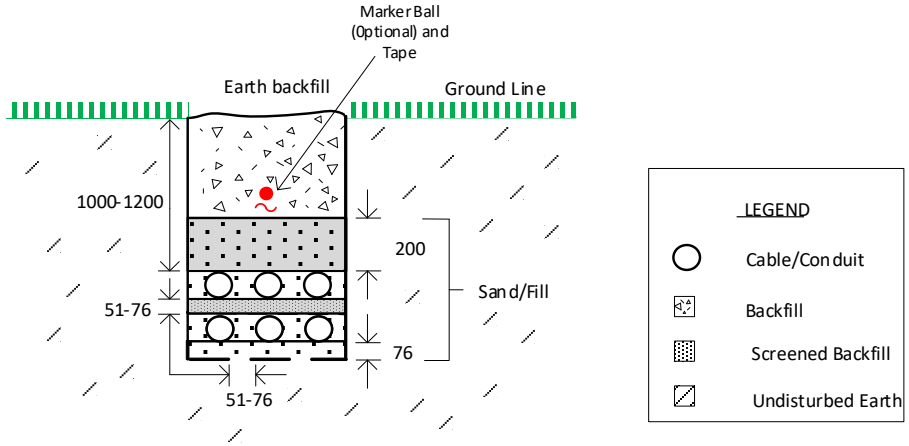


Figure C-1 - Typical direct buried electrical duct bank layout with sand fill.

NOTE: for direct buried duct, spacers should not be used with DB2 or rigid PVC. Spacers will only provide “point” support instead of the continuous bed that is required. Use of spacers may result in damage to the conduit when using sand fill.

C.1.6 Safety and Compliance:

- Energized Facilities - Consult with FortisAlberta for trenching near energized cables. Follow Utility Safety Partners procedures before starting work. See Section C.1.1, Orientation.

- Temporary Covering - Exposed energized cables cannot be left unattended. If the excavation is narrow or small, the primary cable shall be covered with soil bags or some other suitable temporary method. Contact FortisAlberta for more details.

Under no circumstances shall energized primary cables be moved or handled in any way.

C.1.7 Documentation and Record Keeping:

- Record Keeping: Maintain detailed records of the installation process, approvals, inspections and as-built drawings.
- As-Built Drawings: Prepare and submit as-built drawings showing the actual location, depth and details of the cable or duct installation, including pull direction and final pull tensions, for future reference and maintenance.

By following this duct installation procedure, you can ensure a compliant and safe installation that meets the requirements of FortisAlberta and industry standards. Always consult with FortisAlberta and the local authority having jurisdiction to ensure compliance with all regulations and guidelines.

C.2 Service Ducts

- FortisAlberta reserves the right of final approval for the location of facilities before granting construction approval.
- It is recommended that permanent commercial services be in duct.
- All service cables shall be enclosed in rigid PVC duct when crossing a paved surface, such as a driveway, laneway, or municipal right-of-way located outside private property.
- Ducts shall be installed where primary cable is deemed inaccessible by FortisAlberta.
- All ducts shall be equipped with bell collars to avoid damaging the cable.
- The installation of primary service cables under buildings is not permitted.
- The customer will provide all ducts (rigid PVC, DB2, HDPE or various trenchless race way duct approved by FortisAlberta), pull boxes and manholes required for installing the electrical services on the customer's property.
- The customer cannot install ducts into an energized manhole or handhole of a vault.
- Duct sizes requirements for primary cables depend on cable size and number of cables to be installed in the duct. FortisAlberta offers two sizes 4-inch and 6-inch for duct systems.
- When FortisAlberta ducts have been stubbed to the property line, customers shall first confirm that the exposed duct is the correct one and then connect their service entrance duct to the FortisAlberta's supply duct, if provided. Contact 310 Wire (9473) to arrange for duct verification.
- If pulling lengths exceed the maximum pulling tension of the cable, a pull box shall be installed.

C.3 Duct Bends

- All bends and elbows shall be made of ridged, thick-walled PVC (schedule 40), DB2 bends are not acceptable.
- All bends and elbows that have a pull tension in excess of 3336 N (750 lb) shall be encased in a minimum of 76 mm (3 in) of concrete through the radius of the bend. Ducts encased in concrete shall be separated from each other by at least 25 mm (1 in) of concrete. The concrete mixture shall have a compressive strength of 17.2 MPA (2500 psi) minimum.

- An additional 3.0 m (10 ft). horizontal section of rigid, thick-walled PVC shall be attached to the bend.
- Ducts containing primary cables shall be aligned directly underneath the high-voltage bushings of the transformer and centered within the base opening. Duct bends shall exit the earth at a 90-degree angle, be cut off at 100 mm (4 in) above the bottom of the base and have a bell end or collar installed to prevent damage to the cable.
- All spare ducts are to be identified (marked or labeled) and caped (taped or covered by some other suitable method) to prevent material falling into them.
- Ducts containing primary cables entering switching cubicles shall be clearly labeled to identify the equipment they service (e.g., transformers, switchgear etc.).

C.3.1 Rationale for Concrete-Encased Elbows and Joints:

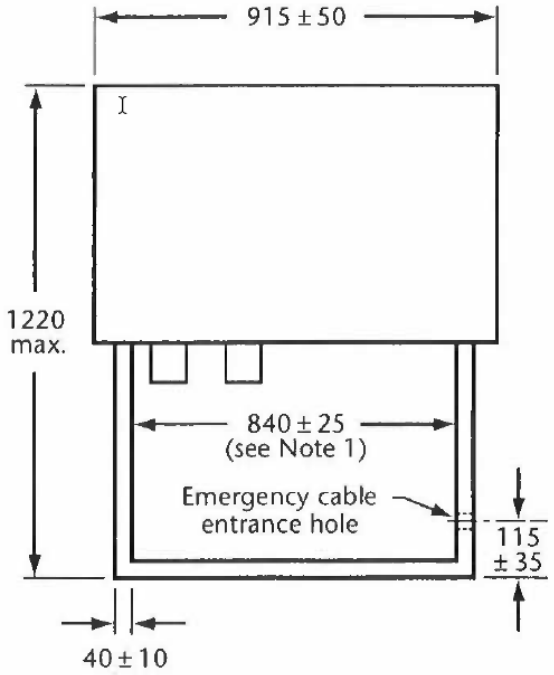
- Concrete encasement of elbows and joints serves as an additional safeguard in duct systems, particularly during cable pulling for new installations. There is a risk that cables or pull ropes may burn through the elbow, compromising the duct system's integrity. Encasing elbows and joints in concrete provides insurance against cable burn-through or conduit heaving or pulling apart during high-tension pulls (installation and removal).
- In new construction, these issues can be mitigated through pull calculations or the use of lubrication to prevent cable damage due to high sidewall bearing pressures.
- The primary advantage of concrete encasement becomes evident during future upgrades or repairs to the cable system. Over time, ducts may accumulate mud, sludge or debris, making cable removal challenging (tensions required to pull the cable out will easily exceed the calculated pull in tensions). When extracting the cable, the focus shifts from protecting it to ensuring the integrity of the conduit system. Concrete encasement adds an extra layer of protection, preventing excessive force from rupturing the conduit system while removing cables due to failure or capacity increases.

Annex D Single- and Three-Phase Transformer Configurations (Informative)

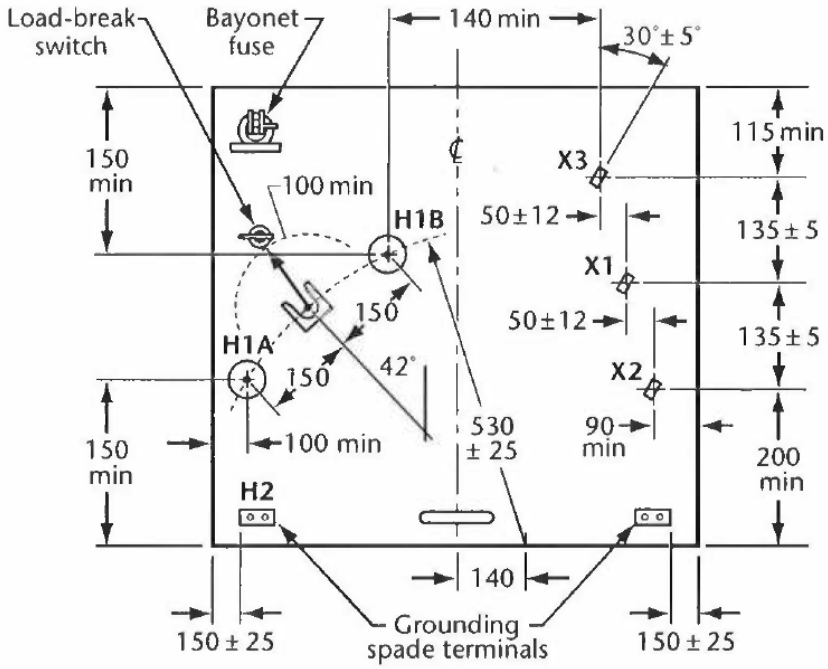
D.1 Transformer Drawings

The following section includes excerpts from CSA C227.3, Low-Profile Single-Phase Pad-Mounted Distribution Transformers with Separable Insulated High-Voltage Connectors [B16], and CSA C227.4, Three-Phase Pad-Mounted Distribution Transformers with Separable Insulated High-Voltage Connections [B17]. These excerpts illustrate typical transformer and compartment dimensions for single- and three-phase padmount distribution-class transformers. Table 7, Physical sizes of transformers, and the associated figures apply to both radial and loop-feed three-phase transformers rated from 75 to 3000 kVA, with voltage classes of 120/208Y/, 277/480Y, and 347/600Y. For three-phase transformers larger than 3000 kVA or with a 2400/4160Y voltage class, please contact FortisAlberta to obtain the necessary drawings.

D.2 Single-Phase Transformers



(a) Plan view of compartment with hood removed



(b) Front view of compartment with hood removed

D.3 Three-Phase Transformers

Table 7
Physical sizes of transformers
(See Clause 5.1.1.)

Rated kVA capacity	Type of feed	Transformer maximum BIL, kV	Width, mm	Figure
75, 150	Radial	95	1280*	3
75, 150, 225, 300	Loop	95	1480	4
75, 150, 225, 300, 500	Radial	125	1480	5
75, 150, 225, 300, 500	Loop	125	1480	6
750, 1000, 1500, 2000, 2500, 3000	Radial	125	1730	7
750, 1000, 1500, 2000, 2500, 3000	Loop	125	1730	8

** For radial feed transformers rated at 75, 150 kVA, a width of 1480 mm should be allowed if agreed by the purchaser.*

D.3.1 Three-Phase, Radial – 75-500kVA

Figure 5 a)
Size 1480 × 1370 radial feed — Plan view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)

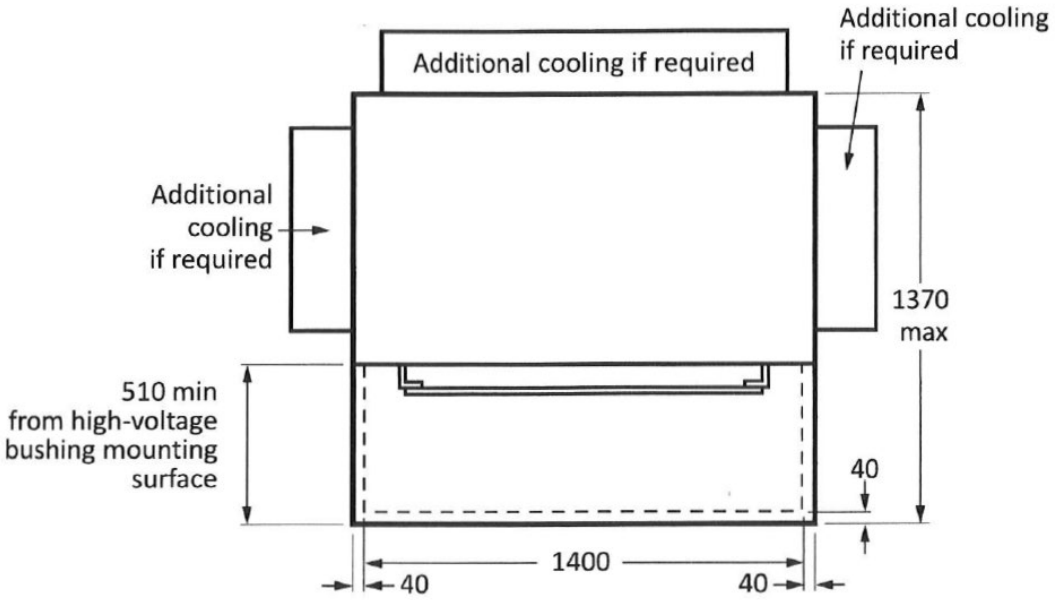
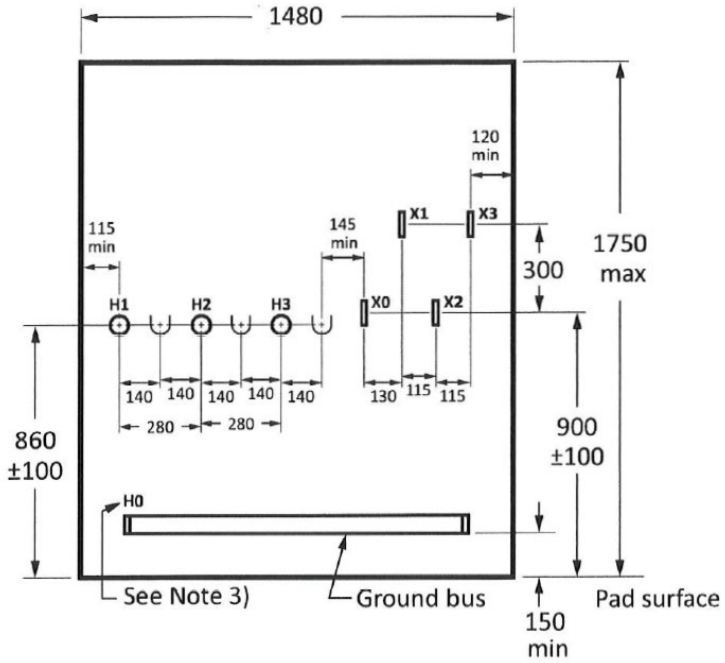


Figure 5 c)
Size 1480 × 1370 radial feed — Front view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)



D.3.2 Three-Phase, Loop Feed – 75-500kVA

Figure 6 a)
Size 1480 × 1370 loop feed — Plan view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)

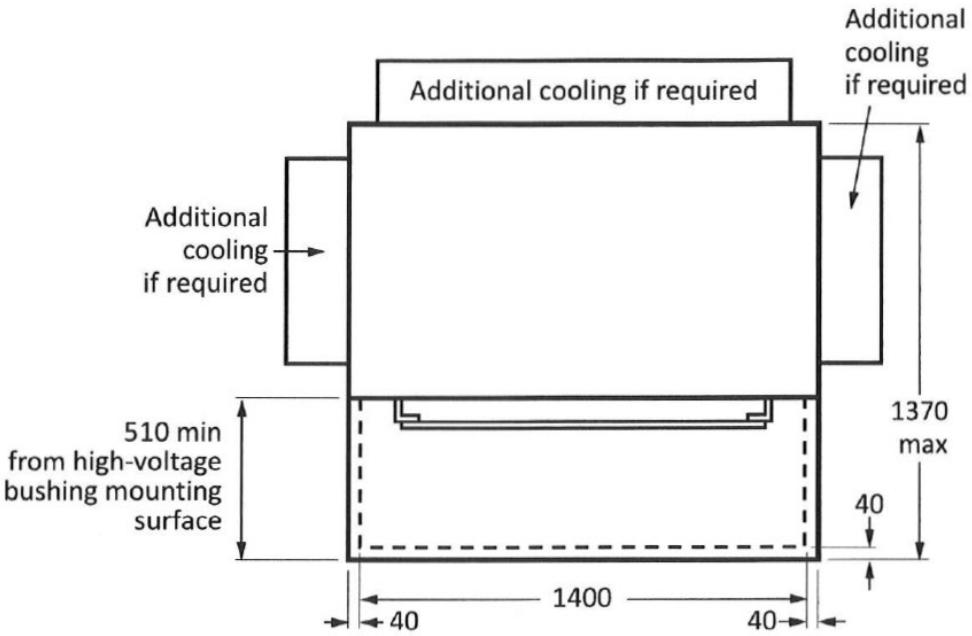
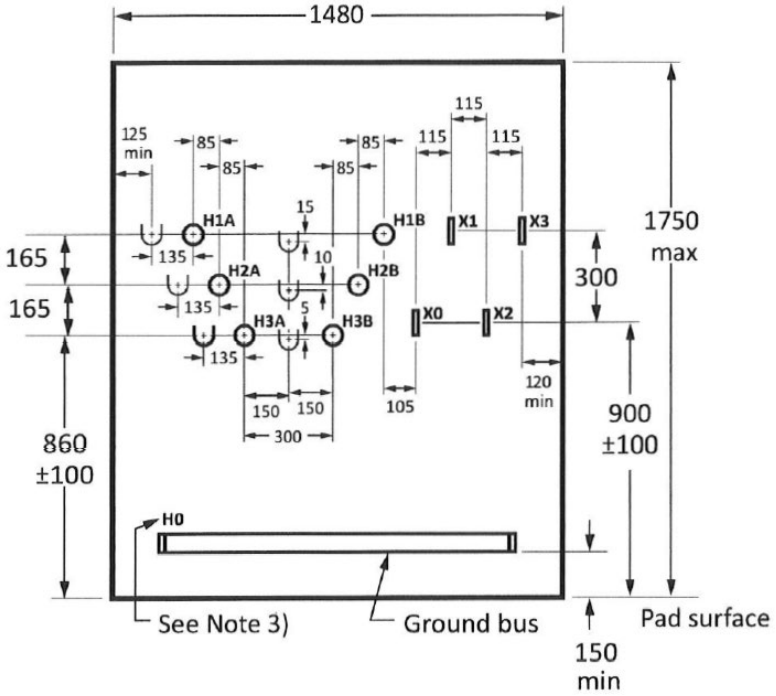


Figure 6 c)
Size 1480 × 1370 loop feed — Front view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)



D.3.3 Three-Phase, Radial – 750-3000kVA

Figure 7 a)
Size 1730 × 1575 radial feed — Plan view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)

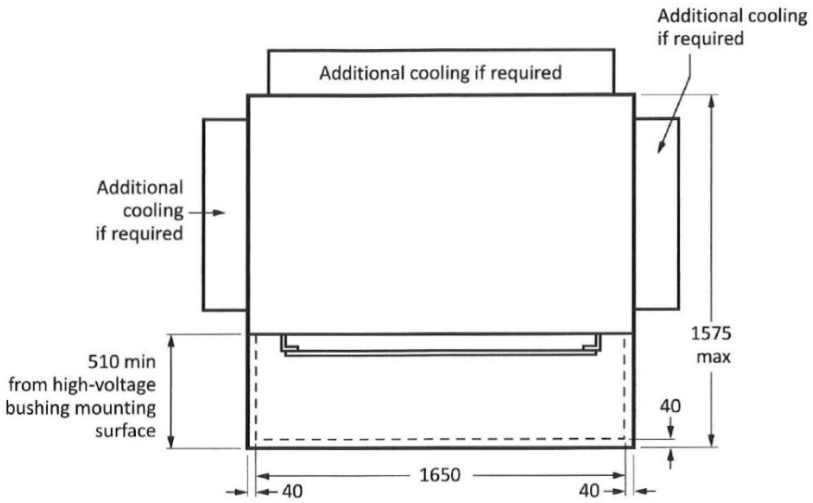
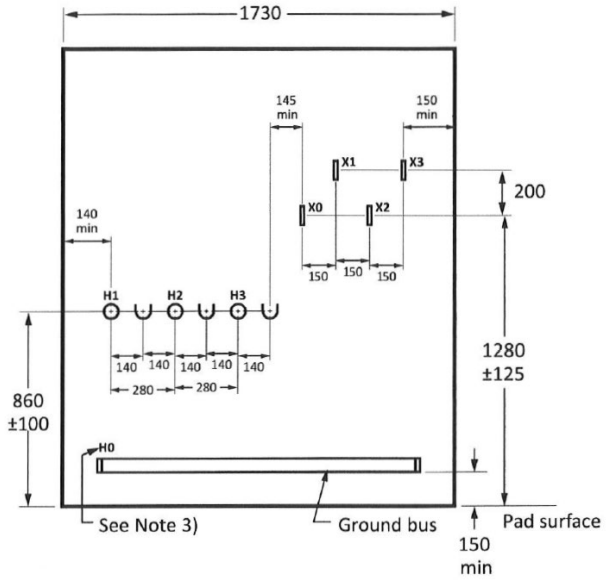


Figure 7 c)
Size 1730 × 1575 radial feed — Front view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)



D.3.4 Three-Phase, Loop Feed – 750-3000kVA

Figure 8 a)
Size 1730 × 1575 loop feed — Plan view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)

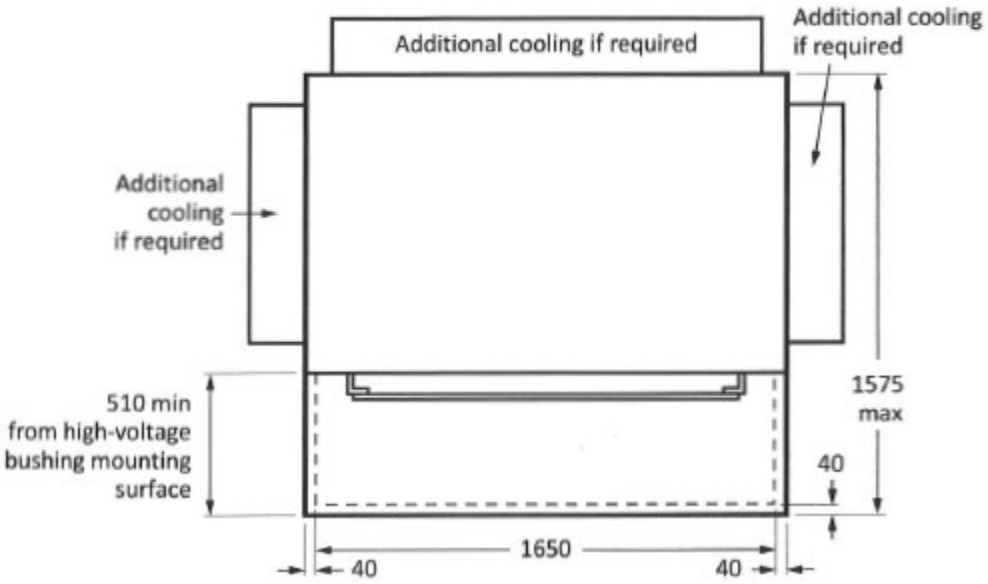
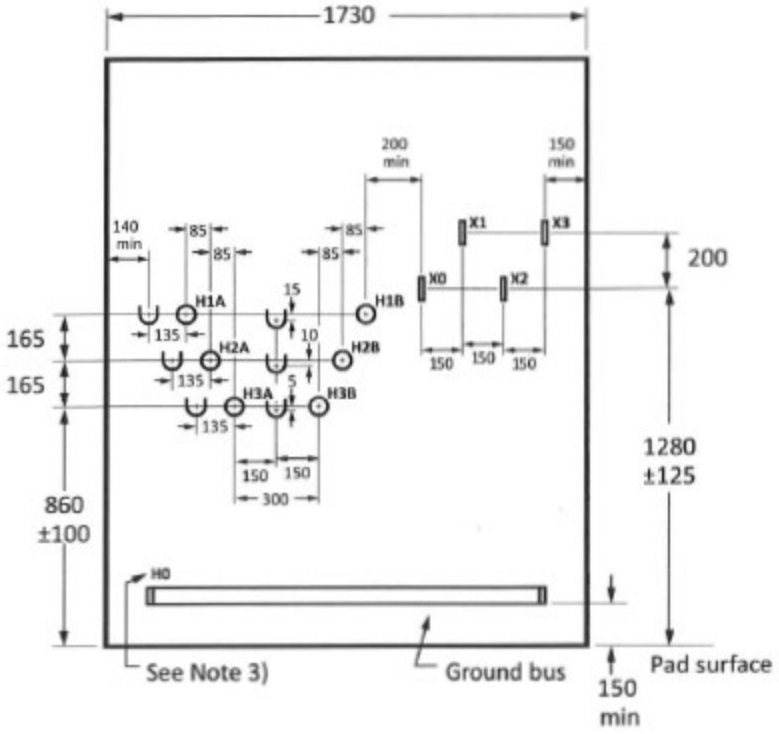


Figure 8 c)
Size 1730 × 1575 loop feed — Front view
(See Clauses 5.2.1, 6.1.1.1, and 9.3 and Table 7.)



Forms

Connection Authorization Form

ELECTRICAL SERVICE CONNECTION AUTHORIZATION
FOR AN ACCREDITED CORPORATION

This document serves as confirmation to the electrical utility supply authority that the electrical service referenced below has been constructed and complies with applicable codes, standards and regulations under the Alberta Safety Codes Act.

ELECTRICAL UTILITY INFORMATION

Name of Electrical Utility[_____] Service Point Location[_____]

ACCREDITED CORPORATION INFORMATION

Name of Accredited Corporation[_____] Accreditation Number [_____]

Billing Location:
Customer Name[_____] Phone[_____] Fax [_____]

Billing Address [_____] Postal Code [_____]

ELECTRICAL SERVICE INFORMATION

Service Location:
County, M.D. or I.D. [_____] Nearest Town, Village or Hamlet [_____]

Subdivision [_____] Civic Address [_____]

Lot No. [__] Blk. No. [___]Plan No. [____]LSD or Pt. of [___]Sec. [____] Twp. [____] Rge. [___] W. of [___]

Service Site Contact:
Customer's Construction Site Representative [_____]Tel: [_____] Fax: [_____]

Service Technical Details:
Voltage (phase to phase) [_____]Number of Phases [_____]Current Rating [_____]

System Grounding Method [_____]Approx. Completion Date (D/M/Y) [_____]

Comments_____
_____

COMPLIANCE DECLARATION

The electrical service installation covered by this authorization has been constructed and complies with applicable codes, standards and regulations under the Alberta Safety Codes Act. I certify the service equipment is ready for connection by the electric utility supply authority. I am authorized by my corporation to sign this document.

Accredited Corporation Representative (print name) _____

Signature _____ Date (D/M/Y)_____

Accredited Corporation Representative's Phone [_____] Fax [_____]

RECONNECTION AUTHORIZATION FORM

All sections of this form must be completed.

SECTION A – OWNER/TENANT DECLARATION

Name: _____ Customer I.D.* _____

**FortisAlberta Inc. PLT to confirm*

Address: _____

Site ID Number: _____

City/Town: _____ Province: Alberta Postal Code: _____

Telephone: Residential: _____ Cell: _____ Business: _____

I, the undersigned, in consideration of FortisAlberta Inc. reconnecting the electrical service, hereby: (1) represent and warrant to FortisAlberta Inc. that I have powers and authority of ownership; (2) acknowledge that I have read the Temporary Disconnection/Reconnection of Electrical Service Procedure; (3) acknowledge that I have instructed FortisAlberta Inc. to reconnect the electrical service; (4) acknowledge and agree that FortisAlberta Inc. assumes no liability, obligation nor responsibility for the adequacy and/or safety of the work performed on the electrical service and/or for any loss, damage and/or injury that may result from reconnection of the service; (5) on behalf of myself and my heirs, representatives and successors, remise, release and forever discharge FortisAlberta Inc. and its officers, directors, employees, agents, representatives, insurers and successors (collectively, the "Releasees") of and from any and all actions, causes of action, claims, counterclaims, demands, damages, costs, expenses and compensation of any kind which I have, or may have in the future, in any way resulting or arising from the work performed on the electrical service and/or reconnection of the electrical service; and (6) covenant and agree to indemnify and hold harmless the Releasees for all losses, damages, costs and expenses which may be suffered as a result of the work performed on the electrical service and/or reconnection of the electrical service.

Date: _____ Owner/Tenant Signature: _____

PLEASE NOTE: FortisAlberta Inc. and its customers are bound by the current customer terms and conditions of distribution access service, a copy of which is available on the FortisAlberta website (www.FortisAlberta.com).

SECTION B – SERVICE DETAILS

This section shall be completed by the person performing the work. Both old and new service type must be checked.

Category of Service: Residential ☐ Farm ☐ Commercial ☐

Type of Service: Overhead ☐ Underground ☐

OLD: Rating: Single Phase ☐ Three Phase ☐ Amperage: _____

Description of service equipment damaged and/or replaced *(check as required)*:

_____ Service Mast Damage ☐

_____ Meter Socket Damage ☐

_____ Main Switch Damage ☐

NEW: Rating: Single Phase ☐ Three Phase ☐ Amperage: _____

SECTION C – ELECTRICIAN/OWNER DECLARATION

This section shall be completed and signed by the person performing the work.

Electrician**: _____ Registration Number: _____

*Owner/Tenant to confirm****

Address: _____

City/Town: _____ Province: Alberta Postal Code: _____

Telephone: Residential: _____ Cell: _____ Business: _____

** Check this box if the work was performed by the owner described in Section A: ☐

I, the undersigned, hereby certify to FortisAlberta Inc. and to the owner that:

(1) only repair work to correct the damage identified above has been performed on this electrical service; and

(2) no change was made to the ratings and/or characteristics of the electrical installation *(strike this line if not applicable)*; and

(3) the work referenced above has been completed and conforms in all aspects with applicable codes, standards and regulations including, without limiting the generality of the foregoing, the *Safety Codes Act* of Alberta.

Date: _____ Signature: _____

*** *PLEASE NOTE: The owner/tenant is responsible for confirming the electrician's registration number. It is in the owner/tenant's best interests to confirm the electrician's registration number.*

Purpose:

This procedure outlines the actions to be taken by owners and electrical contractors when performing planned or unplanned repair work on electrical services.

Scope:

This procedure applies to all owners and all electrical contractors, their employees and sub contractors when working on electrical services that are or will be supplied from FortisAlberta Inc. Electrical contractors are responsible for ensuring the information in this procedure is communicated to their employees and sub-contractors.

Permit:

A permit in the electrical discipline is required to install, alter or add to an electrical system. Some exceptions apply, as per the Safety Codes Act (Alberta), Permit Regulation, section 8(2).

Definitions:

In this procedure:

electrician means a person who holds a trade certificate or equivalent in the electrician trade acceptable under the Apprenticeship and Industry Training Act (Alberta);

owner includes a lessee, a person in charge, a person who has care and control and a person who holds out that the person has the powers and authority of ownership or who for the time being exercises the powers and authority of ownership;

permit issuer means a safety codes officer or a person designated to issue permits pursuant to section 44 of the Safety Codes Act (Alberta);

planned/unplanned work (no permit required) means electrical repair work on customer-owned equipment where the failed equipment must be repaired or replaced without modifying the ratings or characteristics of the electrical installation; and

planned/unplanned work (permit required) means electrical repair work on customer-owned equipment where the failed equipment must be replaced and modifies the ratings or characteristics of the electrical installation.

Procedures:

All planned or unplanned work must be carried out by a qualified electrician or as required under article 9(1) of the Permit Regulation document AR 204/2007. It is in the owner's best interests to confirm the electrician's registration number.

Disconnection of Service

The disconnection of service must be arranged with FortisAlberta Inc. by contacting 310 WIRE (i.e., 310 9743).

An electrician may request FortisAlberta Inc.'s permission for such electrician to temporarily disconnect a customer's service for maintenance. FortisAlberta Inc. may, at its discretion, grant such permission if the electrician has: (1) identified the customer name and meter number of the service to be disconnected along with expected reconnection date and time; (2) confirmed that the electrician has been trained by FortisAlberta Inc. in the disconnection of electrical service; and (3) acknowledged that such disconnection by the electrician and maintenance by the electrician are at the electrician's sole risk.

Reconnection of Service

Reconnection of service must be arranged with FortisAlberta Inc. by contacting 310 WIRE (i.e., 310 9743).

An electrician who disconnected the service by removing the meter, may re-install the same meter after receiving prior approval from Fortis Alberta and installing a contractor meter seal. Should the disconnection be completed by the electrician at the weatherhead, Fortis Alberta MUST do the reconnection.

For planned/unplanned work on an electrical service where the ratings of the equipment has been modified and requires a permit, the permit must be provided to FortisAlberta Inc. prior to the reconnection.

Should it be impractical to obtain a permit (i.e., weekend, statutory holiday or after normal hours) for unplanned work, FortisAlberta Inc. may, at its discretion, reconnect without a permit. In this case, the owner and the electrician must sign a Reconnection Authorization Form releasing FortisAlberta Inc. from any and all liability for loss, damage or injury which may be suffered as a result of the reconnection.

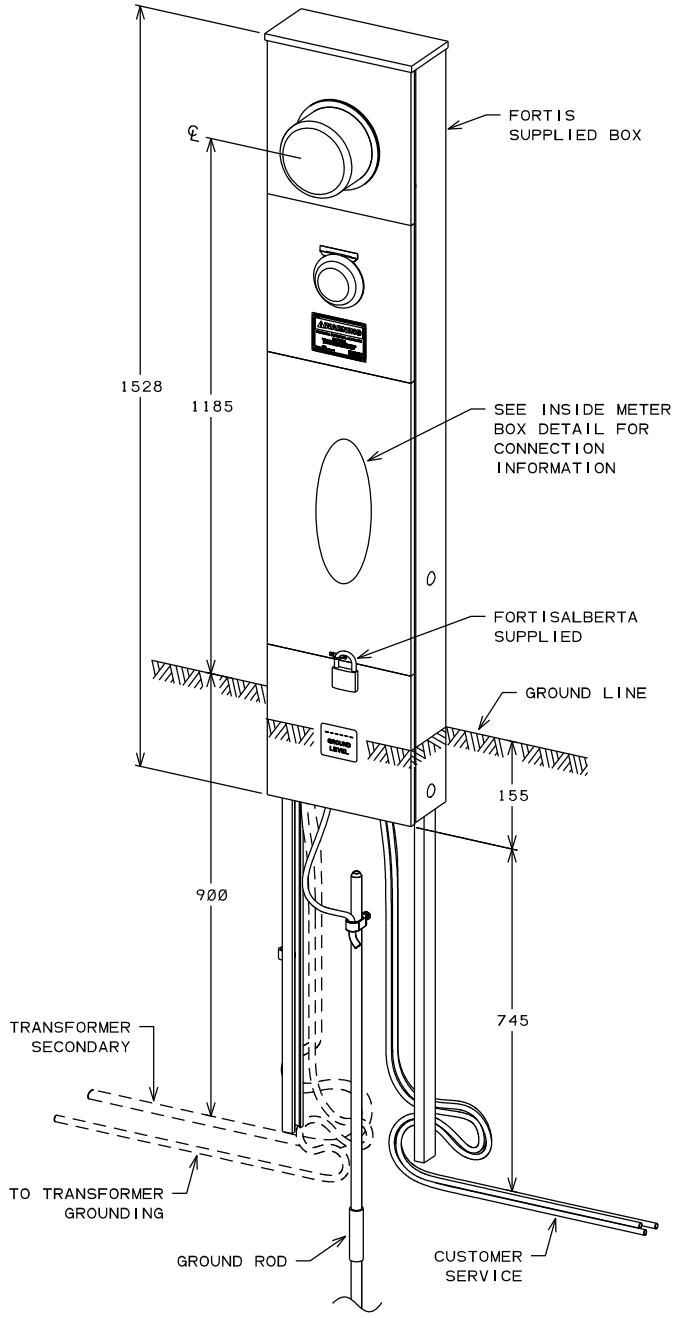
When service is reconnected without a permit from an approved permit issuer, the electrician or owner must obtain a permit and forward same to FortisAlberta Inc. on the next business day where practical (otherwise, as soon as possible thereafter).

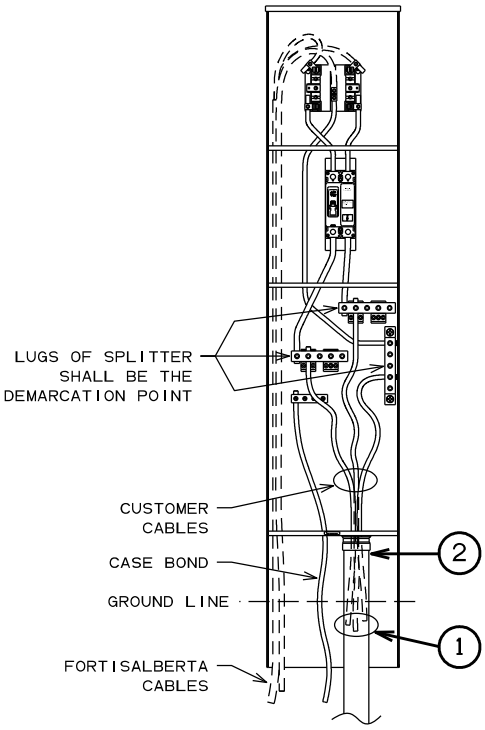
Failure to obtain a permit and forward same to FortisAlberta Inc. as noted above may result in customer notification and disconnection of service.

For planned/unplanned repair work on an electrical service where the ratings of the equipment has not been modified, and a permit is not required, FortisAlberta Inc. may, at its discretion, reconnect service without a permit if the owner and, if applicable, the electrician sign a Reconnection Authorization Form releasing FortisAlberta Inc. from any liability for loss, damage or injury which may be suffered as a result of the reconnection.

Prior to requesting a reconnect, the electrician or owner must ensure the main switch at the customer panel is placed in the open position, properly wired and enclosed.

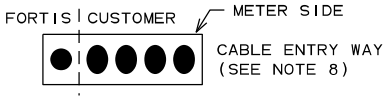
Service and Metering Guide Drawings (SMG)





INSIDE METER BOX DETAIL

BILL OF MATERIAL (CUSTOMER INSTALLED)		
PART #	QUANTITY	DESCRIPTION
1	--	UNDERGROUND CABLE, TYPE USEB OR EQUIVALENT
2	--	2 INCH RIGID PVC CONDUIT



METER BOX (BOTTOM VIEW) DETAIL

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS

2 - CUSTOMER TO INSTALL A SEPARATE GROUND AT THEIR SERVICE BOX

3 - TO AVOID CIRCULATING CURRENTS ON THE GROUNDED CONDUCTOR:
- THE NEUTRAL BLOCK IS INSULATED
- WHEN TERMINATING THE UTILITY AND CUSTOMER NEUTRAL, INSULATE AND ISOLATE THE NEUTRAL FROM THE CABINET BY WRAPPING WITH WHITE VINYL TAPE

4 - A CUSTOMER BOND/ GROUND IS NOT PROVIDED VIA THIS METER BOX. THE CUSTOMER IS REQUIRED TO GROUND THEIR SERVICE PER THE CANADIAN ELECTRICAL CODE (CEC) SECTION 10

5 - SERVICE CONNECTION ALLOWANCE UP TO 4, #6AWG TO 250AWG CONDUCTORS WITH A MAX TOTAL LOAD OF 200A

6 - FOR ARMORED CABLE, IF A BARE BONDING CONDUCTOR IS PRESENT, BOND (AT ONE POINT ONLY) AT THE CUSTOMER SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR IN THE PEDESTAL BY CUTTING IT BACK, COVERING WITH VINYL TAPE, OR HEAT SHRINK TUBING

7 - FOR DISTRIBUTED ENERGY RESOURCE (GENERATION), MAX CONNECTED GENERATION SHALL BE LIMITED TO 160A FOR A 200A BREAKER OR 80% OF THE BREAKER NAME PLATE

8 - WHERE A SERVICE DISCONNECTING MEANS IS NOT EQUIPPED WITH A BARRIER BETWEEN THE LINE AND LOAD SIDE, THE CUSTOMER CABLES SHALL ENTER THE PEDESTAL AND NOT COME INTO CONTACT WITH OR CROSS CONDUCTORS CONNECTED TO THE LINE TERMINALS

9 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS

Engineering Stamp: NO STAMP NEEDED

APEGA Permit No. P07387

Description:
- ADDED PROVISION FOR LOCKING
- RELOCATE GROUND CONNECTION TO SPLITTER SECTION
- ADDED METER BOX (BOTTOM VIEW) DETAIL
- UPDATED INSIDE METER BOX DETAIL
- UPDATED NOTES

Authenticated and Validated original filed with the Engineering Department

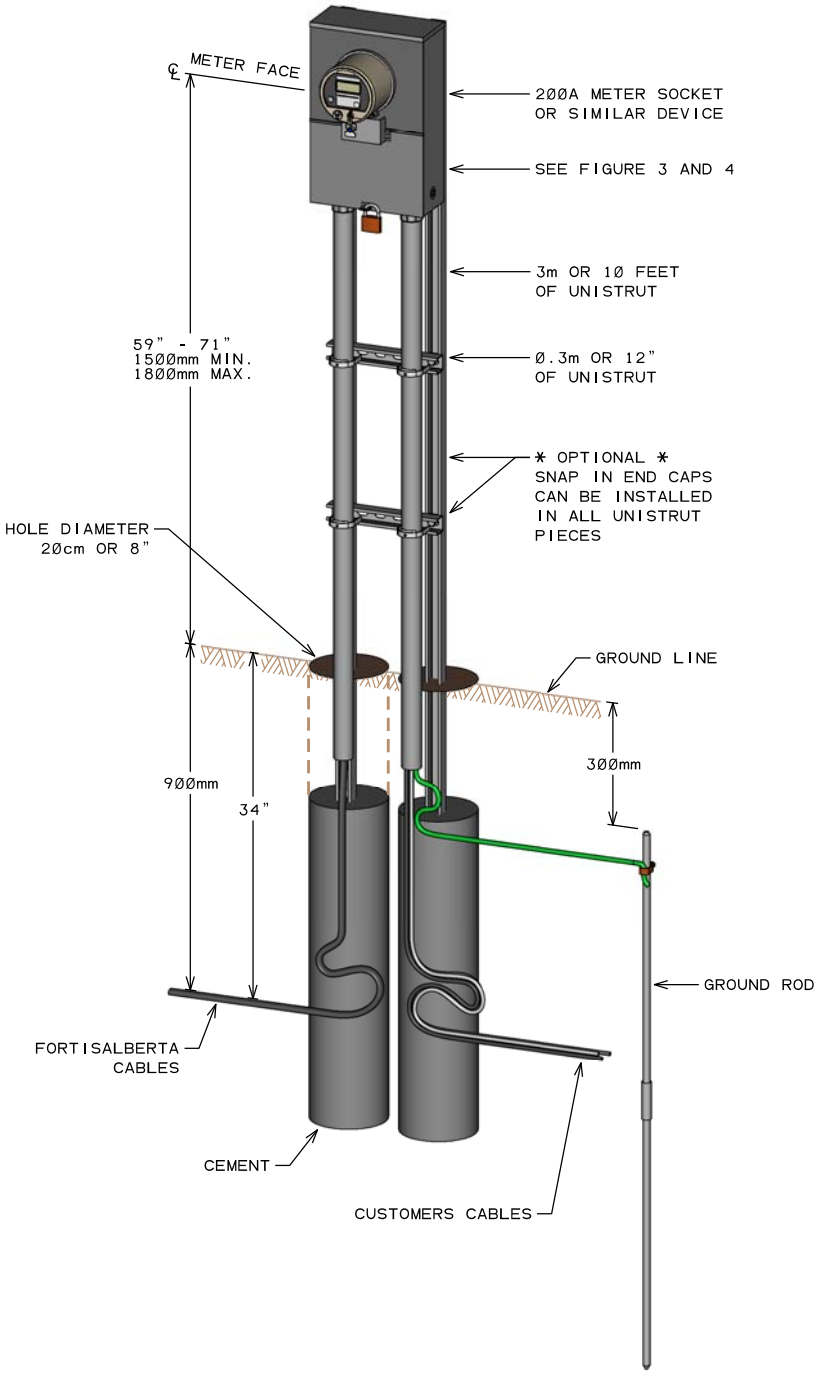
Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
24-07-05	15-11-12
REVISION Checked: KP	ORIGINAL Design / Checked: NS
REVISION Approved: SM	ORIGINAL Approved: KN

SINGLE PHASE METERING PEDESTAL

FORTIS ALBERTA

Drawing Number: SMG 2.1

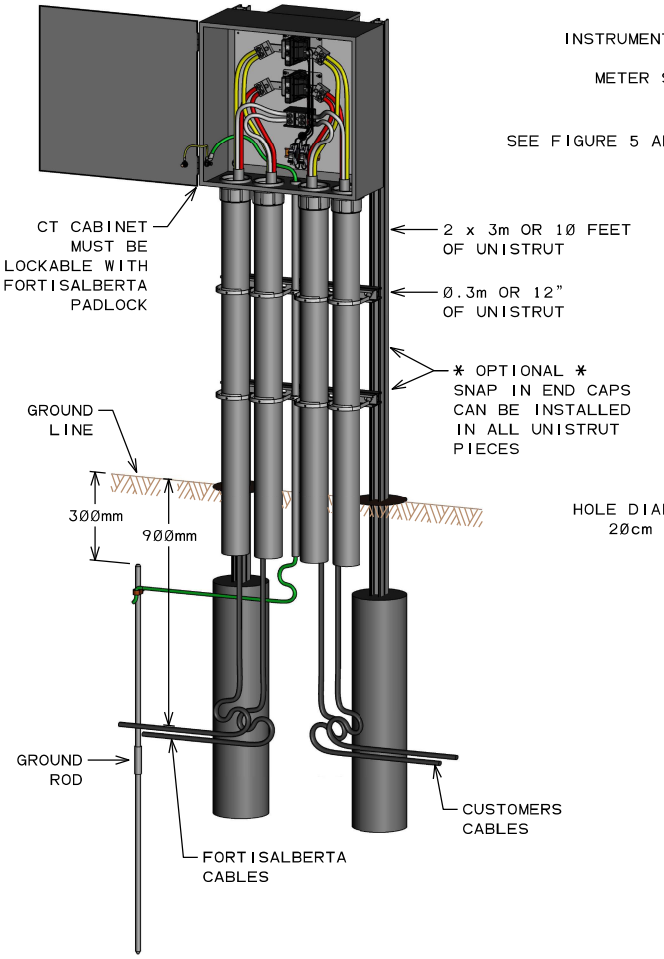
Sheet: 1 / 3



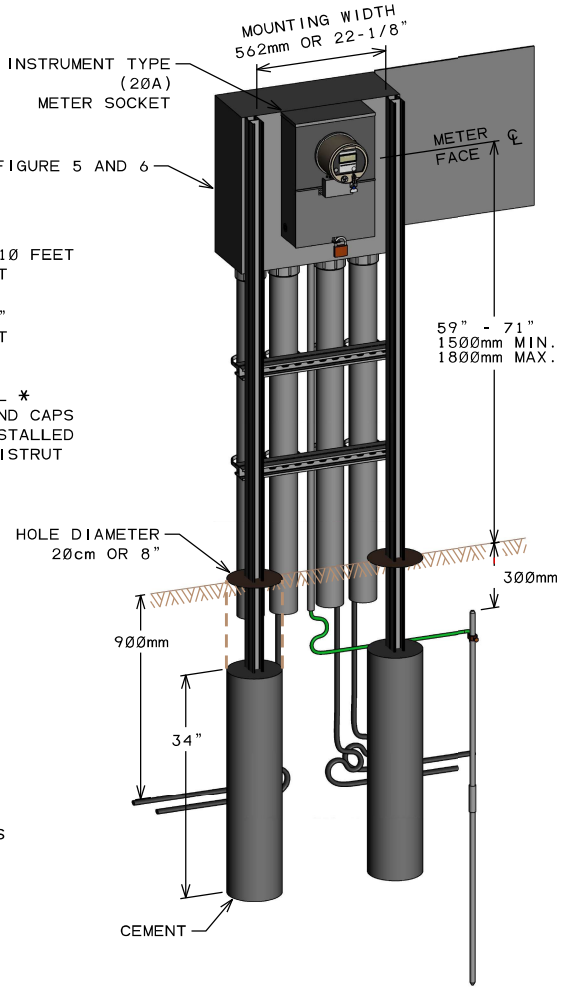
LOT LINE METERING

- THE METER MUST BE INSTALLED ON A PEDESTAL 1.5m INSIDE FRONT PROPERTY LINE
- CONDUCTOR REQUIREMENTS WILL DICTATE WHICH 200AMP SOCKET IS REQUIRED

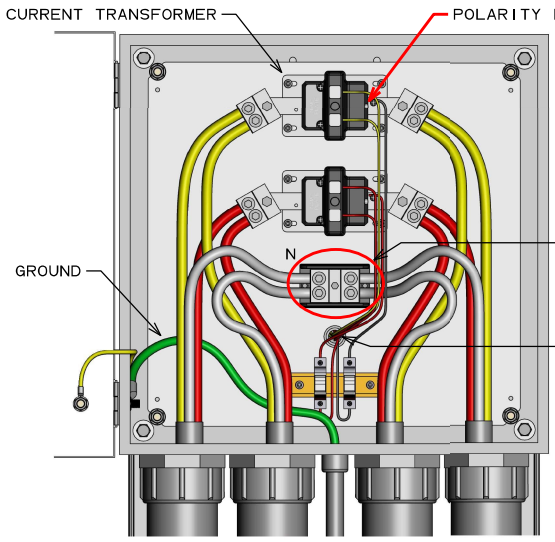
Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED APEGGA Permit No. P07387	- ADDED REFERENCE TO FIGURES 3 AND 4 - UPDATED GROUND	20-01-27	15-11-12	LOT LINE METERING (SELF CONTAINED 200A)
		REVISION Checked NS	ORIGINAL Design / Checked NS	
		REVISION Approved	ORIGINAL Approved KN	FORTIS ALBERTA
				Drawing Number SMG 2.1 Sheet 2/3



CT CABINET SIDE



METER SIDE



* NOTE *
CABLES COLOURED FOR CLARITY. ACTUAL COLOUR MAY VARY.

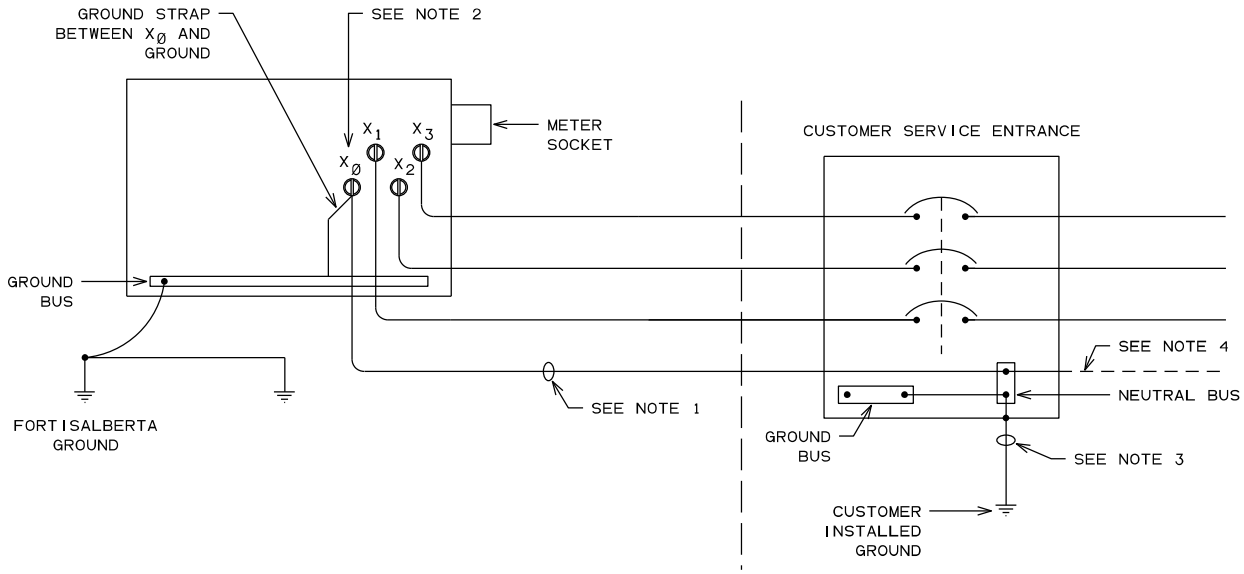
CT CABINET DETAIL

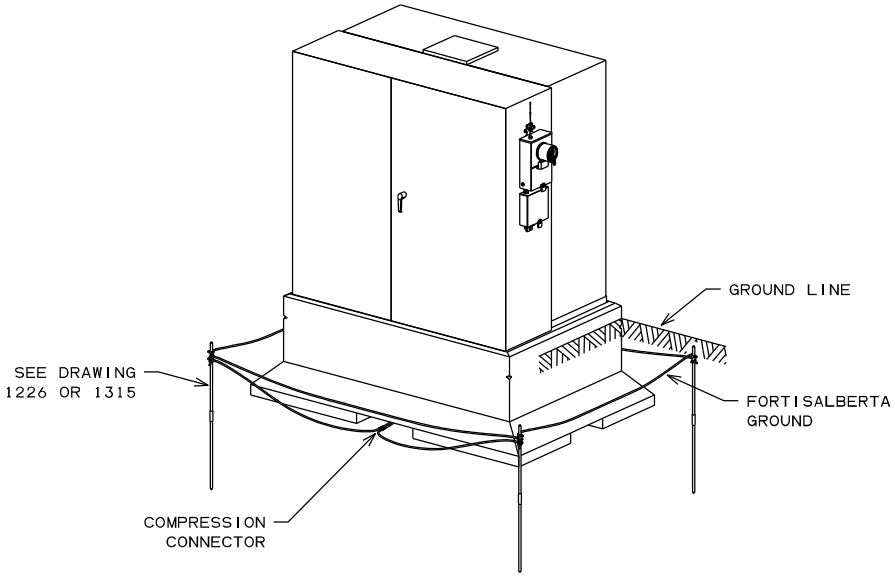
LOT LINE METERING - INSTRUMENT TYPE (400AMP TO 600AMP MAX)

- THE METER MUST BE INSTALLED ON A PEDESTAL 1.5m INSIDE FRONT PROPERTY LINE
- SINGLE OR PARALLEL CONDUCTORS PERMITTED
- GROUND ROD OR PLATE IS REQUIRED FOR THIS STRUCTURE (DO NOT GROUND NEUTRAL HERE)

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- ADDED POLARITY MARK CALL OUT TO CT CABINET DETAIL	25-04-01	15-11-12	LOT LINE METERING (INSTRUMENT TYPE 400A OR 600A)
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Checked NS / REVISION Approved	ORIGINAL Design / Checked / ORIGINAL Approved KN	FORTIS ALBERTA

Drawing Number: SMG 2.1 | Sheet: 3/3





DETAIL OF FORTISALBERTA PADMOUNT TRANSFORMER GROUNDING

NOTE:

1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR

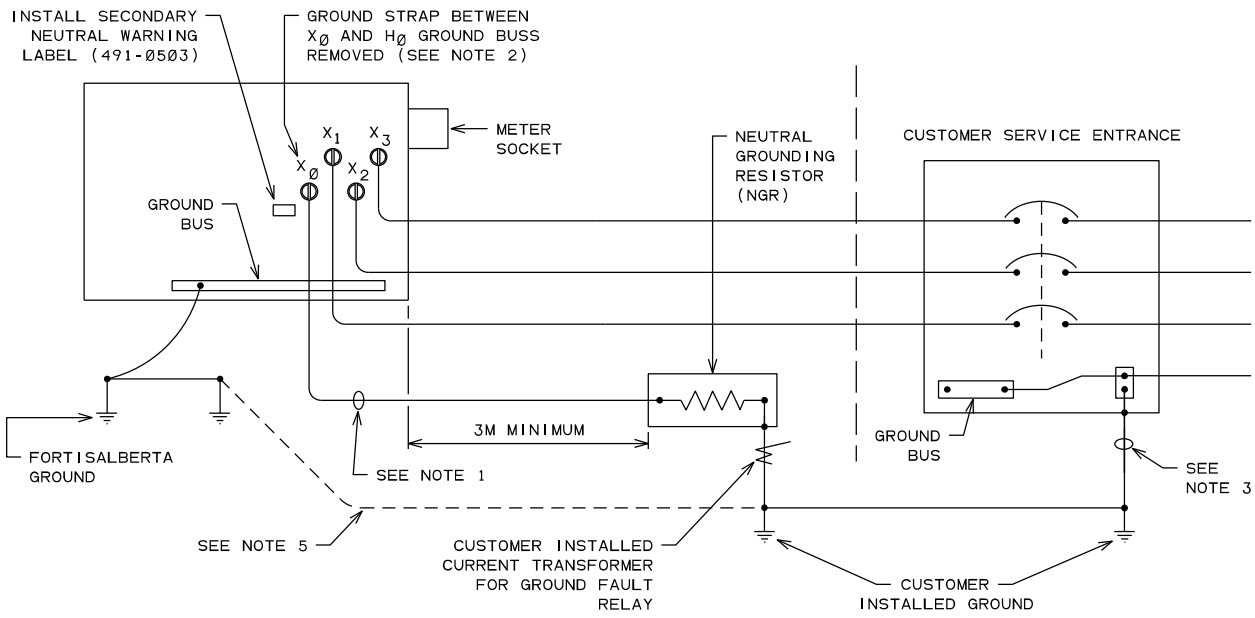
2 - THE STANDARD SERVICE CONNECTION TO FORTISALBERTA SECONDARY CONNECTIONS IS FOR A 4 WIRE GROUNDED WYE. IF THE CUSTOMER ELECTS TO USE THE BARE BONDING CONDUCTOR IN A 3 WIRE TECK CABLE AS THE CUSTOMERS NEUTRAL (WHEN THERE ARE NO NEUTRAL CURRENT PRESENT). THEN THE BARE BONDING WIRE SHALL BE IDENTIFIED WITH WHITE TAPE AT BOTH ENDS OF THE TECK CABLE AND THE CUSTOMER SERVICE NEUTRAL SHALL BE CONNECTED TO THE XØ BUSHING OF THE TRANSFORMER

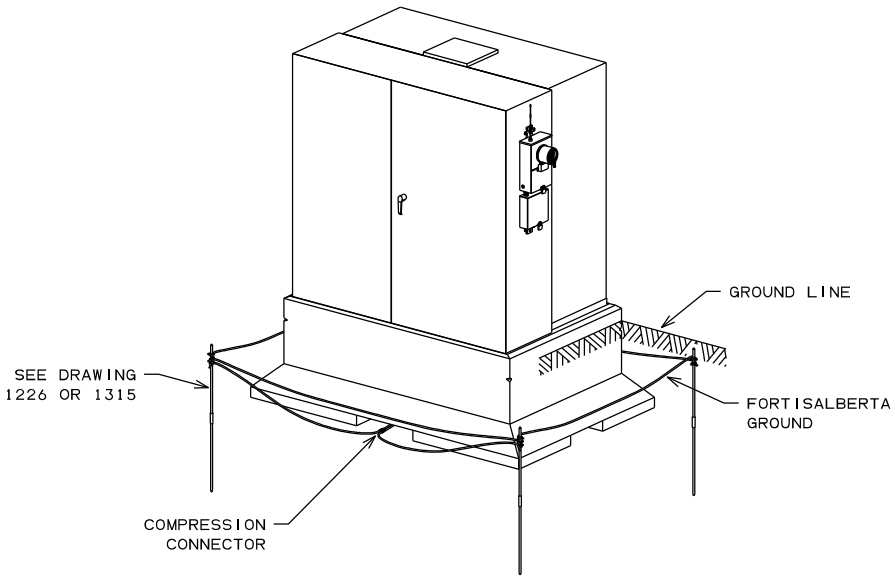
3 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032

4 - LOAD WILL DETERMINE IF REQUIRED, OPTIONAL

5 - FOR ARMORED CABLE, THE BONDING CONDUCTOR SHALL BE BONDED AT THE CUSTOMER SERVICE PANEL ONLY. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER BY CUTTING IT BACK, COVERING WITH VINYL TAPE OR HEAT SHRINK TUBING

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REVISED NOTE 5	24-07-05	09-08-13	3 PHASE SERVICE (PADMOUNT METERING)
		REVISION Checked JM	ORIGINAL Design / Checked GM	
		REVISION Approved NS	ORIGINAL Approved TZ.	FORTIS ALBERTA
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department			Drawing Number SMG 2.13.1 Sheet 1/1





DETAIL OF FORTISALBERTA PADMOUNT TRANSFORMER GROUNDING

NOTE:

1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR

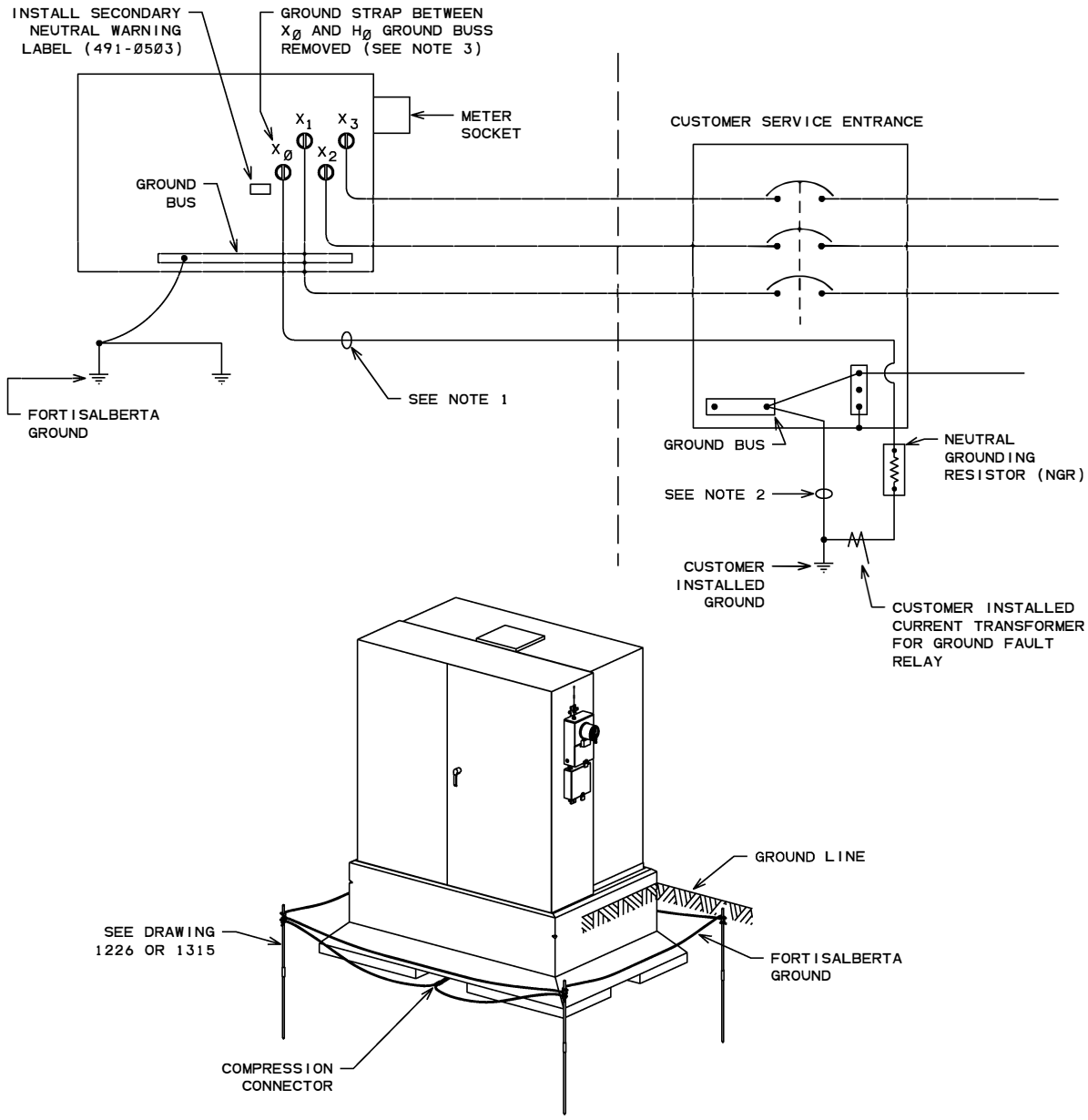
2 - TRANSFORMER GROUND STRAP BETWEEN XØ BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL. CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE

3 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032

4 - FOR ARMORED CABLE, THE BONDING CONDUCTOR SHALL BE BONDED AT THE CUSTOMER SERVICE PANEL ONLY. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER BY CUTTING IT BACK, COVERING WITH VINYL TAPE OR HEAT SHRINK TUBING

5 - IF THE 3m SEPARATION CANNOT BE MAINTAINED, THEN BOND THE CUSTOMER TO THE UTILITY GROUND ELECTRODE

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	3 PHASE PADMOUNT METERING WITH OUTDOOR NGR	
NO STAMP NEEDED	- REVISED NOTE 4 - ADDED NOTE 5 AND BOND ON DRAWING	24-07-05	07-08-02		
		REVISION Checked: JM	ORIGINAL Design / Checked: NS		
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Approved: NS	ORIGINAL Approved: TC	FORTIS ALBERTA	Drawing Number: SMG 2.13.2 — Sheet: 1/1



DETAIL OF FORTISALBERTA PADMOUNT TRANSFORMER GROUNDING

NOTE:

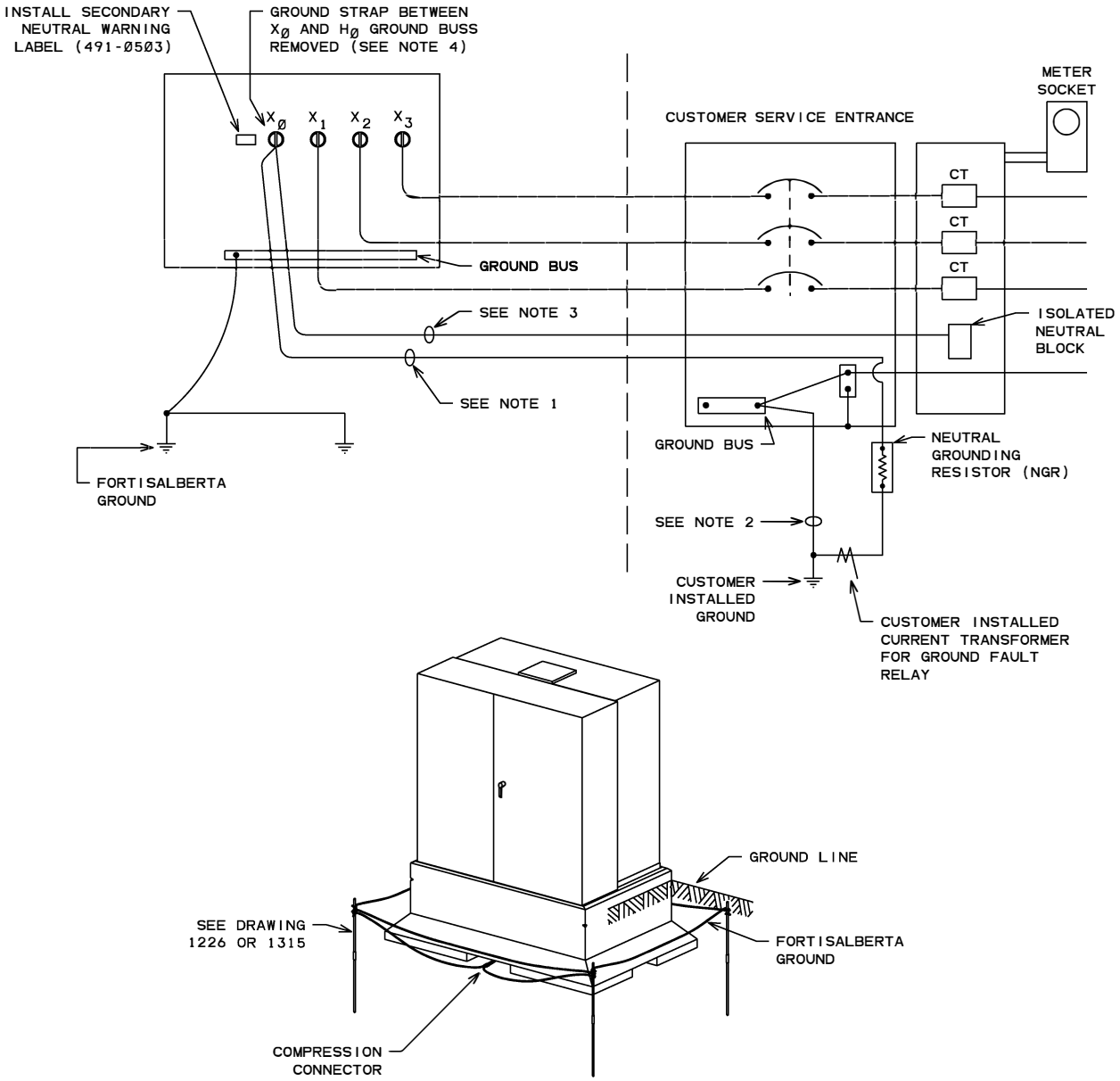
1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUS OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR

2 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4-032

3 - TRANSFORMER GROUND STRAP BETWEEN XØ BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL. CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE

4 - FOR ARMORED CABLE, THE BONDING CONDUCTOR SHALL BE BONDED AT THE CUSTOMER SERVICE PANEL ONLY. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER BY CUTTING IT BACK, COVERING WITH VINYL TAPE OR HEAT SHRINK TUBING

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	3 PHASE PADMOUNT METERING WITH INDOOR NGR	
NO STAMP NEEDED	- REVISED NOTE 4	24-07-05	07-08-02		
	REVISION Checked JM	ORIGINAL Design / Checked NS			
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Approved NS	ORIGINAL Approved	FORTIS ALBERTA	Drawing Number SMG 2.13.3 / Sheet 1/1



DETAIL OF FORTISALBERTA PADMOUNT TRANSFORMER GROUNDING

NOTE:

1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUS OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR

2 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032

3 - ISOLATED NEUTRAL CONNECTION REQUIRED FOR FORTISALBERTA METERING. CONDUCTOR MUST BE WHITE OR TAPED WHITE AT BOTH ENDS AND SIZED TO CONDUCT THE RATED CURRENT OF THE IMPEDANCE GROUNDING DEVICE, BE ROUTED AS DIRECTLY AS PRACTICABLE AND CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR. IN ACCORDANCE TO CANADIAN ELECTRICAL CODE CLAUSE 6-412 AND 10-308

4 - TRANSFORMER GROUND STRAP BETWEEN XØ BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL. CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE

5 - FOR ARMORED CABLE, THE BONDING CONDUCTOR SHALL BE BONDED AT THE CUSTOMER SERVICE PANEL ONLY. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER BY CUTTING IT BACK, COVERING WITH VINYL TAPE OR HEAT SHRINK TUBING

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REVISED NOTE 5	24-07-05	07-08-02	3 PHASE SERVICE WITH INDOOR METERING AND NGR
		REVISION Checked JM	ORIGINAL Design / Checked NS	
		REVISION Approved NS	ORIGINAL Approved JZ	FORTIS ALBERTA
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department			Drawing Number SMG 2.13.4 Sheet 1/1

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART 1 AND ALBERTA AMENDMENTS.

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.

3 - THE MOTOR CONTROL PANEL MUST HAVE TWO SEPARATE COMPARTMENTS WITH BARRIER SUITABLE FOR SERVICE ENTRANCE APPLICATIONS.

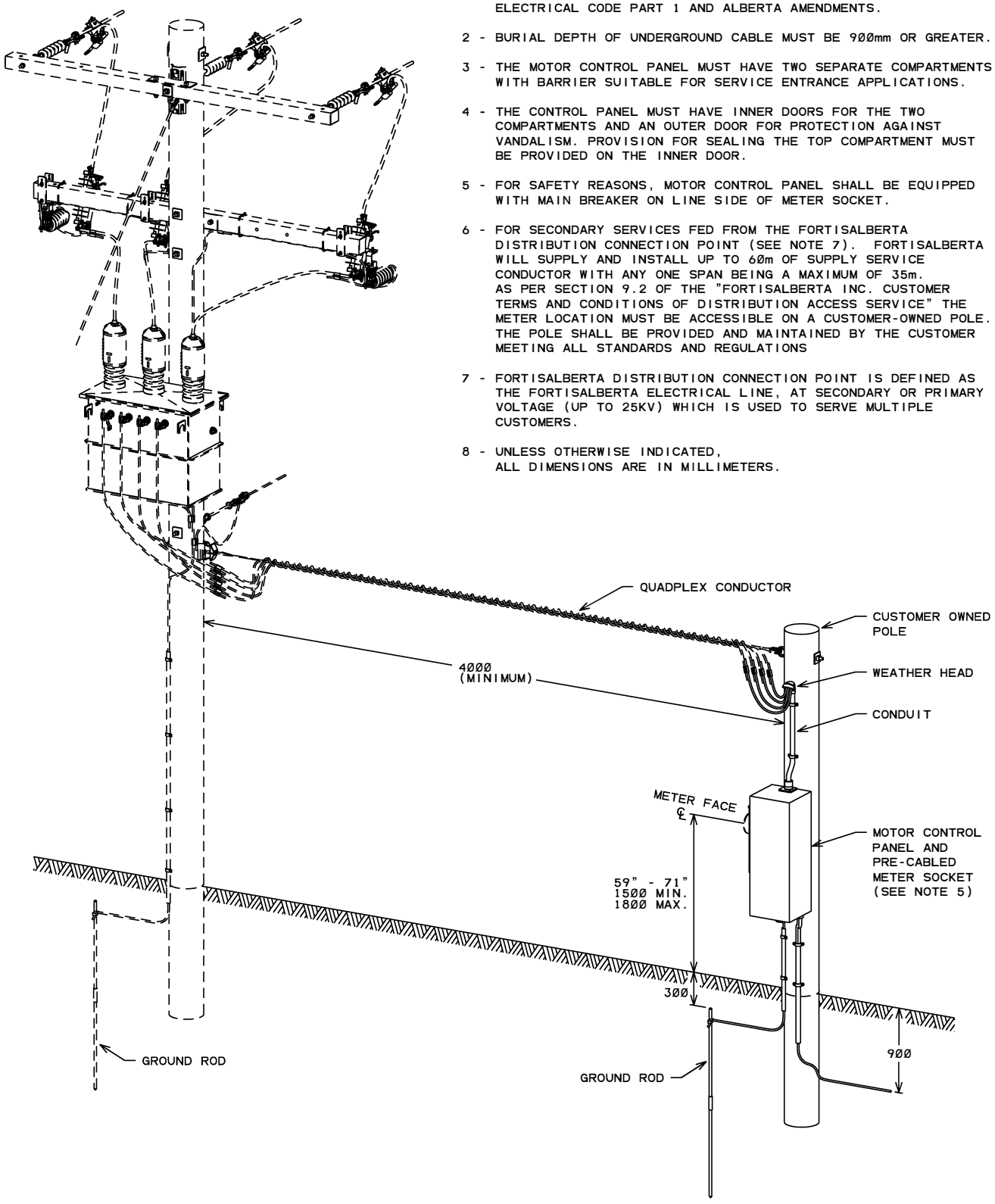
4 - THE CONTROL PANEL MUST HAVE INNER DOORS FOR THE TWO COMPARTMENTS AND AN OUTER DOOR FOR PROTECTION AGAINST VANDALISM. PROVISION FOR SEALING THE TOP COMPARTMENT MUST BE PROVIDED ON THE INNER DOOR.

5 - FOR SAFETY REASONS, MOTOR CONTROL PANEL SHALL BE EQUIPPED WITH MAIN BREAKER ON LINE SIDE OF METER SOCKET.

6 - FOR SECONDARY SERVICES FED FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 7). FORTISALBERTA WILL SUPPLY AND INSTALL UP TO 60m OF SUPPLY SERVICE CONDUCTOR WITH ANY ONE SPAN BEING A MAXIMUM OF 35m. AS PER SECTION 9.2 OF THE "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATION MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE. THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS

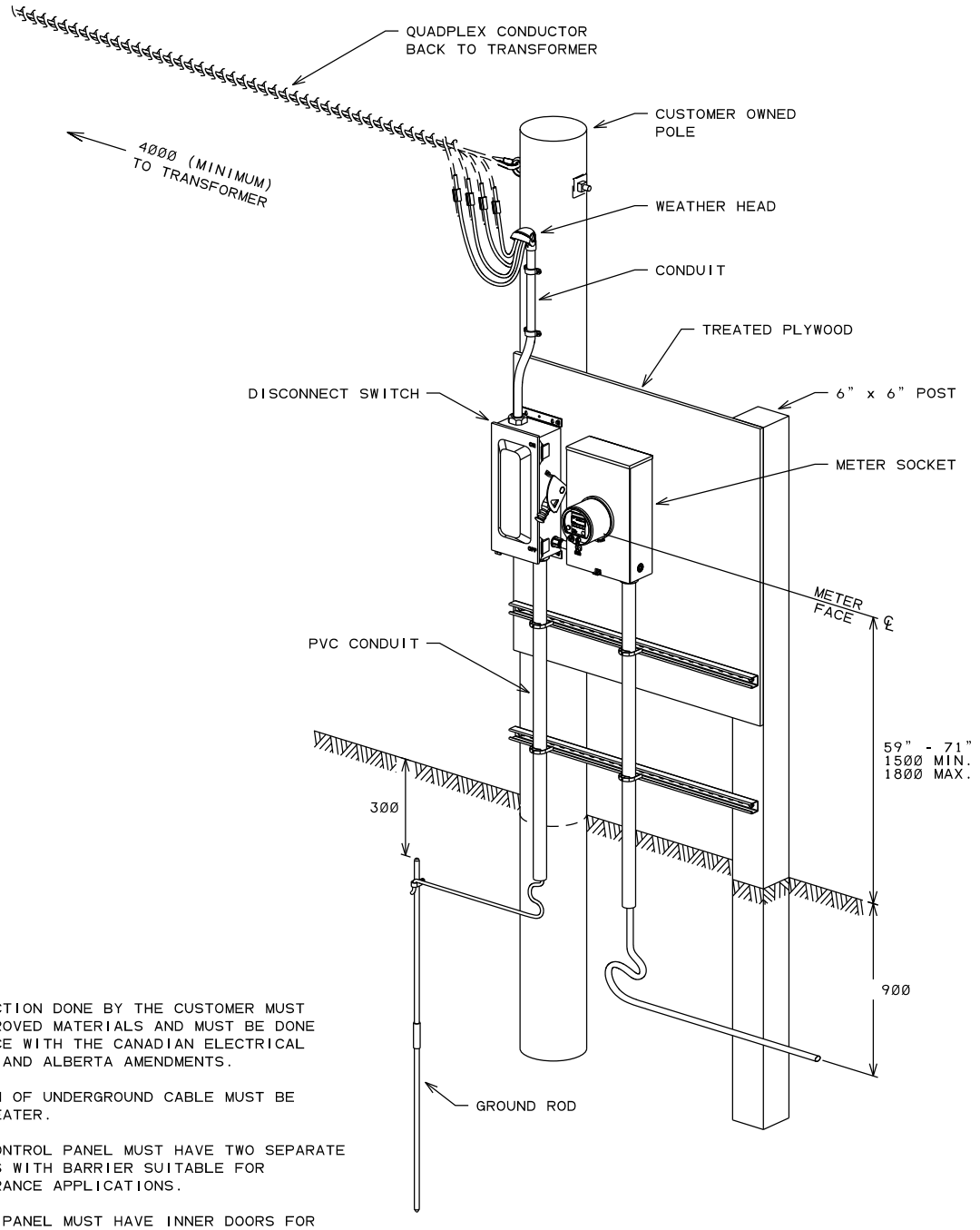
7 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.

8 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS.



Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- ADDED BARE BONDING CONDUCTOR DETAIL - CHANGED MIN SEPARATION BETWEEN XMER POLE AND METER FROM 5 TO 4m - CHANGED MIN SPAN LENGTH FROM 30 TO 35m - REVISED NOTE 6 - REMOVED REFERENCE TO TECH 90 CABLE AS THIS AN OVERHEAD SERVICE - UPDATED GROUND	20-02-14	07-08-02	THREE PHASE OILFIELD AND IRRIGATION OVERHEAD SERVICE
APEGGA Permit No. P07387		REVISION Checked NS	ORIGINAL Design / Checked NS	
		REVISION Approved HN	ORIGINAL Approved JZ.	FORTIS ALBERTA

Drawing Number	Sheet
SMG 2.13.5	1 / 2



NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART 1 AND ALBERTA AMENDMENTS.

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.

3 - THE MOTOR CONTROL PANEL MUST HAVE TWO SEPARATE COMPARTMENTS WITH BARRIER SUITABLE FOR SERVICE ENTRANCE APPLICATIONS.

4 - THE CONTROL PANEL MUST HAVE INNER DOORS FOR THE TWO COMPARTMENTS AND AN OUTER DOOR FOR PROTECTION AGAINST VANDALISM. PROVISION FOR SEALING THE TOP COMPARTMENT MUST BE PROVIDED ON THE INNER DOOR.

5 - FOR SECONDARY SERVICES FED FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 7). FORTISALBERTA WILL SUPPLY AND INSTALL UP TO 60m OF SUPPLY SERVICE CONDUCTOR WITH ANY ONE SPAN BEING A MAXIMUM OF 35m. AS PER SECTION 9.2 OF THE "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATION MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE. THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS

6 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.

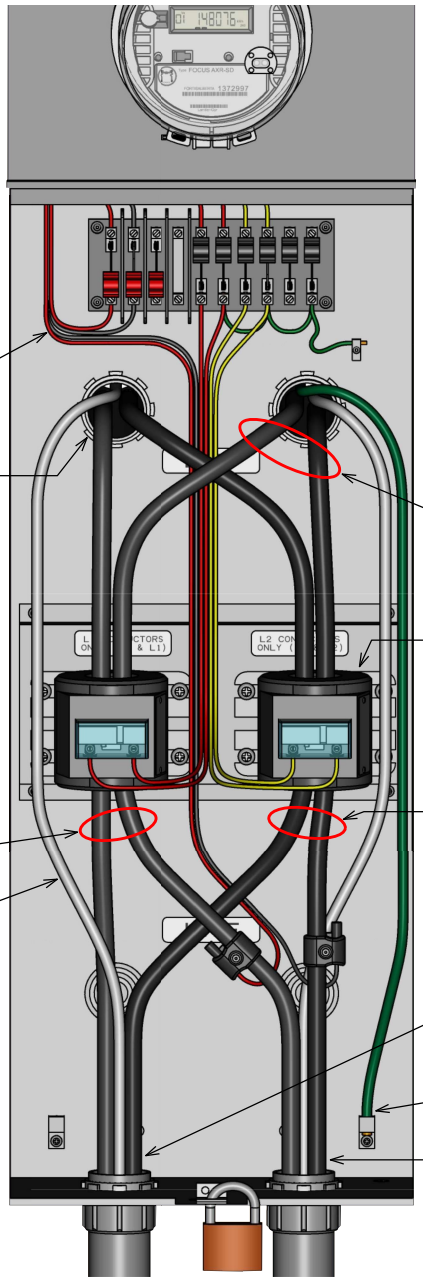
7 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS.

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED			20-02-14	THREE PHASE OILFIELD AND IRRIGATION OVERHEAD SERVICE
		REVISION Checked	ORIGINAL Design / Checked KS	
APEGGA Permit No. P07387		REVISION Approved	ORIGINAL Approved HN	FORTIS ALBERTA

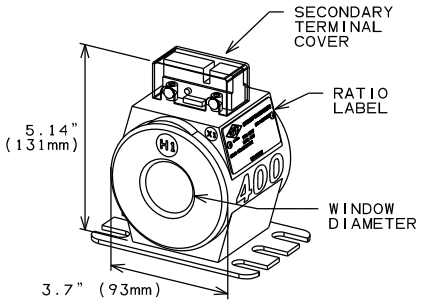
Drawing Number	Sheet
SMG 2.13.5	2 / 2

SINGLE PHASE INSTRUMENT : ALL-IN-ONE

- DESIGNED FOR RESIDENTIAL USE WHERE MAIN BREAKER IS LOCATED INDOORS AND 7m (OR LESS) AWAY
- DESIGNED FOR CONDUCTOR SIZE MAXIMUM OF 1 x 600 Kcmil Cu OR 2 x 250 Kcmil Cu OR AL
- USEB CABLE MUST BE SPLIT TO PASS THROUGH CT'S AND PAIRED BACK TOGETHER IN OUTGOING RACEWAY
- CASE MUST BE GROUNDED
- BARE CONCENTRIC CONDUCTORS MUST BE FULLY COVERED FROM WHERE THE OUTER CABLE JACKET IS REMOVED TO WHERE THE CONNECTION IN THE CUSTOMER PANEL BOARD IS MADE. USE HEAT SHRINK SLEEVES OR WHITE VINYL TAPE



METER DETAIL



RATIO	WINDOW DIAMETER
200:5	1.5" (38mm)

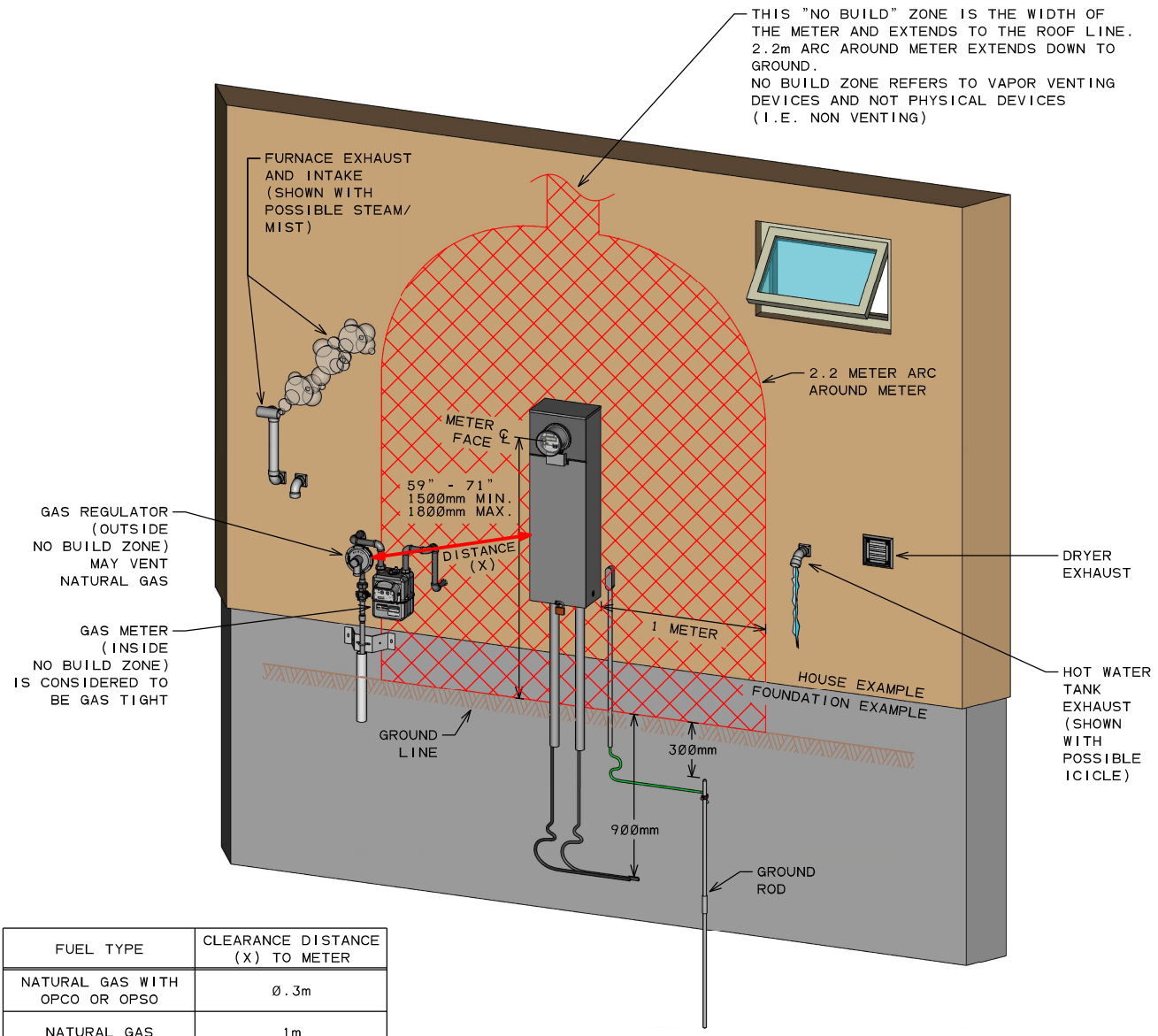
UP TO 1 x 600Kcmil Cu OR PARALLEL 4/0 Cu OR AL

RATIO	WINDOW DIAMETER
400:5	2.0" (51mm)

PARALLEL 250Kcmil

CURRENT TRANSFORMER DETAIL

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- CHANGED CONDUCTOR SIZE MAX - UPDATED NOTES - UPDATED METER BOX - ADDED CURRENT TRANSFORMER DETAIL - CHANGED DRAWING TITLE	25-03-28	15-11-12	SINGLE PHASE INSTRUMENT ALL-IN-ONE
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Checked NS	ORIGINAL Design / Checked NS	FORTIS ALBERTA
		REVISION Approved SD	ORIGINAL Approved KN	Drawing Number SMG 2.16.4 Sheet 1/2



FUEL TYPE	CLEARANCE DISTANCE (X) TO METER
NATURAL GAS WITH OPCO OR OPSO	0.3m
NATURAL GAS	1m
PROPANE	3m

TYPICAL OUTDOOR RESIDENTIAL METER SOCKET ISOMETRIC VIEW

NOTE:

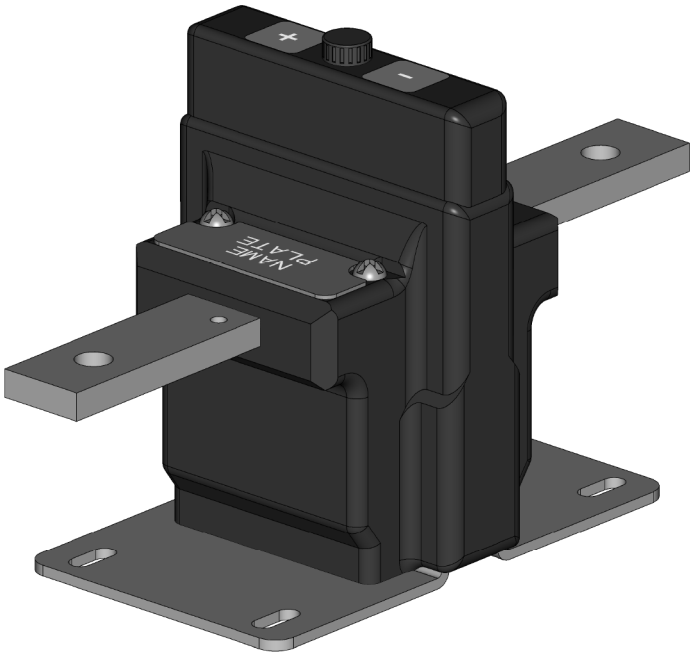
- "NO BUILD" ZONE EXTENDS 1m AROUND SIDES OF THE METER ENCLOSURE
  * SPECIAL NOTE *
  - IT ALSO EXTENDS UPWARDS (THE WIDTH OF THE METERING BOX) ABOVE THE METER TO THE ROOF LINE. THIS IS TO PREVENT WATER "DRIPPING" ONTO THE METER

- ANY VAPOR PRODUCING OUTLETS (MOST COMMON TYPES ARE SHOWN IN THE PICTURE ABOVE) SHOULD BE LOCATED OUTSIDE OF THE "NO BUILD" ZONE. THIS IS TO PREVENT ANY MOISTURE OR CONDENSATION FROM FORMING AND/ OR DEVELOPING INSIDE OR ON THE METER ENCLOSURE

- METER SOCKETS ARE TO LOCATED A MINIMUM DISTANCE OF 1m FROM THE CORNER OF A BUILDING

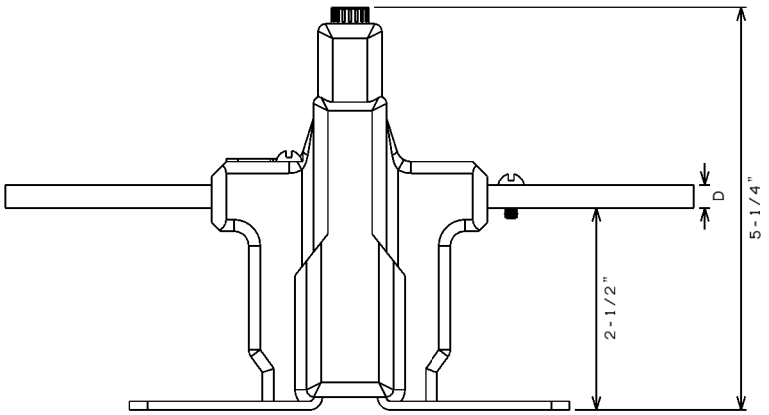
Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- ADDED GAS METER AND GAS METER INFORMATION - UPDATED METER - MOVED GROUND - UPDATED NOTES	25-03-28	15-11-12	TYPICAL METER SOCKET INSTALLATION
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Checked NS / REVISION Approved SD	ORIGINAL Design / Checked NS / ORIGINAL Approved KW	FORTIS ALBERTA — Drawing Number SMG 2.16.4 — Sheet 2/2

SHOWN IS A TYPICAL
2 WIRE CURRENT TRANSFORMER,
5 TO 1200 AMPERES

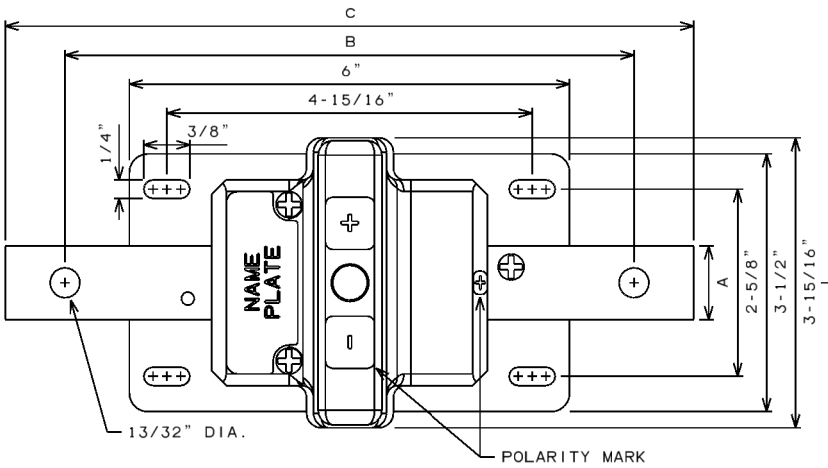


ISOMETRIC DETAIL

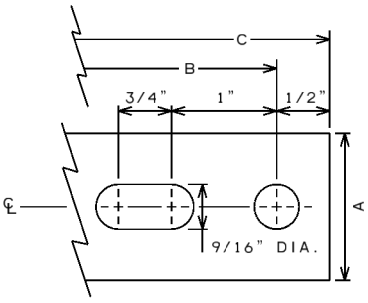
PRIMARY BAR DIMENSIONS				
CAPACITY AMPS.	A	B	C	D
5-400 AMPS.	1"	7-3/4"	9-3/8"	5/16"
500-1200 AMPS.	2"	10-1/2"	11-1/2"	3/8"



FRONT DETAIL



TOP DETAIL



500-1200 AMPS

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	2 WIRE CURRENT TRANSFORMER DIMENSION SPECIFICATION		
NO STAMP NEEDED	- REMOVED STAMP	15-12-09	15-11-12			
		REVISION Checked KJS	ORIGINAL Design / Checked KJS			
		REVISION Approved HN	ORIGINAL Approved KN	FORTIS ALBERTA	Drawing Number SMG 2.16.5	Sheet 1/1

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER

3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE SECONDARY POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH

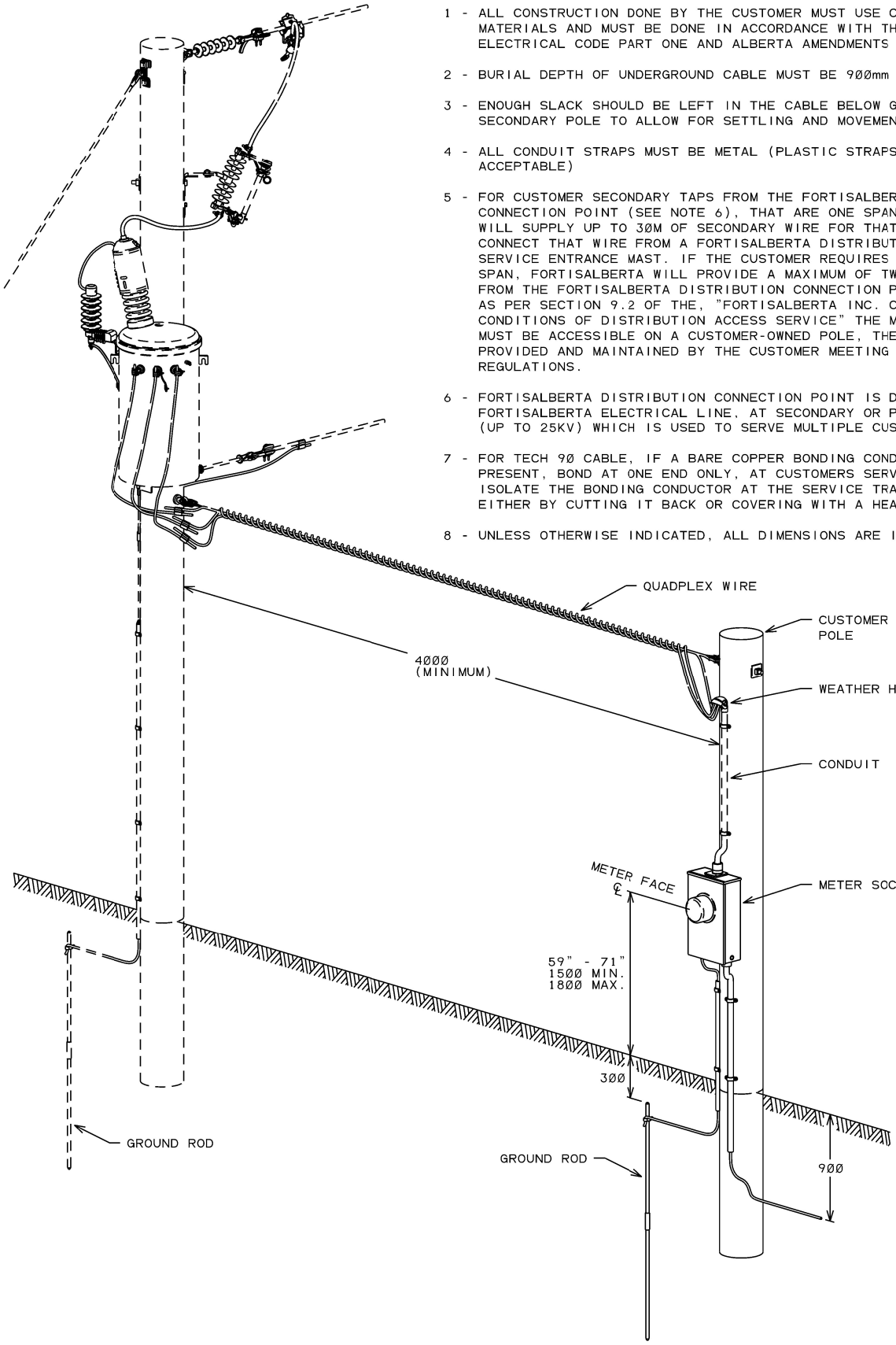
4 - ALL CONDUIT STRAPS MUST BE METAL (PLASTIC STRAPS ARE NOT ACCEPTABLE)

5 - FOR CUSTOMER SECONDARY TAPS FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 6), THAT ARE ONE SPAN, FORTISALBERTA WILL SUPPLY UP TO 30M OF SECONDARY WIRE FOR THAT SINGLE SPAN AND CONNECT THAT WIRE FROM A FORTISALBERTA DISTRIBUTION POLE TO THE SERVICE ENTRANCE MAST. IF THE CUSTOMER REQUIRES MORE THAN ONE SPAN, FORTISALBERTA WILL PROVIDE A MAXIMUM OF TWO SPANS (60M) FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 6). AS PER SECTION 9.2 OF THE, "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATIONS MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE, THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS.

6 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.

7 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE

8 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED APEGA Permit No. P07387	- CHANGED MINIMUM DISTANCE TO CUSTOMER OWNED POLE - UPDATED TECH 90 CABLE NOTE	20-06-03	07-08-02	CUSTOMER OWNED POLE MOUNT TO UNDERGROUND SERVICE
		REVISION Checked NS	ORIGINAL Design / Checked NS	
		REVISION Approved HN	ORIGINAL Approved JZ	FORTIS ALBERTA

Drawing Number	Sheet
SMG 4.1	1 / 1

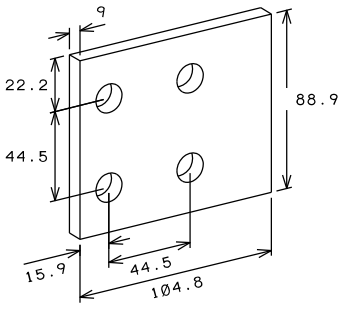


FIGURE 2

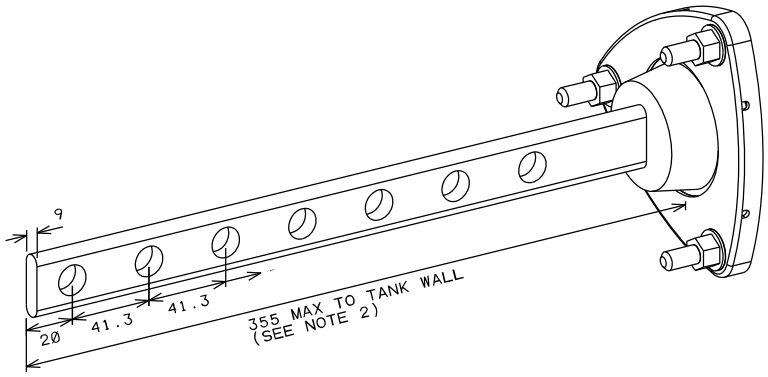


FIGURE 1

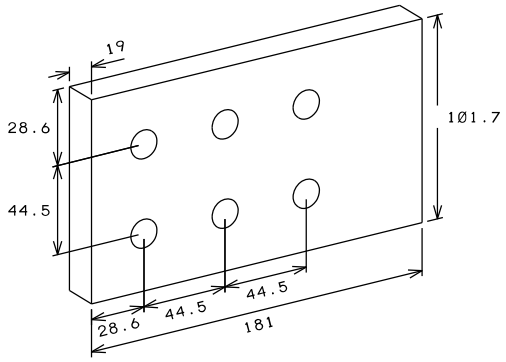


FIGURE 3

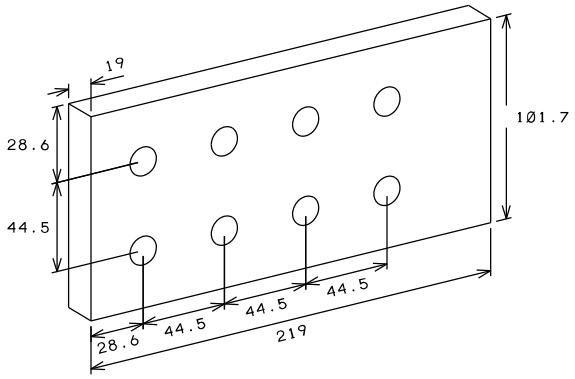


FIGURE 4

		VOLTAGE				
KVA	# OF PHASES	4160/ 2400	600/ 347	480/ 277	208/ 120	240/ 120
UP TO 100kVA INCLUSIVE	1					FIG. 1
167kVA	1					FIG. 4
775-300kVA INCLUSIVE	3		FIG. 2	FIG. 2	FIG. 2	
500-1000kVA INCLUSIVE	3		FIG. 2	FIG. 2	FIG. 4	
1500-2000kVA INCLUSIVE	3		FIG. 3	FIG. 4		
4000kVA	3		FIG. 4			
7500-10000kVA INCLUSIVE	3	FIG. 2				

NOTE:

1 - ALL LOW VOLTAGE BUSHINGS ON TRANSFORMERS THAT ARE 500kVA AND LARGER SHALL HAVE BUSHING SUPPORTS TO PROVIDE MITIGATION FOR THE HEAVY WEIGHTED LOW VOLTAGE CABLES AFFIXED TO THE LOW VOLTAGE BUSHINGS

2 - WHEN MORE THAN FOUR CABLES (PER PHASE) ARE INSTALLED, THE CUSTOMER SHALL SUPPLY AND INSTALL A CABLE MANAGEMENT SYSTEM CONSISTING OF A CLAMP AND STRAIN RELIEF MECHANISM SUITED FOR A UNISTRUT CHANNEL OR RAIL TO BE LOCATED BELOW THE SECONDARY TERMINALS OF THE SUPPLY SERVICE TRANSFORMER

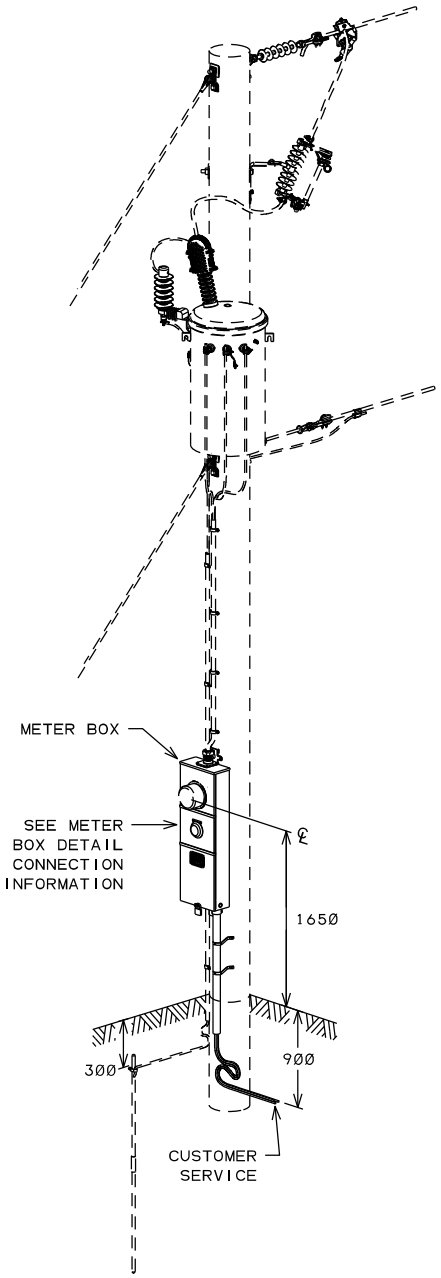
3 - CUSTOMER MUST SUPPLY ALL SECONDARY CONNECTIONS

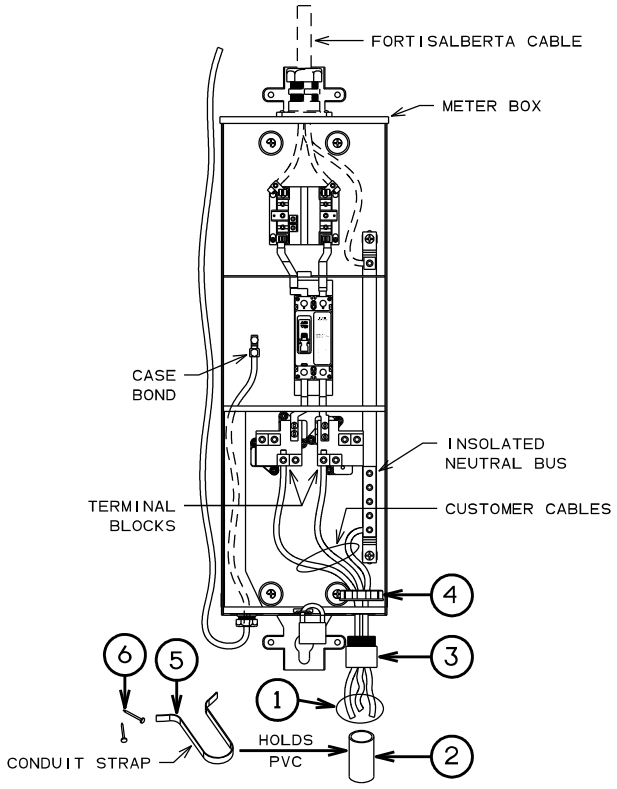
4 - ALL TRANSFORMER TERMINAL PADS ARE DRILLED WITH 14.3mm DIAMETER HOLES EXCEPT WHERE OTHERWISE SHOWN

5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REVISED DRAWING AND NOTES	24-07-08	07-08-02	SERVICE SECONDARY CONNECTORS
		REVISION Checked KP	ORIGINAL Design / Checked NS	
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Approved SM	ORIGINAL Approved JC.	FORTIS ALBERTA

Drawing Number: SMG 4.3 | Sheet: 1/1





METER BOX DETAIL

BILL OF MATERIAL (CUSTOMER INSTALLED)

PART #	QUANTITY	DESCRIPTION
1	--	UNDERGROUND CABLE, TYPE USEB OR EQUIVALENT
2	1.5m	RIGID PVC PIPE
3	1	MALE ADAPTER
4	1	LOCK NUT
5	2	METAL PIPE STRAP FOR CONDUIT
6	4	NAILS, 3 1/2" COMMON

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER

3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH

4 - ALL CONDUIT STRAPS MUST BE METAL (PLASTIC STRAPS ARE NOT ACCEPTABLE)

5 - TO AVOID CIRCULATING CURRENTS ON THE GROUNDED CONDUCTOR:
- THE NEUTRAL BLOCK IS INSULATED
- WHEN TERMINATING THE UTILITY AND CUSTOMER NEUTRAL, INSULATE AND ISOLATE THE NEUTRAL FROM THE CABINET BY WRAPPING WITH WHITE VINYL TAPE

NOTE 5 CONT.
- IF THE CUSTOMER SERVICE ENTRANCE CABLE IS INSTALLED IN A METALLIC CONDUIT OR IS PART OF A ARMORED CABLE ASSEMBLY, ISOLATION FROM THE METER SOCKET SHALL BE MAINTAINED VIA RIGID PVC COUPLING/ CONNECTOR

6 - A CUSTOMER BOND/ GROUND IS NOT PROVIDED VIA THIS METER BOX. THE CUSTOMER IS REQUIRED TO GROUND THEIR SERVICE PER THE CANADIAN ELECTRICAL CODE (CEC) SECTION 10

7 - SERVICE CONNECTION ALLOWANCE UP TO 4, #6AWG TO 250AWG CONDUCTORS WITH A MAX TOTAL LOAD OF 200A

8 - FOR ARMORED CABLE, THE BONDING CONDUCTOR SHALL BE BONDED AT THE CUSTOMER SERVICE PANEL ONLY. ISOLATE THE BONDING CONDUCTOR IN THE PEDESTAL BY CUTTING IT BACK, COVERING WITH VINYL TAPE OR HEAT SHRINK TUBING

9 - FOR DISTRIBUTED ENERGY RESOURCE (GENERATION), MAX CONNECTED GENERATION SHALL BE LIMITED TO 160A FOR A 200A BREAKER OR 80% OF THE BREAKER NAME PLATE

10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- UPDATED METER AND MOUNTING POSITION - UPDATED NOTES - UPDATED DRAWING	24-07-05	07-08-02	SINGLE PHASE RURAL UNDERGROUND SERVICE
		REVISION Checked KP	ORIGINAL Design / Checked NS	
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Approved	ORIGINAL Approved	FORTIS ALBERTA

Drawing Number	Sheet
SMG 5.2	1 / 1

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER

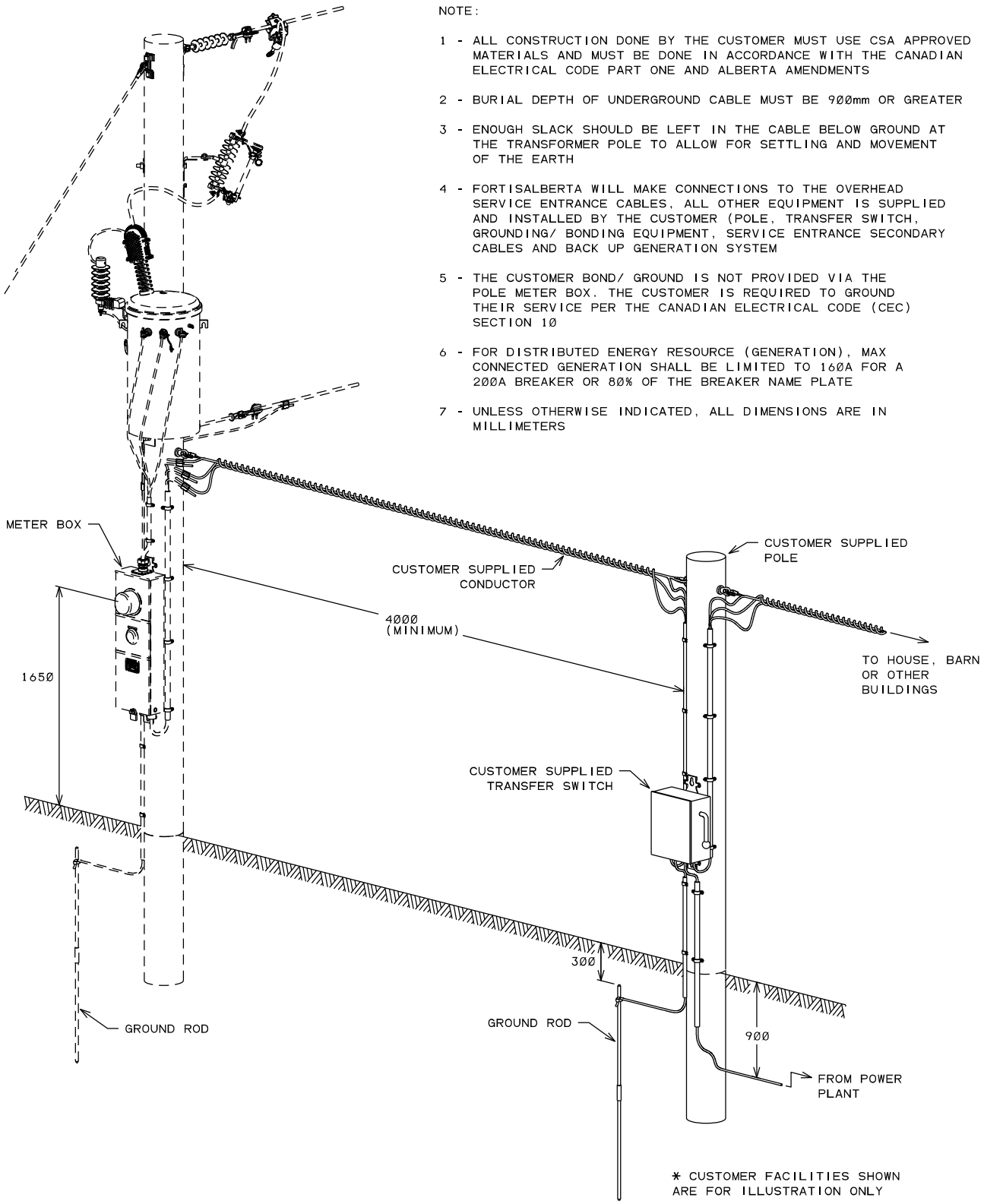
3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH

4 - FORTISALBERTA WILL MAKE CONNECTIONS TO THE OVERHEAD SERVICE ENTRANCE CABLES, ALL OTHER EQUIPMENT IS SUPPLIED AND INSTALLED BY THE CUSTOMER (POLE, TRANSFER SWITCH, GROUNDING/ BONDING EQUIPMENT, SERVICE ENTRANCE SECONDARY CABLES AND BACK UP GENERATION SYSTEM

5 - THE CUSTOMER BOND/ GROUND IS NOT PROVIDED VIA THE POLE METER BOX. THE CUSTOMER IS REQUIRED TO GROUND THEIR SERVICE PER THE CANADIAN ELECTRICAL CODE (CEC) SECTION 10

6 - FOR DISTRIBUTED ENERGY RESOURCE (GENERATION), MAX CONNECTED GENERATION SHALL BE LIMITED TO 160A FOR A 200A BREAKER OR 80% OF THE BREAKER NAME PLATE

7 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS



* CUSTOMER FACILITIES SHOWN ARE FOR ILLUSTRATION ONLY

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- UPDATED METER AND MOUNTING POSITION - UPDATED NOTES - UPDATED DRAWING	24-07-05	07-08-02	SINGLE PHASE STANDBY OVERHEAD SERVICE
		REVISION Checked KP	ORIGINAL Design / Checked NS	
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Approved SM	ORIGINAL Approved JL	FORTIS ALBERTA

Drawing Number	Sheet
SMG 6.0.1	1/1

NOTE:

1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS

2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER

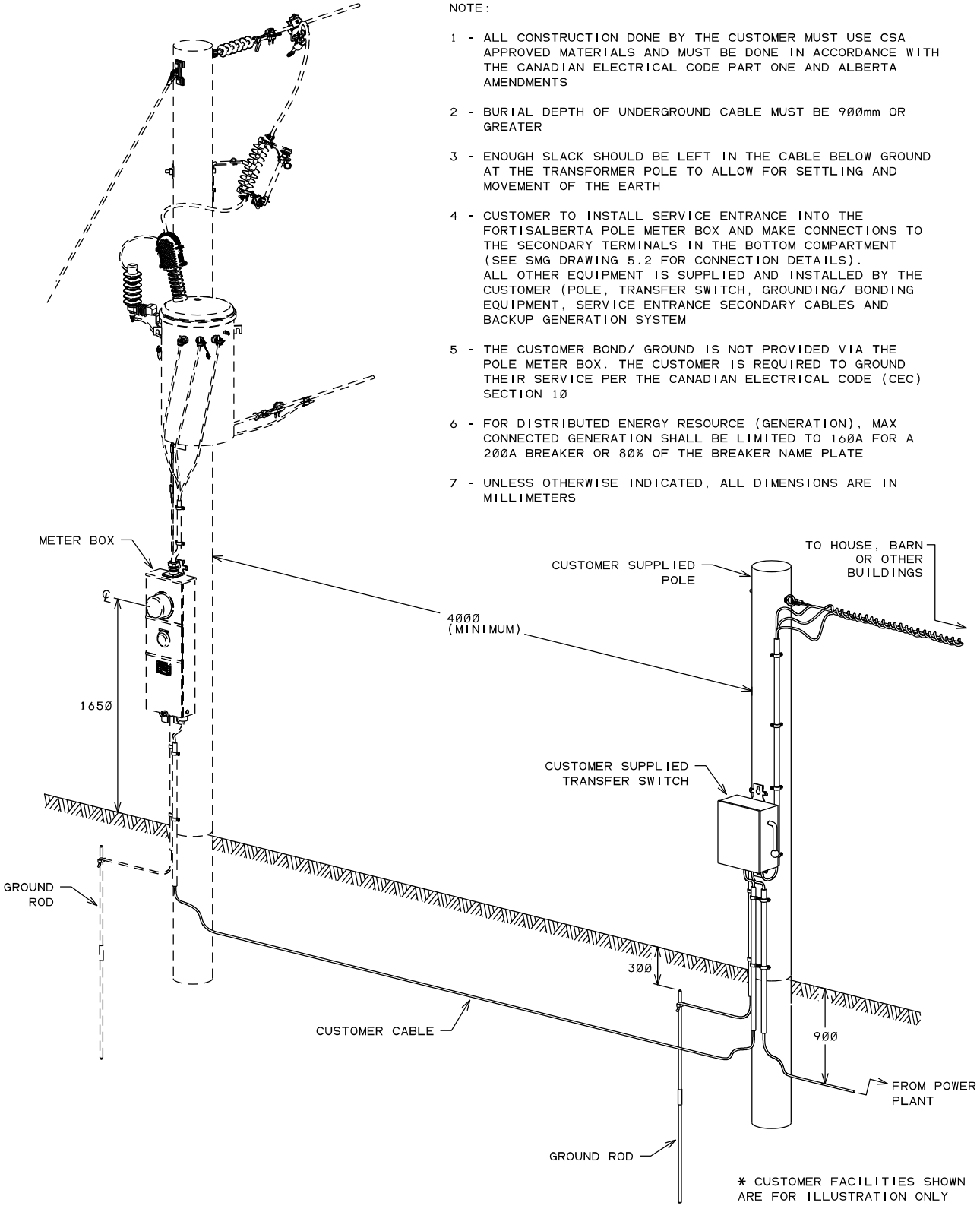
3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH

4 - CUSTOMER TO INSTALL SERVICE ENTRANCE INTO THE FORTISALBERTA POLE METER BOX AND MAKE CONNECTIONS TO THE SECONDARY TERMINALS IN THE BOTTOM COMPARTMENT (SEE SMG DRAWING 5.2 FOR CONNECTION DETAILS). ALL OTHER EQUIPMENT IS SUPPLIED AND INSTALLED BY THE CUSTOMER (POLE, TRANSFER SWITCH, GROUNDING/ BONDING EQUIPMENT, SERVICE ENTRANCE SECONDARY CABLES AND BACKUP GENERATION SYSTEM

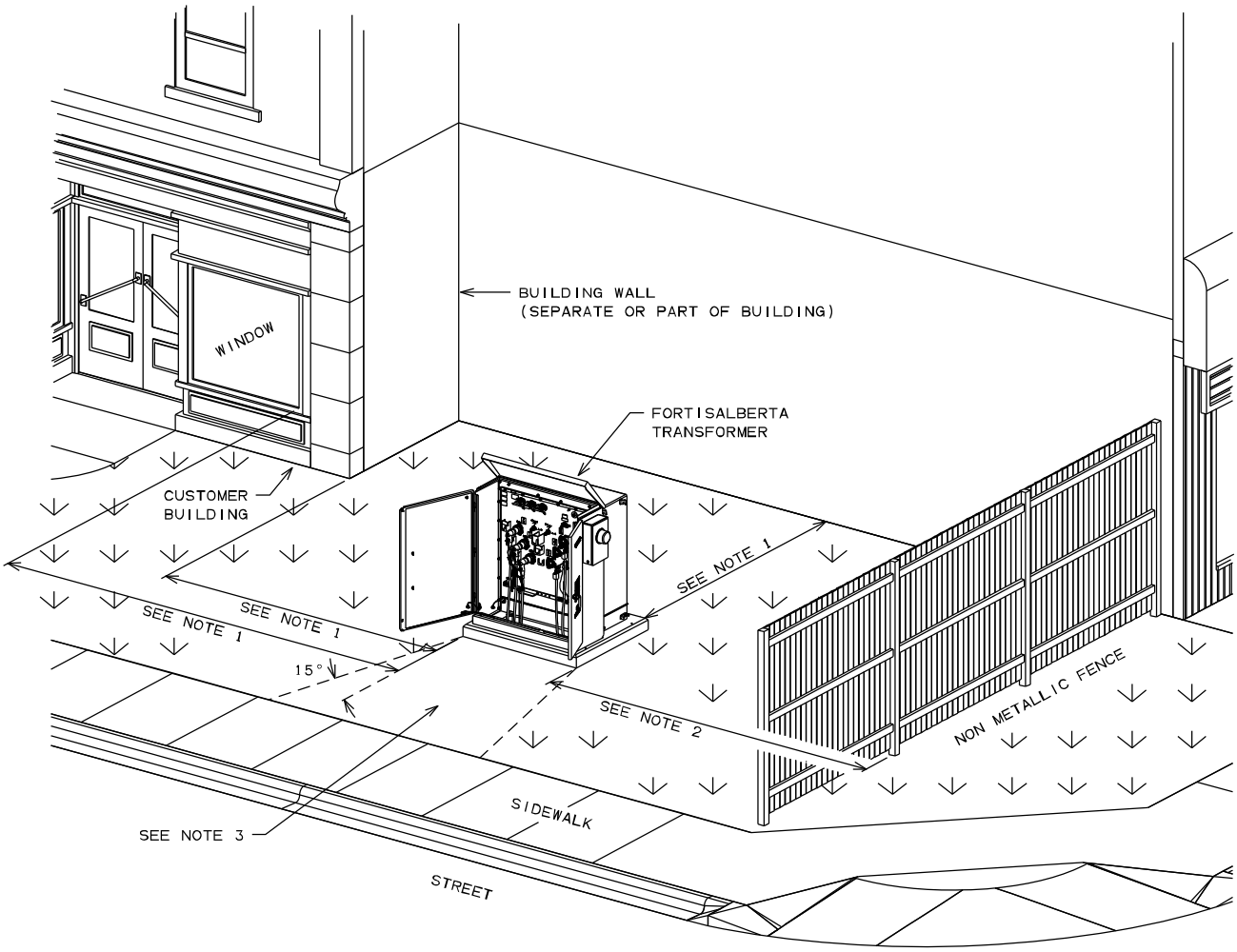
5 - THE CUSTOMER BOND/ GROUND IS NOT PROVIDED VIA THE POLE METER BOX. THE CUSTOMER IS REQUIRED TO GROUND THEIR SERVICE PER THE CANADIAN ELECTRICAL CODE (CEC) SECTION 10

6 - FOR DISTRIBUTED ENERGY RESOURCE (GENERATION), MAX CONNECTED GENERATION SHALL BE LIMITED TO 160A FOR A 200A BREAKER OR 80% OF THE BREAKER NAME PLATE

7 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS



Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- UPDATED METER AND MOUNTING POSITION - UPDATED NOTES - UPDATED DRAWING	24-07-05	07-08-02	SINGLE PHASE STANDBY UNDERGROUND SERVICE
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department	REVISION Checked KP	ORIGINAL Design / Checked NS	FORTIS ALBERTA
		REVISION Approved SM	ORIGINAL Approved FC.	Drawing Number: SMG 6.0.2 — Sheet: 1/1



NOTE:

1 - FOR ALL SINGLE PHASE AND THREE PHASE TRANSFORMERS LESS THAN OR EQUAL TO 3MVA (WITH CURRENT LIMITING FUSING):

- AS MEASURED FROM THE DECK EDGE OF THE CONCRETE PAD. THERE SHALL BE A MINIMUM OF 4.0m WORKING SPACE CLEARANCE ON THE TRANSFORMER DOOR SIDE AND A MINIMUM OF 1.5m (FOR OPERATIONAL REASONS), ON ALL OTHER SIDES

FOR ALL THREE PHASE TRANSFORMERS 4MVA AND ABOVE (WITHOUT CURRENT LIMITING FUSING):

- AS MEASURED FROM THE DECK EDGE OF THE CONCRETE PAD. THERE SHALL BE A MINIMUM OF 4.0m WORKING SPACE CLEARANCE ON THE TRANSFORMER DOOR SIDE AND AT LEAST 4.0m FROM ANY COMBUSTIBLE SURFACE OR MATERIAL ON A BUILDING AND AT LEAST 6.0m FROM ANY WINDOW, DOOR, OR VENTILATION INLET OR OUTLET ON A BUILDING, EXCEPT WHERE A WALL OR BARRIER WITH NON-COMBUSTIBLE SURFACES, OR MATERIAL (AS PER CAN/ULC-S114) IS CONSTRUCTED BETWEEN THE TRANSFORMER AND ANY DOOR, WINDOW, VENTILATION OPENING, OR COMBUSTIBLE SURFACE.

- IF A BARRIER USING A NON-COMBUSTIBLE SURFACE IS TO BE USED (BLAST WALL) MINIMUM DISTANCE TO THE TRANSFORMER PAD SHALL BE 1.5m

2 - ADDITIONAL CLEARANCE MAY BE REQUIRED BETWEEN METALLIC OBJECTS (SUCH AS A FENCE) AND THE TRANSFORMER TO REDUCE SAFETY HAZARDS (STEP AND TOUCH POTENTIAL). IF METALLIC OBJECTS ARE REQUIRED CLOSER THAN 5M TO THE TRANSFORMER UNIT, THE UTILITY SHALL BE ALERTED AND THE HAZARD SHALL BE ASSESSED

3 - THE GRADE MUST BE LESS THAN 9.5° (1:6 GRADE) FOR THE 4m CLEAR AREA IN FRONT OF THE TRANSFORMER

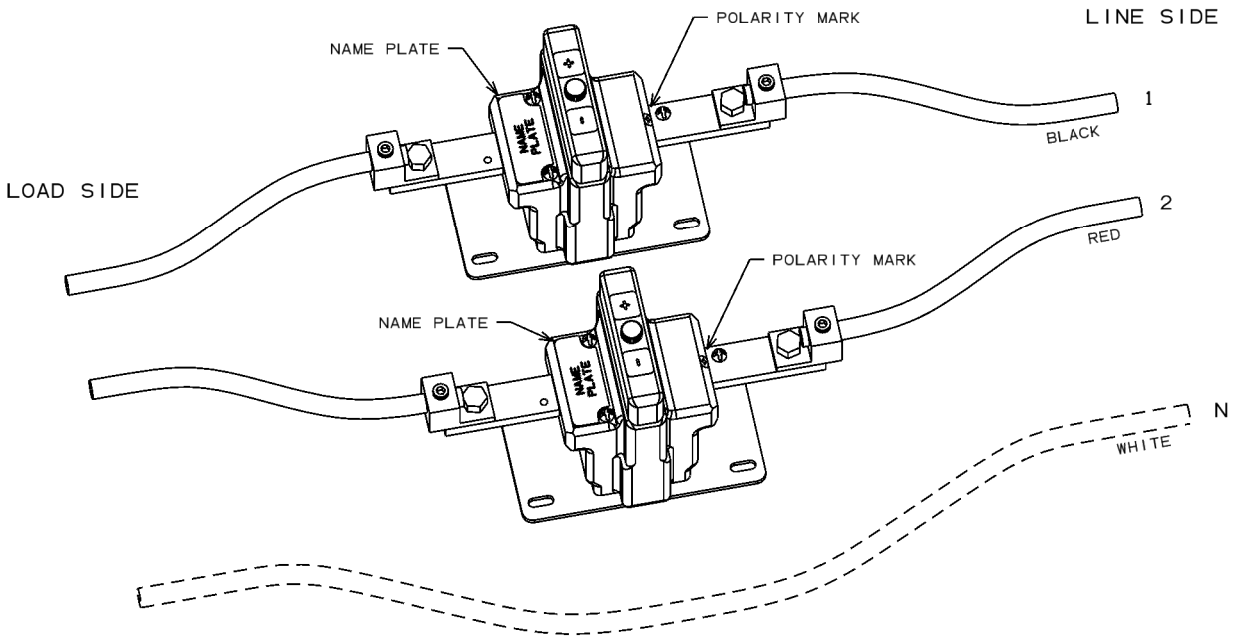
4 - THE TOP OF THE TRANSFORMER MUST NOT BE BLOCKED OR COVERED

5 - THE AREA IMMEDIATELY IN FRONT OF THE TRANSFORMER MUST BE KEPT FREE OF ALL OBSTRUCTIONS

6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REVISED NOTE 1 FROM 3M TO 4M FROM A COMBUSTIBLE WALL - REVISED NOTES TO PROVIDE INFORMATION REGUARDING CLEARANCES FROM A METALIC FENCE - UPDATED TRANSFORMER PAD DRAWING	18-02-22	09-07-15	COMMERCIAL SERVICES LOCATION OF PADMOUNT TRANSFORMERS
		REVISION Checked NS	ORIGINAL Design / Checked	
		REVISION Approved HN	ORIGINAL Approved D.M.	FORTIS ALBERTA

Drawing Number	Sheet
SMG 7.1	1 / 1

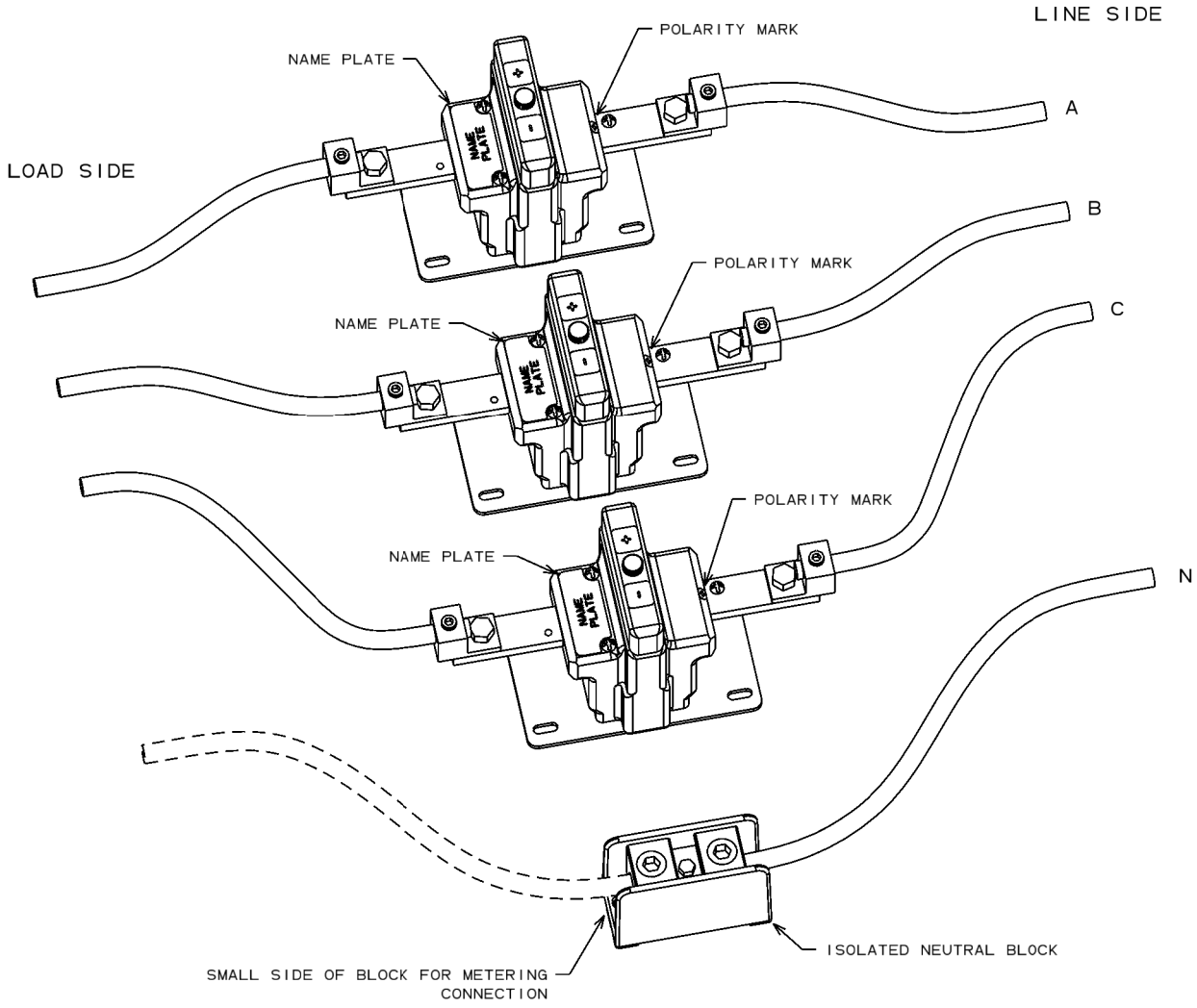


NOTE:

1 - IF LOAD AND LINE ARE REVERSED THE CT'S MUST BE REVERSED SO THAT THE POLARITY MARKS ARE ALWAYS ON THE LINE SIDE.

2 - NO CONNECTIONS ARE REQUIRED TO THE NEUTRAL CONDUCTOR

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	SINGLE PHASE INSTRUMENT TRANSFORMER ENCLOSURE LAYOUT	
NO STAMP NEEDED	- REMOVED STAMP	15-12-09	09-07-09		
		REVISION Checked NS	ORIGINAL Design / Checked		
		REVISION Approved HN	ORIGINAL Approved D.M.	FORTIS ALBERTA	Drawing Number: SMG 7.6.1 / Sheet: 1/1



NOTE:

1 - PT'S AND FUSES WILL BE SUPPLIED BY FORTISALBERTA AS REQUIRED (SEE TABLE IN SECTION 2.16.5)

2 - THE NEUTRAL CONDUCTOR MUST BE RUN INTO THE INSTRUMENT TRANSFORMER ENCLOSURE
THE CUSTOMER MUST INSTALL AN ISOLATED NEUTRAL BLOCK TO FACILITATE CONNECTION
OF THE POTENTIAL WIRE FOR METERING

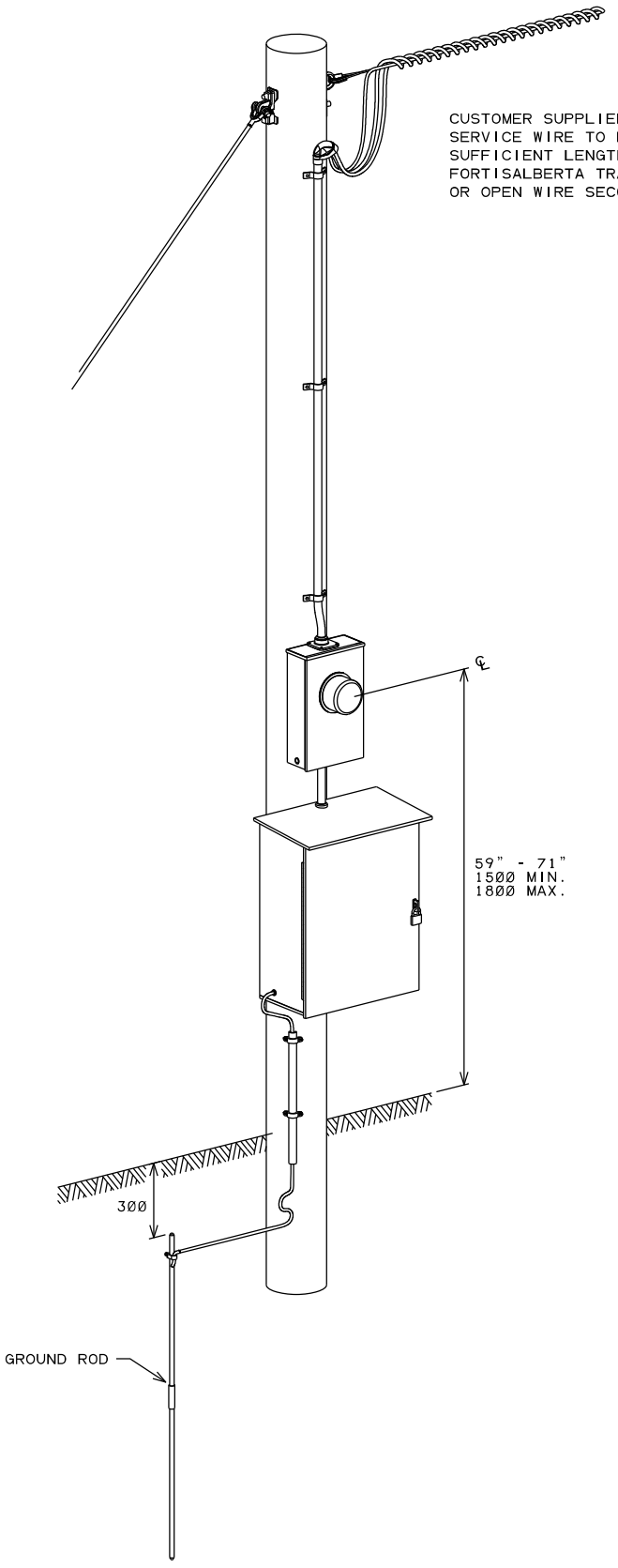
3 - IF LOAD AND LINE ARE REVERSED THE CT'S MUST BE REVERSED SO THAT THE POLARITY MARKS
ARE ALWAYS ON THE LINE SIDE

4 - THE ISOLATED NEUTRAL BLOCK MUST BE INSULATED FROM THE ENCLOSURE AND CANNOT BE GROUNDED

5 - WHERE PARALLEL CONDUCTORS ARE USED FOR GREATER AMPACITY,
ONLY ONE NEUTRAL CONDUCTOR NEED BE CONNECTED TO THE ISOLATED NEUTRAL BLOCK

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REMOVED STAMP	15-12-09	09-07-09	THREE PHASE INSTRUMENT TRANSFORMER ENCLOSURE LAYOUT
		REVISION Checked NS	ORIGINAL Design / Checked	
		REVISION Approved HN	ORIGINAL Approved D.M.	FORTIS ALBERTA

Drawing Number	Sheet
SMG 7.6.2	1 / 1



NOTE:

1 - SMG 9.2 DRAWING IS OF A TEMPORARY SINGLE PHASE HOT CYCLED METERED SERVICE AND IS FOR ILLUSTRATION PURPOSES ONLY. THREE PHASE TEMPORARY SERVICES CONNECTED TO 277/480V OR 347/600V REQUIRED COLD CYCLED METER CONNECTIONS. REFER TO CEC SECTION 76 AND CONSULT YOUR LOCAL AUTHORITY HAVING JURISDICTION FOR ACCEPTABLE SERVICE CONNECTIONS

2 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.

3 - POLE, OVERHEAD SERVICE WIRE, AND ALL OTHER ASSOCIATED EQUIPMENT (EXCEPT METER) ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.

4 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS.

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- REVISED OVERHEAD SECONDARY SERVICE DROP - REVISED NOTE	24-07-05	07-08-02	CUSTOMER OWNED TEMPORARY/PERMANENT OVERHEAD SERVICE STRUCTURE
		REVISION Checked KP	ORIGINAL Design / Checked NS	
		REVISION Approved SM	ORIGINAL Approved TS.	FORTIS ALBERTA
APEGA Permit No. P07387	Authenticated and Validated original filed with the Engineering Department			Drawing Number SMG 9.2 Sheet 1/1

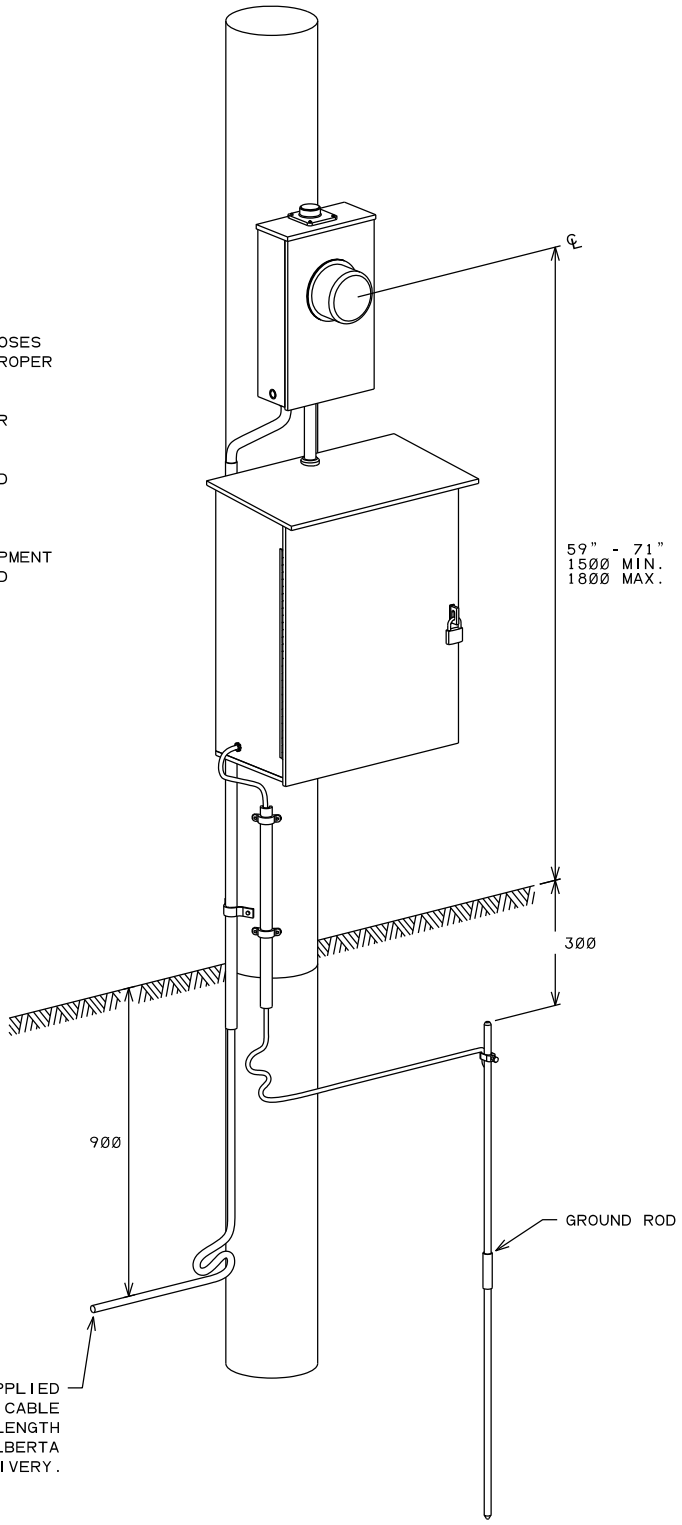
NOTE:

1 - THE DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. CONSULT YOUR ELECTRICIAN FOR PROPER INSTALLATION DETAILS

2 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.

3 - CUSTOMER TEMPORARY STUB, UNDERGROUND CABLE, AND ALL OTHER ASSOCIATED EQUIPMENT (EXCEPT METER) ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.

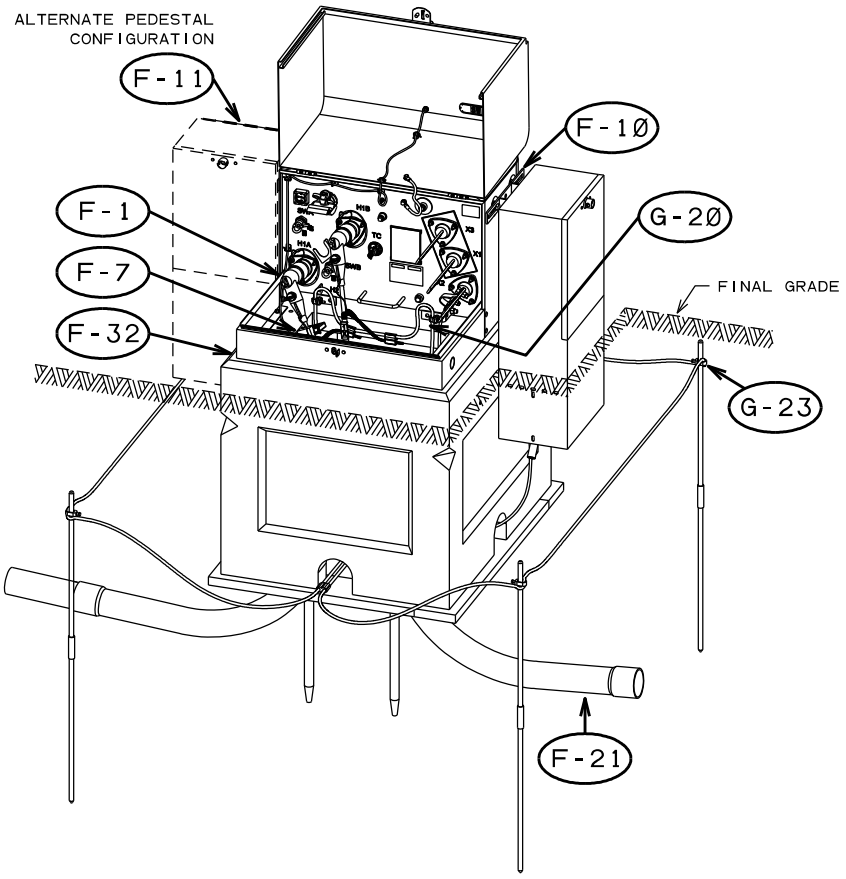
4 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.



Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
NO STAMP NEEDED	- UPDATED GROUND	20-01-27	07-08-02	CUSTOMER OWNED TEMPORARY/PERMANENT UNDERGROUND SERVICE STRUCTURE
APEGGA Permit No. P07387		REVISION Checked NS	ORIGINAL Design / Checked NS	
		REVISION Approved	ORIGINAL Approved	FORTIS ALBERTA

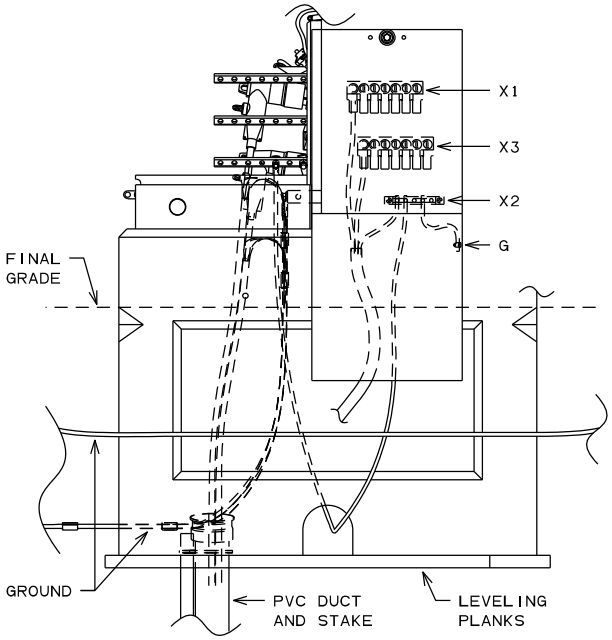
Drawing Number	Sheet
SMG 9.3	1 / 1

Structure Drawings



ISOMETRIC VIEW

SINGLE LINE SYMBOL



POWER PEDESTAL DETAIL

NOTE:

1 - FOR INSTALLATION OF ELBOW TERMINATOR, SEE DISTRIBUTION CONSTRUCTION AND OPERATIONS STANDARDS S30-02

2 - DE-ENERGIZE TRANSFORMER BEFORE DISCONNECTING GROUND X2

3 - EQUIPMENT PADS ARE NOT TO BE PLACED ON SOILS THAT ARE IN CLASS 7 SOIL (WET, PEAT, ORGANICS) WITHOUT SPECIAL FOUNDATIONS BEING REQUIRED

4 - WHERE METALLIC GUARD POSTS, RAILS, OR SIMILAR BARRIERS ARE USED (FOR GUARD POST DIMENSIONS SEE DWG 1302) TO PROVIDE MECHANICAL PROTECTION FOR PADMOUNTED EQUIPMENT, GRADIENT CONTROL PROTECTION SHALL BE PROVIDED TO MAINTAIN SAFE TOUCH AND STEP POTENTIALS AS REQUIRED

5 - LEAVE 2m OF EACH CONDUCTOR TAIL FOR CONNECTION TO EQUIPMENT CASE

6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

Engineering Stamp

PROFESSIONAL LICENSEE (ENGINEERING) ALBERTA
NOEL SMITH
242399

APEGA Permit No. P07387

Description
- UPDATED GROUND LOOP
- CHANGED POWER IN CABLES TO BOND TO THE NEW LOOP

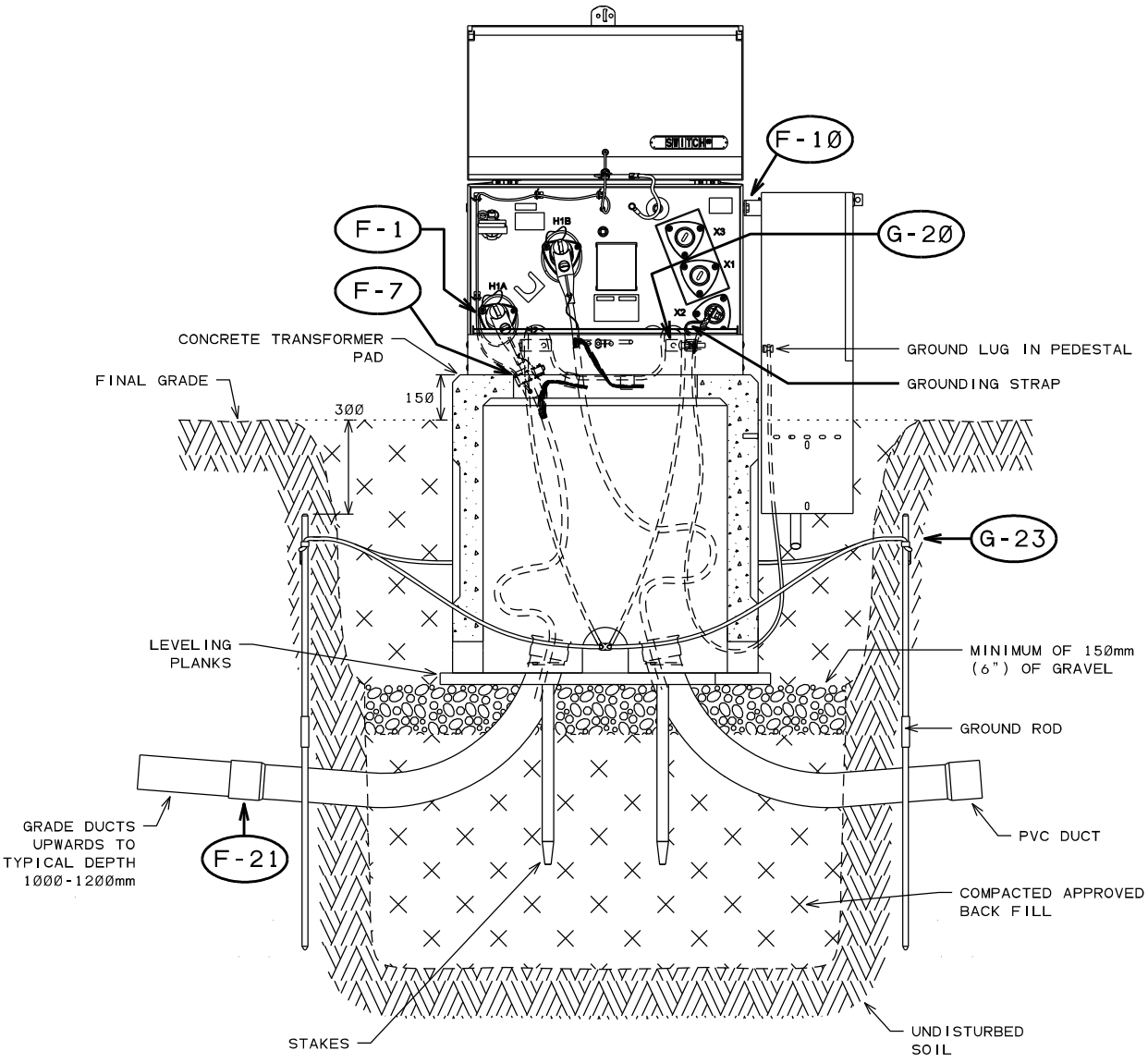
Authenticated and Validated original filed with the Engineering Department

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
24-02-08	03-08-06
REVISION Checked: JM	ORIGINAL Design / Checked: NS
REVISION Approved: NS	ORIGINAL Approved: TC

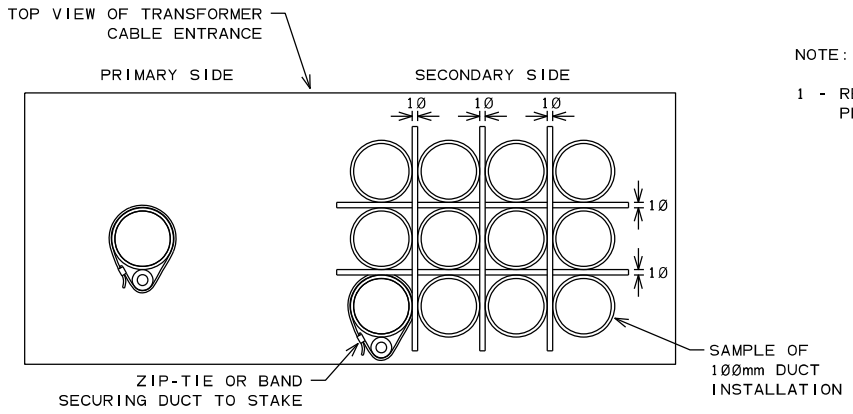
1PH LOW PROFILE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT

FORTIS ALBERTA

Drawing Number	Sheet
1226	1 / 3



FRONT VIEW



MULTIPLE DUCT PLACEMENT

NOTE:

1 - REFER TO DRAWING 1303 FOR PLACEMENT OF EQUIPMENT

Engineering Stamp

PROFESSIONAL LICENSEE (ENGINEERING) ALBERTA
NOEL SMITH
242399

APEGA Permit No. P07387

Description
- UPDATED GROUND LOOP
- CHANGED POWER IN CABLES TO BOND TO THE NEW LOOP

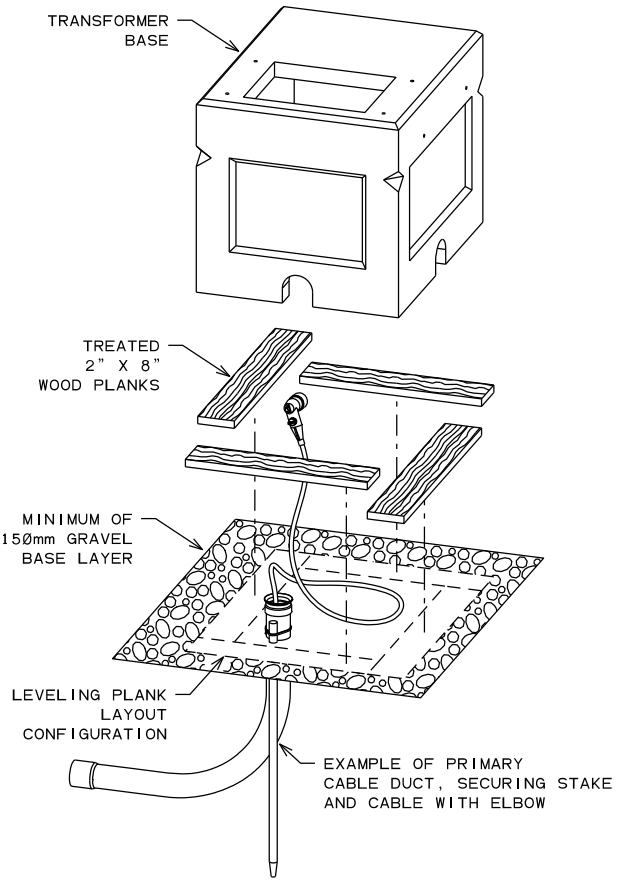
Authenticated and Validated original filed with the Engineering Department

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
24-02-08	16-10-03
REVISION Checked JM	ORIGINAL Design / Checked NS
REVISION Approved NS	ORIGINAL Approved HN

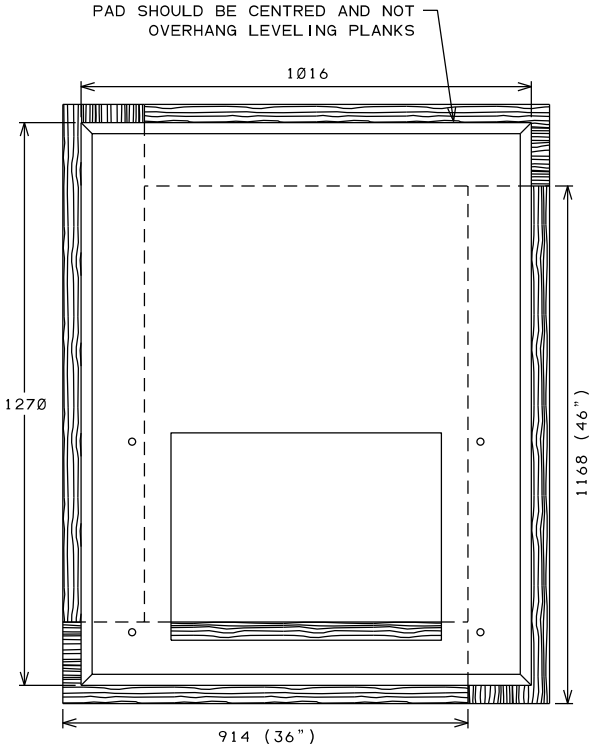
1PH LOW PROFILE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT

FORTIS ALBERTA

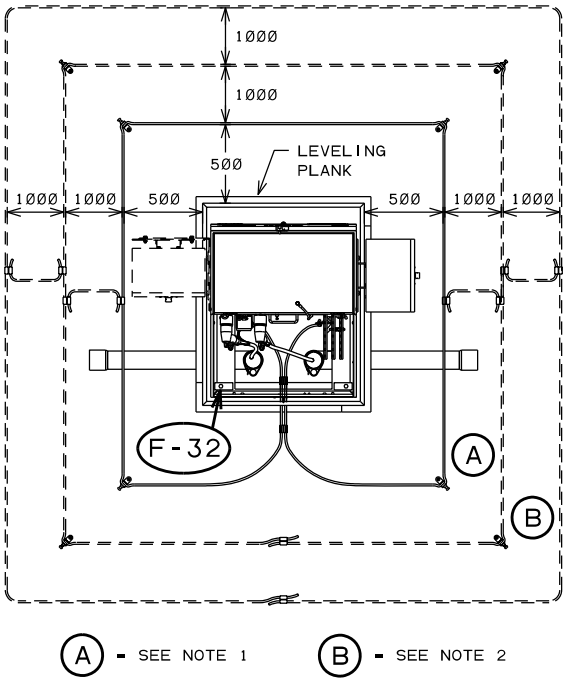
Drawing Number	Sheet
1226	2 / 3



LEVELING PLANK INSTALLATION DETAIL



LEVELING PLANK OVERVIEW DETAIL



(A) - SEE NOTE 1 (B) - SEE NOTE 2

PLAN VIEW

NOTE:

1 - GROUND REQUIREMENT (GRADIENT CONTROL) FOR 1 PHASE EQUIPMENT WITH A MULTI-GROUNDED NEUTRAL

2 - IF A MULTI-GROUNDED NEUTRAL SYSTEM IS NOT PRESENT INSTALL ADDITIONAL GRADIENT CONTROL CONDUCTOR BY RELOCATING THE GROUND RODS 1500mm FROM THE EQUIPMENT PAD AND INSTALLING AN ADDITIONAL TWO GRADIENT CONTROL LOOPS AROUND THE EQUIPMENT (FOR A TOTAL OF 3 LOOPS) AS SHOWN

3 - CABLE MAY BE IN DUCT UNDER BOX PAD

4 - NUMBER OF DUCTS IS LIMITED BY THE SIZE OF THE OPENING TO THE SECONDARY COMPARTMENT OF A TRANSFORMER. 50mm, 75mm, 100mm, AND 150mm DUCTS MAY BE INSTALLED. WHEN FORTISALBERTA INSTALLS A TRANSFORMER, EITHER 100mm OR 150mm DUCTS WILL BE INSTALLED

5 - CABLE LARGER THAN 750MCM MUST BE APPROVED BY FORTISALBERTA

6 - ALL SECONDARY CONNECTOR LUGS SHALL BE SUPPLIED BY CUSTOMER. LUGS SHALL BE ONE HOLE MECHANICAL, AL/CU LUG, FITTED FOR TRANSFORMER PAD AND CABLE SIZE BUT NOT LARGER THAN 40mm IN WIDTH

7 - NUMBER OF CABLES IS LIMITED TO 6 PER PHASE

8 - IF ARMOURED CABLE IS USED, ARMOURED JACKET MUST BE STRIPPED DOWN TO DUCT

9 - LUGS CONNECTED TO THE TRANSFORMER SECONDARY PAD SHALL BE MADE ON TAP HOLES ON THE PHASE TERMINALS MARKED X_1 AND X_3, NEUTRAL LUGS SHALL BE CONNECTED TO THE BOTTOM TERMINAL MARKED X_2

10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES (INCHES)

Engineering Stamp
PROFESSIONAL ENGINEER ALBERTA
H. NAVIS
APEGGA Permit No. P07387

Description
- ADDED BELL ENDS TO DUCT
- REMOVED "OPTIONAL" TEXT FROM WOOD PLANK DETAILS

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
20-01-27	16-10-03
REVISION Checked NS	ORIGINAL Design / Checked NS
REVISION Approved HN	ORIGINAL Approved HN

1PH LOW PROFILE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT

FORTIS ALBERTA

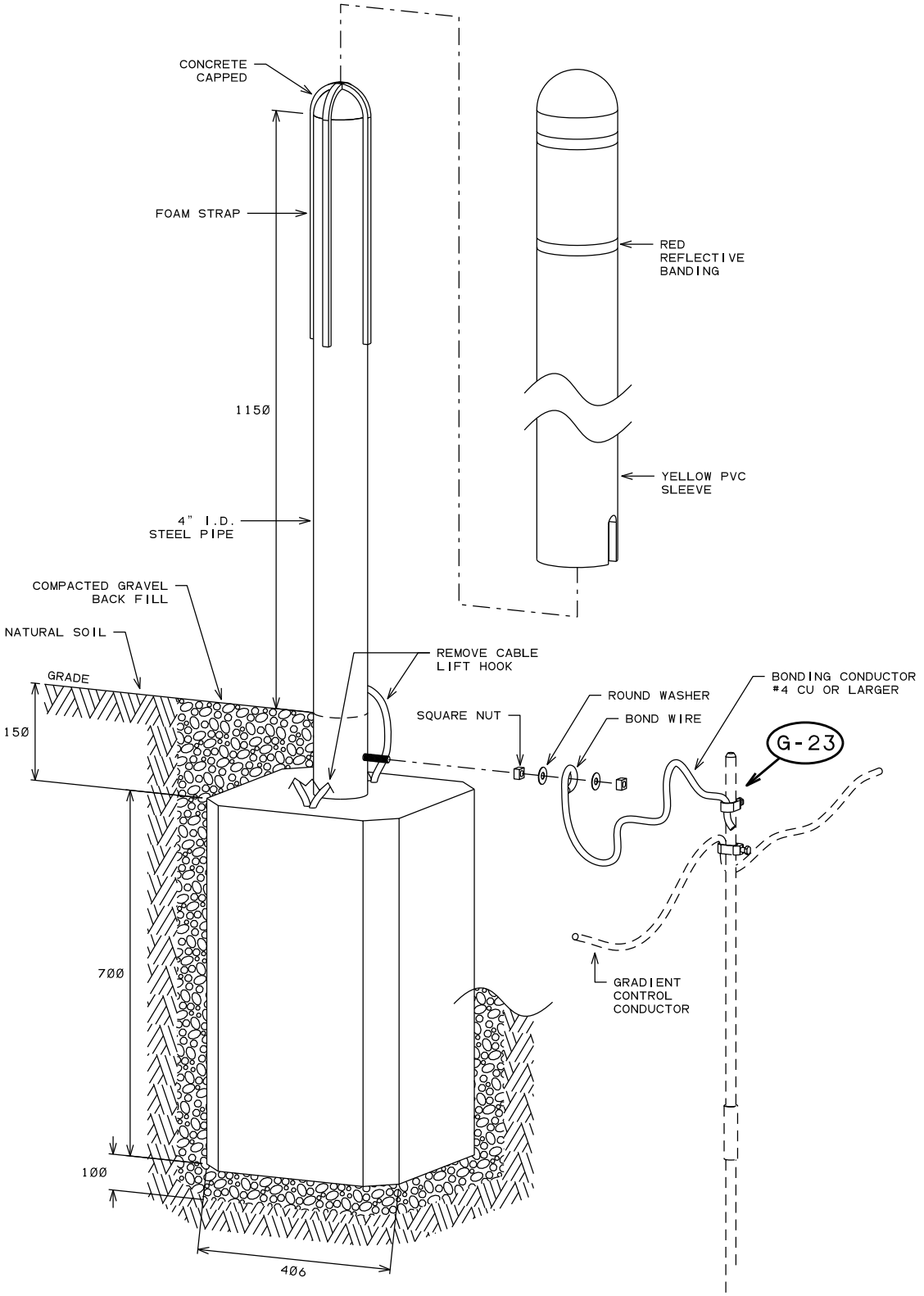
Drawing Number	Sheet
1226	3 / 3

Item #	Description	UI	-1	-2	-	-	-	-	-	-	-	-
5030603	LUMBER, 2" X 8" X 12 FT, FIR, TREATED		2	2								
5310220	CONDUCTOR, STR, SD BARE, #4, CU.	M	25	60								
5530152	CONNECTOR, COMP PG, CU, U/G NEUT		2	13								
5571311	CONNECTOR, FOR 3/4" GND ROD & CU CNDCTR		4	4								
5571421	ROD, GROUND, POINTED, 3/4 X 4' CU-BONDED		8	8								
5571525	COMPRES. COUPLING, SECT. CU-CLAD GRD ROD		4	4								
7550505	BASE, PRECAST FOR MINI:PAD TRANSFORMER		1	1								

- -
January 30,2025. Added structure 1526-2, modified remarks 1 and 2.
- -

REMARKS:

1. 1526-1 is for all single phase padmounted transformer and switching cubical installations with a multi-grounded neutral system, see structure drawing 1226 and 1230 (BOM ref. 1226-8 and 1230-3) for the grounding detail see 1226, page 3, note 1.
2. 1526-2 is for all single phase padmounted transformer and switching cubical installations where a multi-grounded neutral system is not preset; see structure drawing 1226 and 1230 (BOM ref. 1226-8 and 1230-3) for the grounding detail see 1226, page 3, note 2.
3. Coil excessive grounding conductor and leave in vault.
4. For temporary lid cover for order:
   (1) 755-0605 890mm x 530mm lid
   (4) 513-2501 5/8 inch hex bolt
   (4) 514-3000 5/8 inch flat washer
   (4) 514-3001 5/8 inch lock washer



Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA
H. NAVIS
APEGGA Permit No. P07387

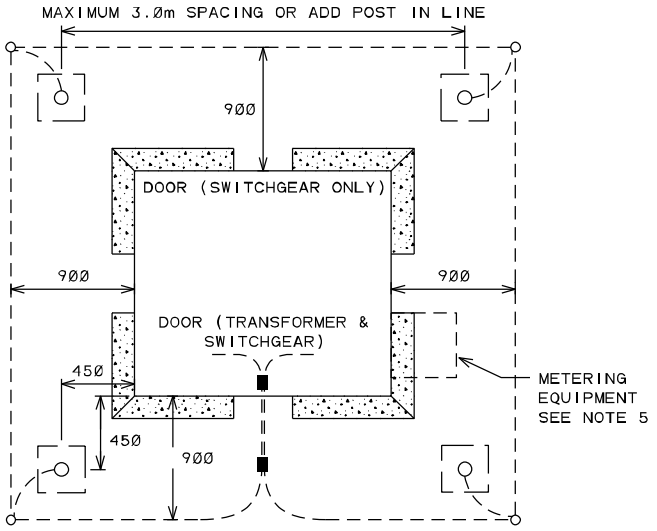
Description
- UPDATED GROUND ROD CONNECTION

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
20-01-27	09-07-15
REVISION Checked NS	ORIGINAL Design / Checked GM
REVISION Approved HN	ORIGINAL Approved D.M.

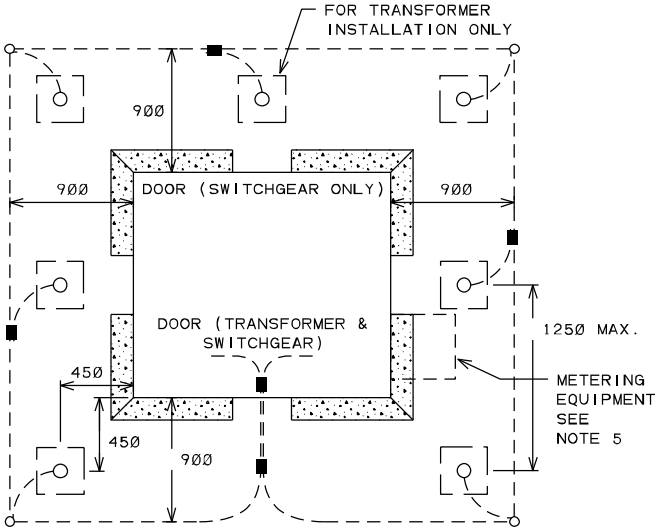
SERVICE GUARD POST

FORTIS ALBERTA

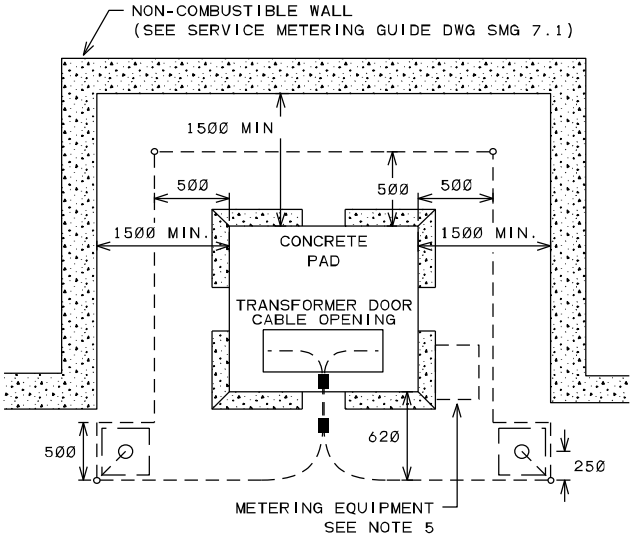
Drawing Number	Sheet
1302	1/2



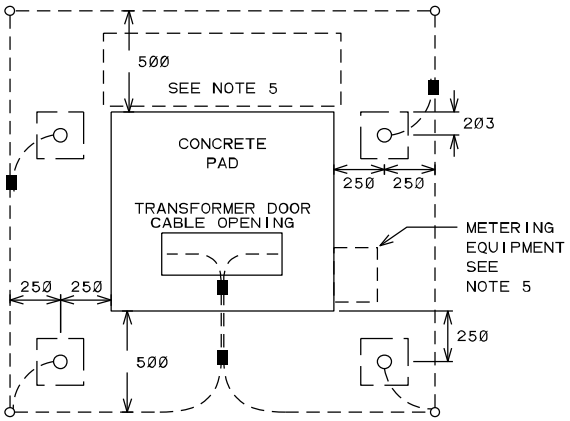
PAD LOCATED IN OPEN AREA



PAD LOCATED IN OPEN AREA
WITH HEAVY TRAFFIC



PAD LOCATED IN ALCOVE OR BESIDE BUILDINGS
(FOR TRANSFORMERS WITH CURRENT LIMITING FUSES ONLY)



SINGLE PHASE PAD MOUNTED TRANSFORMER
LOCATED ON URD RIGHT OF WAY

NOTE:

1 - WHERE THE TRANSFORMER IS LOCATED IN AN AREA EXPOSED TO VEHICLE DAMAGE, THE GUARD POSTS MUST BE SUPPLIED BY THE CUSTOMER

2 - AS MEASURED FROM THE EDGE OF THE CONCRETE SWITCHGEAR/ TRANSFORMER PAD, THERE SHALL BE A MINIMUM OF 4M WORKING SPACE CLEARANCE ON THE SWITCHGEAR/ TRANSFORMER DOOR SIDE AND A MINIMUM OF 1.5M ON ALL OTHER SIDES

3 - FOR GROUND GRID DETAILS, SEE DRAWING 1226 FOR SINGLE PHASE OR 1315 FOR THREE PHASE TRANSFORMER APPLICATIONS
FOR GROUND GRID DETAILS, SEE DRAWING 1593 FOR PAD MOUNT SWITCH APPLICATIONS

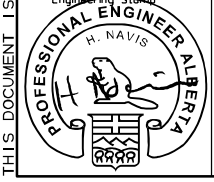
4 - THE REQUIREMENTS FOR GUARD POSTS, INCLUDING THE NECESSITY LOCATION AND INSTALLATION MUST BE CONFIRMED WITH FORTISALBERTA PRIOR TO CONSTRUCTION

5 - IF THERE IS A SECONDARY PEDESTAL/ METERING EQUIPMENT ATTACHED TO THE SWITCHGEAR/TRANSFORMER PAD, THE GUARD POST & GROUND GRID SHOULD BE EXTENDED IN SUCH A WAY TO PROTECT THE PERIPHERAL EQUIPMENT ALSO

6 - POST ENCASEMENT TO BE COMPACTED ALL AROUND WITH SUITABLE BACK FILL OR GRAVEL

7 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

Engineering Stamp



Description
- RELOCATED THE TAIL BOND CONNECTION OF THE GRID AS IT ENTERS THE VAULT SUCH THAT IT IS CLEAR THAT THERE IS A CONNECTION INSIDE OF THE VAULT
- UPDATED SERVICE AND METERING GUIDE LOOKUP
- REVISED NOTE 2 CLEARANCE CHANGED FROM 3M TO 4M

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
16-09-13	09-07-15
REVISION Checked NS	ORIGINAL Design / Checked
REVISION Approved HN	ORIGINAL Approved D.M.

SERVICE GUARD POST

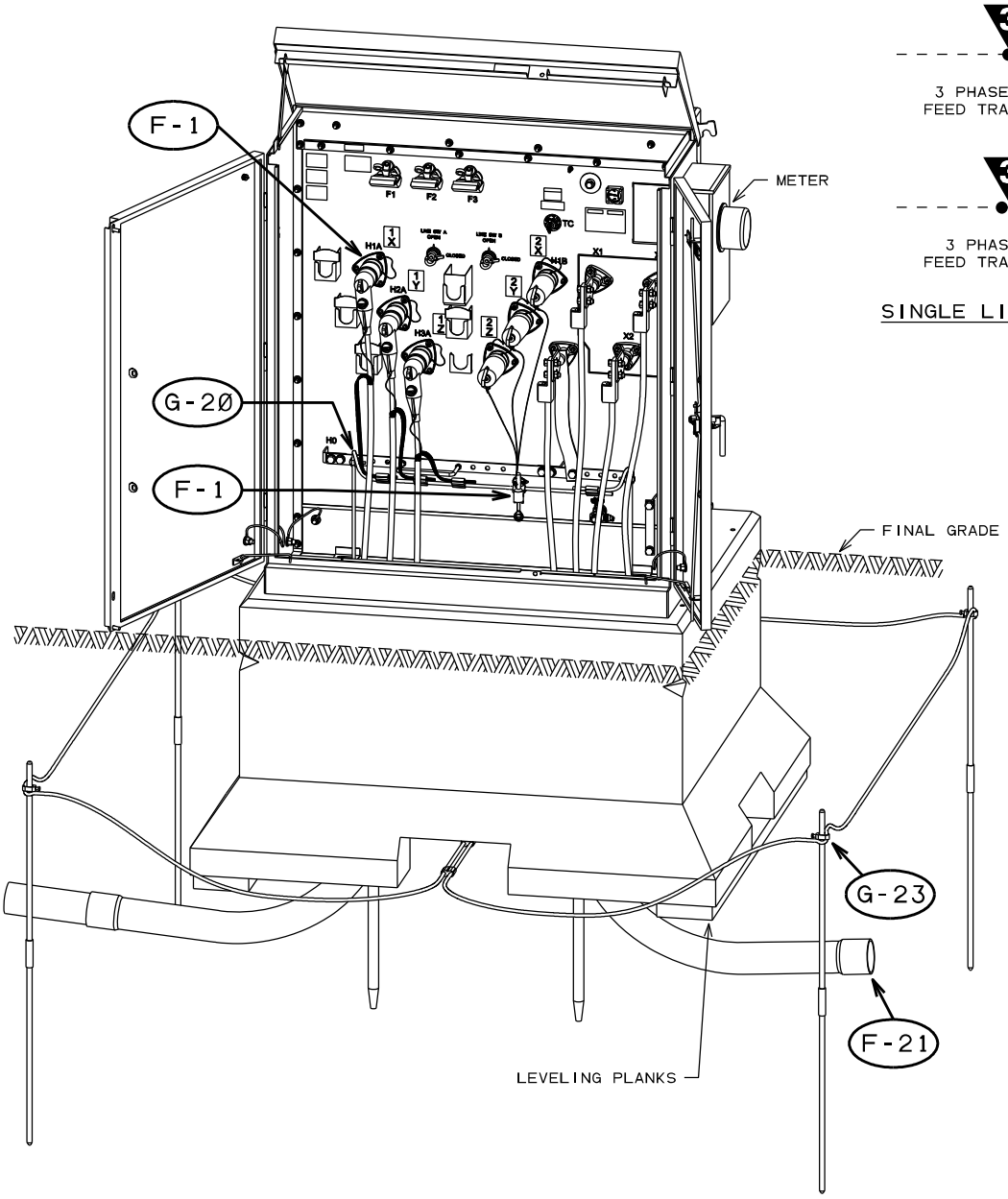
FORTIS ALBERTA

Drawing Number	Sheet
1302	2 / 2

Structure #: 1302 FortisAlberta 2020/06/09
Description: SERVICE GUARD POST

Item #	Description	UI	-1	-	-	-	-	-	-	-	-	-
5141104	NUT, SQUARE, 1/2 INCH, UNC 13, GALV		2									
5142102	WASHER, ROUND, 9/16" HOLE, 1-3/8" RIM		2									
5150802	POST, BUMPER, HEAVY DUTY		1									
5310220	CONDUCTOR, STR, #4, CU.	M	1									
5571311	CONNECTOR, FOR 5/8" TO 3/4" GND. ROD		1									

REMARKS:
Bill of material is for one guard post only, order additional guard posts where required.



3 PHASE RADIAL FEED TRANSFORMER

3 PHASE LOOP FEED TRANSFORMER

SINGLE LINE SYMBOL

ISOMETRIC VIEW

NOTE:

1 - FOR INSTALLATION OF ELBOW TERMINATOR, SEE DISTRIBUTION CONSTRUCTION AND OPERATIONS STANDARDS S30-02

2 - DE-ENERGISE TRANSFORMER BEFORE DISCONNECTING GROUND AT X0

3 - EQUIPMENT PADS ARE NOT TO BE PLACED ON SOILS THAT ARE IN CLASS 7 SOIL (WET, PEAT, ORGANICS) WITHOUT SPECIAL FOUNDATIONS BEING REQUIRED

4 - WHERE METALLIC GUARD POSTS, RAILS, OR SIMILAR BARRIERS ARE USED (FOR GUARD POST DIMENSIONS SEE DWG 1302) TO PROVIDE MECHANICAL PROTECTION FOR PADMOUNTED EQUIPMENT, GRADIENT CONTROL PROTECTION SHALL BE PROVIDED TO MAINTAIN SAFE TOUCH AND STEP POTENTIALS AS REQUIRED

5 - LEAVE 2m OF EACH CONDUCTOR TAIL FOR CONNECTION TO EQUIPMENT CASE

6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

Engineering Stamp

PROFESSIONAL LICENSEE ENGINEERING ALBERTA
NOEL SMITH
242399

APEGA Permit No. P07387

Description
- UPDATED GROUND LOOP
- CHANGED POWER IN CABLES TO BOND TO THE NEW GROUND
- ADDED BUSHING INSERTS AND BONDING TO HOT LINE CLAMP ON GROUND LOOP

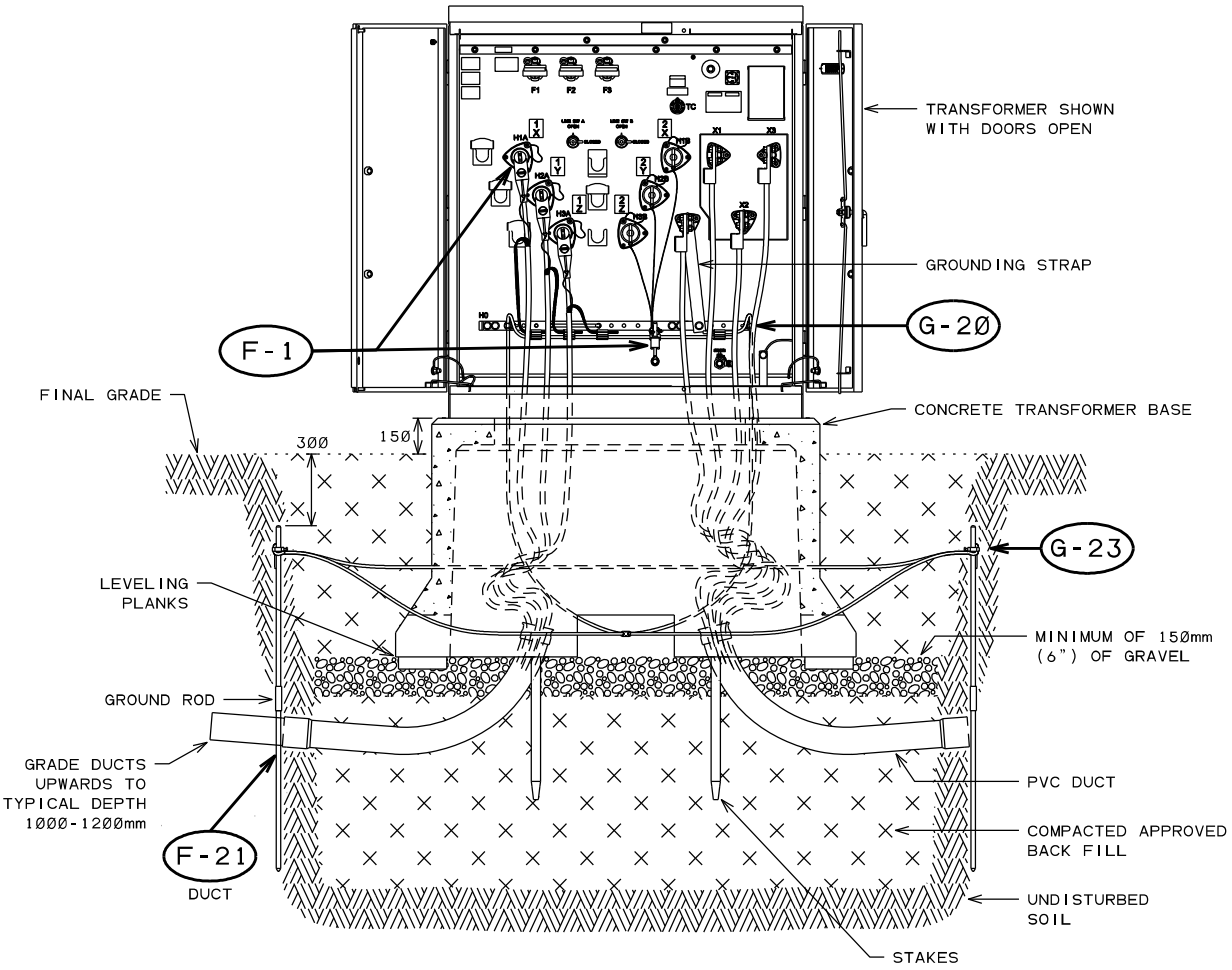
Authenticated and Validated original filed with the Engineering Department

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
24-01-15	02-06-10
REVISION Checked: JM	ORIGINAL Design / Checked: NS
REVISION Approved: NS	ORIGINAL Approved: TS.

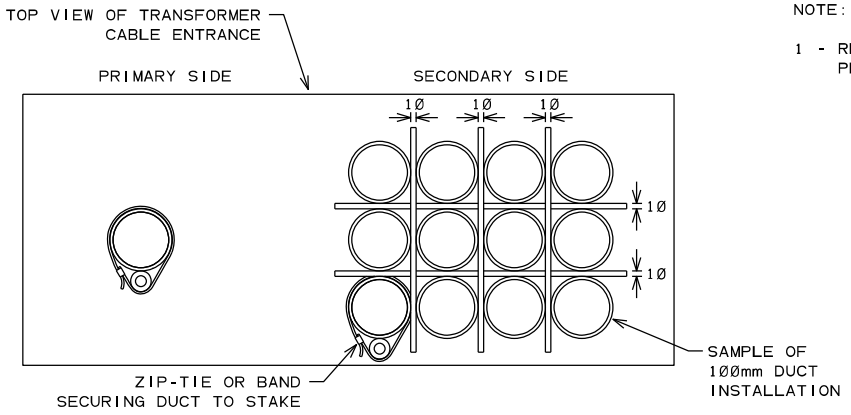
THREE PHASE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT

FORTIS ALBERTA

Drawing Number	Sheet
1315	1 / 4



FRONT VIEW



MULTIPLE DUCT PLACEMENT

NOTE:

1 - REFER TO DRAWING 1303 FOR PLACEMENT OF EQUIPMENT

Engineering Stamp

PROFESSIONAL LICENSEE (ENGINEERING) ALBERTA
NOEL SMITH
242399

APEGA Permit No. P07387

Description

- UPDATED GROUND LOOP
- CHANGED POWER IN CABLES TO BOND TO THE NEW GROUND
- ADDED BUSHING INSERTS AND BONDING TO HOT LINE CLAMP ON GROUND LOOP

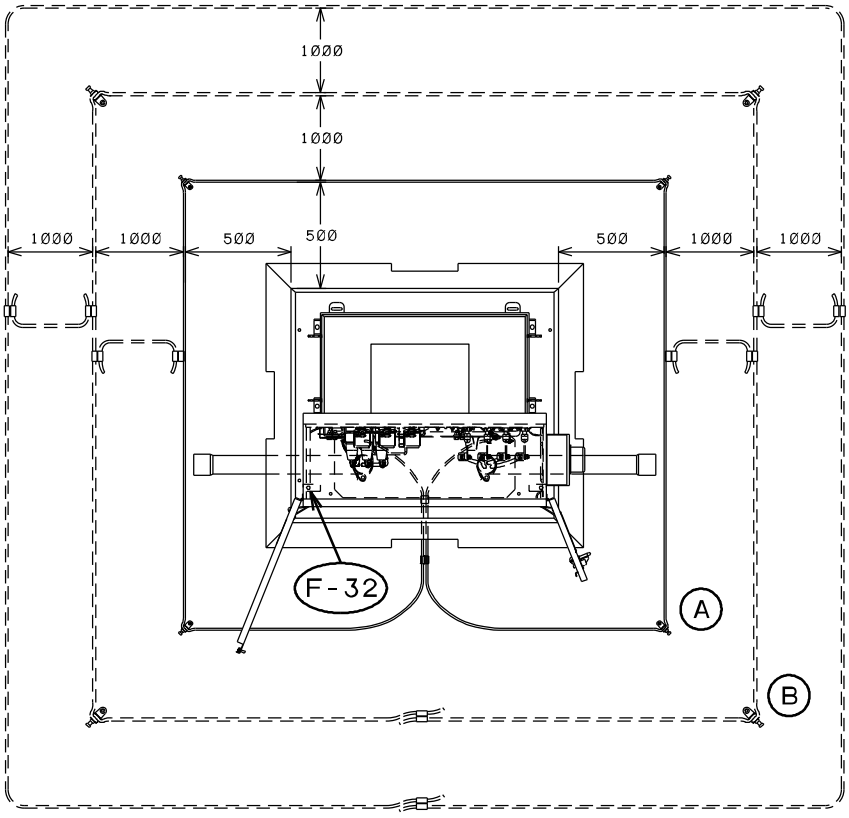
Authenticated and Validated original filed with the Engineering Department

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
24-01-10	16-10-03
REVISION Checked: JM	ORIGINAL Design / Checked: NS
REVISION Approved: NS	ORIGINAL Approved: HN

THREE PHASE PADMOUNT TRANSFORMER

FORTIS ALBERTA

Drawing Number	Sheet
1315	2 / 4



(A) = SEE NOTE 1 (B) = SEE NOTE 2

PLAN VIEW

NOTE:

1 - GROUNDING REQUIREMENT (GRADIENT CONTROL) FOR THREE PHASE EQUIPMENT WITH A MULTI-GROUNDED NEUTRAL

2 - IF A MULTI-GROUNDED NEUTRAL SYSTEM IS NOT PRESENT INSTALL ADDITIONAL GRADIENT CONTROL CONDUCTOR BY RELOCATING THE GROUND RODS TO 1500mm FROM THE EQUIPMENT PAD AND INSTALLING AN ADDITIONAL TWO GRADIENT CONTROL LOOPS AROUND THE EQUIPMENT (FOR A TOTAL OF 3 LOOPS) AS SHOWN

3 - CABLE MAY BE IN DUCT UNDER BOX PAD

4 - NUMBER OF DUCTS IS LIMITED BY THE SIZE OF THE OPENING TO THE SECONDARY COMPARTMENT OF A TRANSFORMER. 50mm, 75mm, 100mm, AND 150mm DUCTS MAY BE INSTALLED. WHEN FORTISALBERTA INSTALLS A TRANSFORMER, EITHER 100mm OR 150mm DUCTS WILL BE INSTALLED

5 - CABLE LARGER THAN 750MCM MUST BE APPROVED BY FORTISALBERTA

6 - ALL SECONDARY CONNECTOR LUGS SHALL BE SUPPLIED BY CUSTOMER. LUGS SHALL BE ONE HOLE MECHANICAL, AL/CU LUG, FITTED FOR TRANSFORMER PAD AND CABLE SIZE BUT NOT LARGER THAN 40mm IN WIDTH

7 - NUMBER OF CABLES IS LIMITED TO 6 PER PHASE

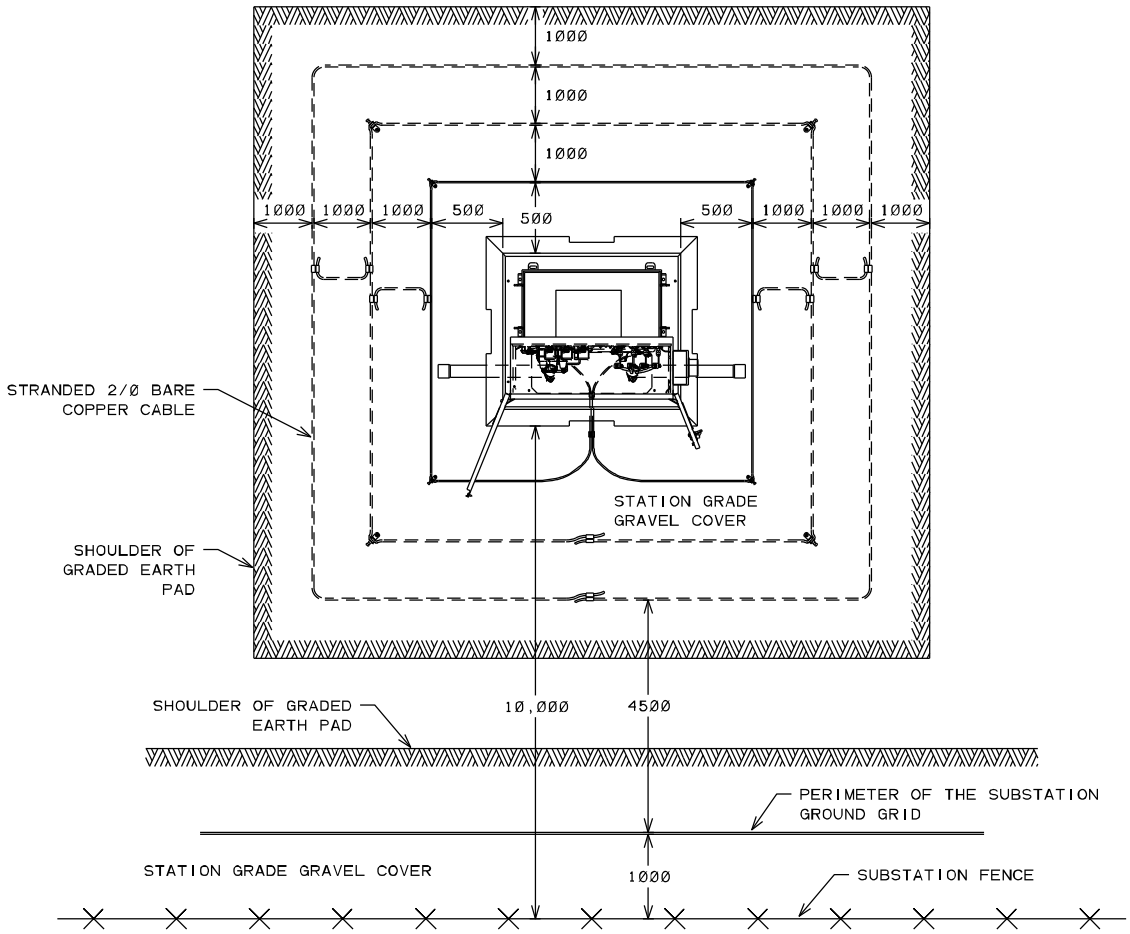
8 - IF ARMOURED CABLE IS USED, ARMOURED JACKET MUST BE STRIPPED DOWN TO DUCT

9 - LUGS CONNECTION TO TRANSFORMER SECONDARY PAD SHALL BE MADE TO THE TERMINALS MARKED X_1, X_2, & X_3, NEUTRAL LUGS SHALL BE CONNECTED TO THE TERMINAL MARKED X_0

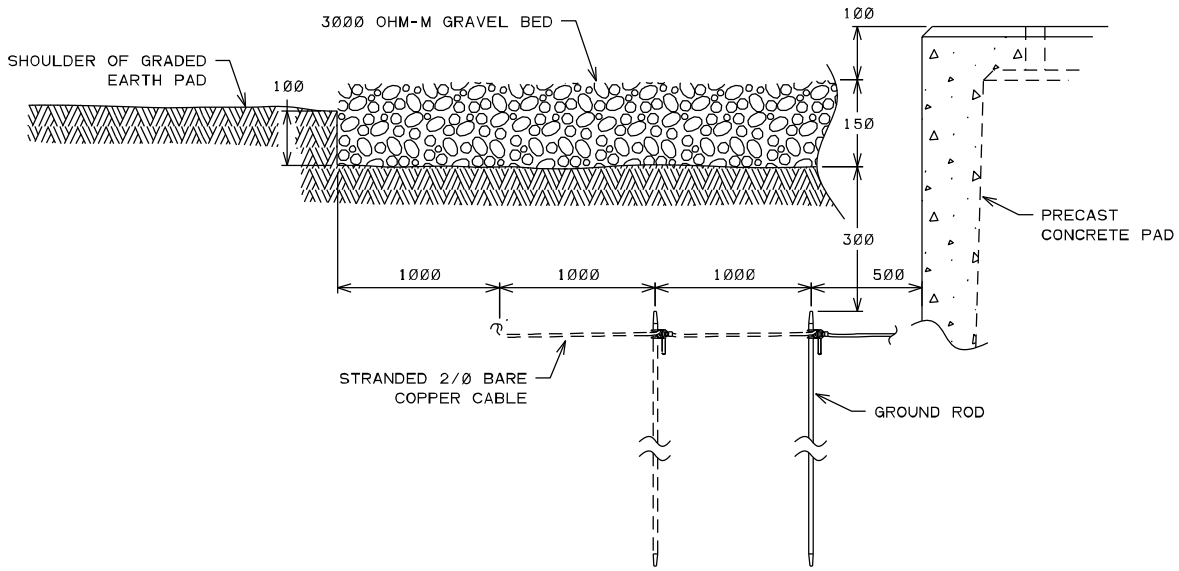
10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES (INCHES)

Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	
PROFESSIONAL ENGINEER ALBERTA H. NAVIS			16-10-03	THREE PHASE PADMOUNT TRANSFORMER
		REVISION Checked	ORIGINAL Design / Checked AS	
		REVISION Approved	ORIGINAL Approved HN	FORTIS ALBERTA

Drawing Number 1315 Sheet 3/4



STATION SERVICE PLAN VIEW



STATION SERVICE SIDE VIEW

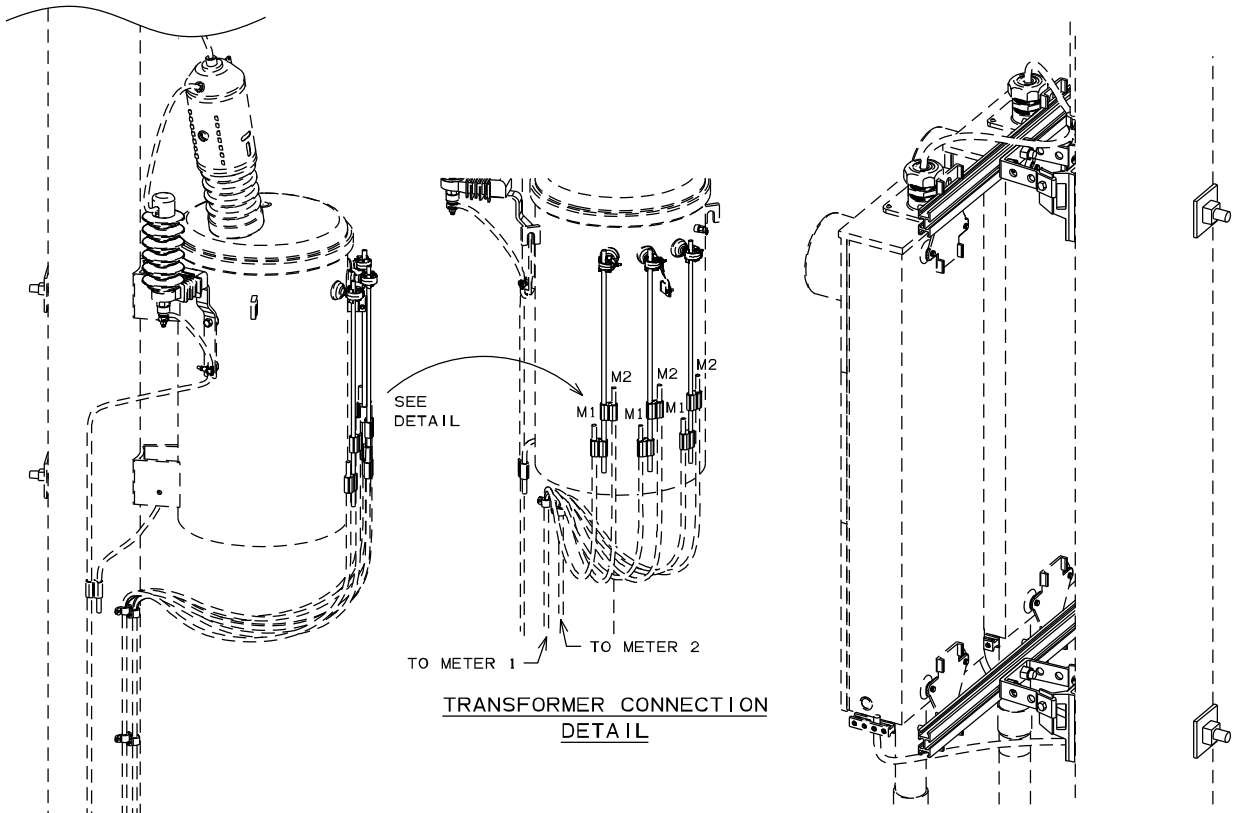
Engineering Stamp: PROFESSIONAL ENGINEER ALBERTA H. NAVIS	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD) 16-10-03	STATION SERVICE TRANSFORMER GENERAL ARRANGEMENT
		REVISION Checked	ORIGINAL Design / Checked AS	
		REVISION Approved	ORIGINAL Approved HN	FORTIS ALBERTA

Drawing Number	Sheet
1315	4 / 4

Item #	Description	UI	-1	-2	-3	-4	-5	-6	-	-	-	-
5310202	WIRE, COPPER, STR, SD BARE, 2/0	M	17	81	20	81	22	81				
5530155	CONNECTOR, PARALLEL GROOVE, 1 TO 2/0		2	13	2	13	2	13				
5571311	CONNECTOR, FOR 5/8" TO 3/4" GND. ROD		4	4	4	4	4	4				
5571421	ROD, GRD, SECT, 3/4 X 4' CU-CLAD TAPERED		16	16	16	16	16	16				
5571525	COMPRES. COUPLING, SECT. CU-CLAD GRD ROD		12	12	12	12	12	12				
7550507	PAD, PRECAST CONCRETE, TRANS, 75-500KVA		1	1								
7550512	PAD, PRECAST CONCRETE,TRANS,750-3000KVA				1	1						
7550516	PAD, PRECAST CONCRETE, TRANS, 1-20 MVA						1	1				

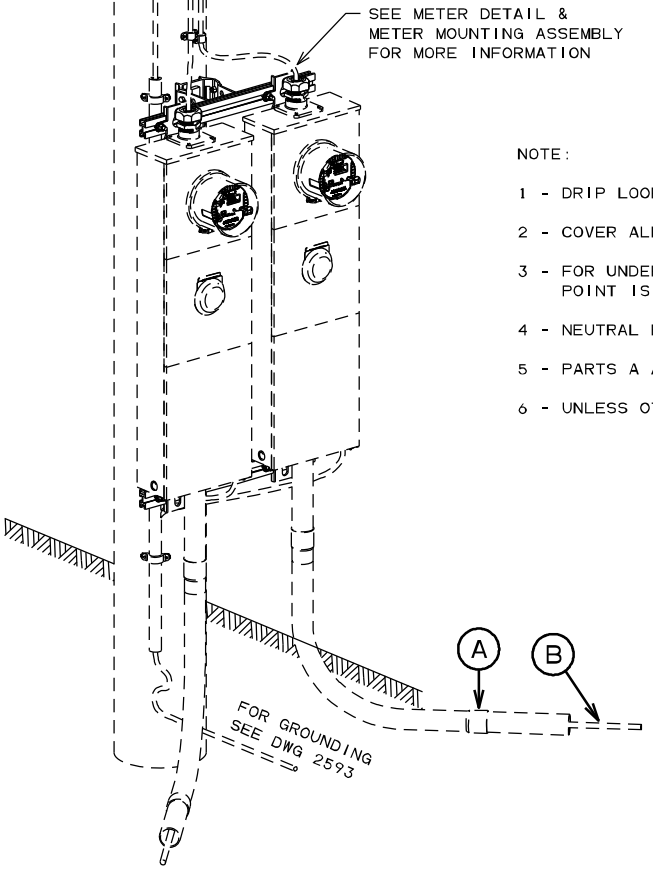
REMARKS:

1. Structure 1515 is for customer installed pad and grounds.
2. 1515-1 is for all three phase pad mounted transformers 75-500kVA with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-1) for grounding detail.
3. 1515-2 is for all three phase pad mounted transformers 75-500kVA without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-2) for grounding detail.
4. 1515-3 is for all three phase pad mounted transformers 750-3000kVA with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-4) for grounding detail.
5. 1515-4 is for all three phase pad mounted transformers 750-3000kVA without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-5) for grounding detail.
6. 1515-5 is for three phase pad mounted transformers 1000-5000kVA, 4.16kV secondary and 4000kVA, 600V secondary with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-6) for grounding detail.
7. 1515-6 is for three phase pad mounted transformers 1000-5000kVA, 4.16kV secondary and 4000kVA, 600V secondary without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-7) for grounding detail
8. When required for leveling of the pre-cast base, order (2) 2" x 8" x 12' leveling planks item 503-0602.
9. Coil excessive grounding conductor and leave in vault.
10. For temporary lid cover for structures 1515-1 and 1515-2 order:
    (1) 755-0606 l081mm x 481mm lid
    (4) 513-2501 5/8 inch hex bolt
    (4) 514-3000 5/8 inch flat washer
    (4) 514-3001 5/8 inch lock washer



TRANSFORMER CONNECTION
DETAIL

(REVERSE VIEW)
METER DETAIL



NOTE:

1 - DRIP LOOP SERVICE ENTRANCE CABLE MUST BE PROVIDED

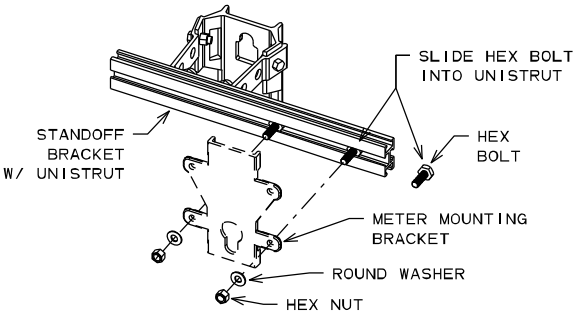
2 - COVER ALL CONNECTORS WITH SELF AMALGAMATING TAPE

3 - FOR UNDERGROUND CUSTOMER SERVICES THE ATTACHMENT POINT IS AT THE BREAKER

4 - NEUTRAL BAR IN METER BOX MUST BE BONDED TO THE BOX

5 - PARTS A AND B ARE SUPPLIED AND INSTALLED BY THE CUSTOMER

6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



METER MOUNTING ASSEMBLY

Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA
KEVIN VAN POPTA

Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
		17-12-20
	REVISION Checked	ORIGINAL Design / Checked KVS
	REVISION Approved	ORIGINAL Approved KVP

SINGLE PHASE POLE DUAL METERING FOR TWO SERVICES

FORTIS ALBERTA

Drawing Number	Sheet
1635	1 / 1

Structure #: 1635 FortisAlberta 2021/05/04 Page: 1
Description: 1 PH DOUBLE POLE METERING, O/H

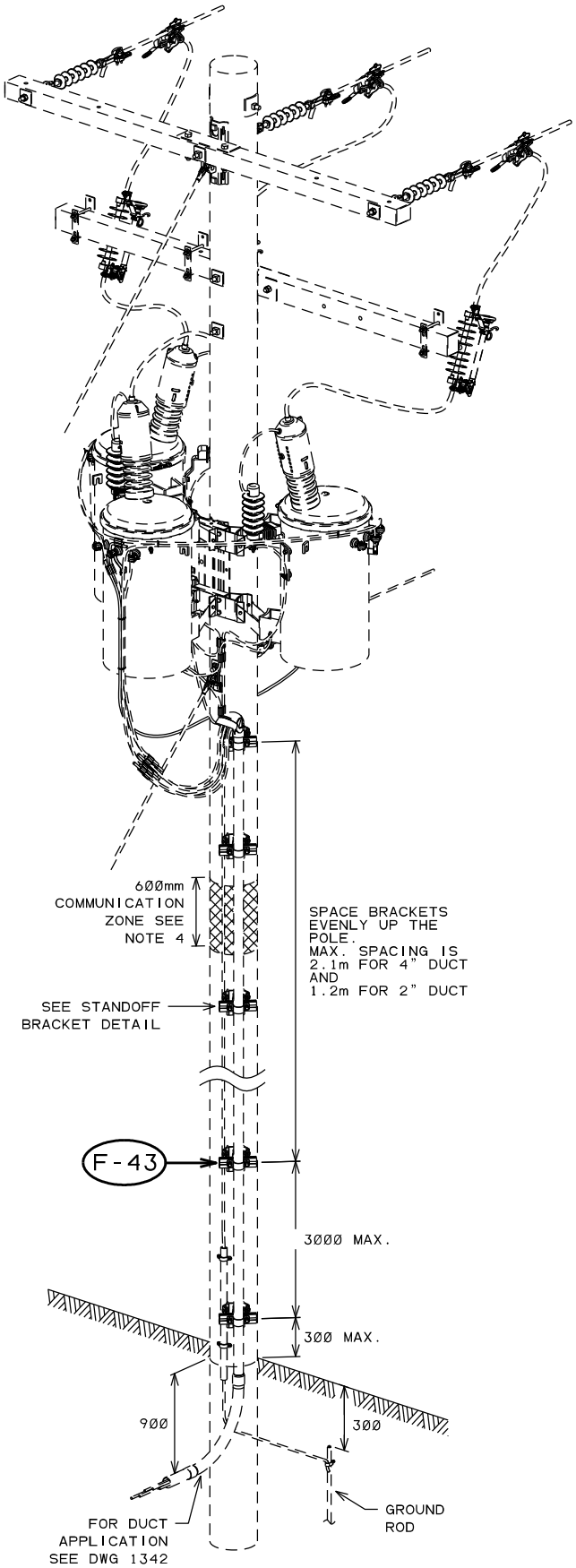
Item #	Description	UI	-1	-	-	-	-	-	-	-	-	-
5132618	BOLT, MACHINE, 3/4 X 18 INCH		2									
5138401	BOLT, LAG, 1/2" X 4", FETTER, GALV		2									
5139385	BOLT, HXHD CPSCRW, ZINC PLTD 1/4 X 1/2		8									
5141217	NUT, CHANNEL, 1/4"		8									
5142207	WASHER, SQ, 3.5 X 3.5 X 1/4, 13/16 HOLE		2									
5142603	WASHER, SPRING LOCK, DOUBLE 3/4		2									
5142990	WASHER, LOCK, ZINC PLATED 1/4"		8									
5311206	CONDUCTOR, 4/0 AWG, RWU90, 1000V	M	6									
5530133	CONNECTOR, COMP PG		6									
5530136	CONNECTOR, COMP PG		6									
5890450	BRACKET, ALUMINUM, STANDOFF		2									
5890456	BRACKET, T SLOT, 4 WAY, 24 INCHES LONG		2									

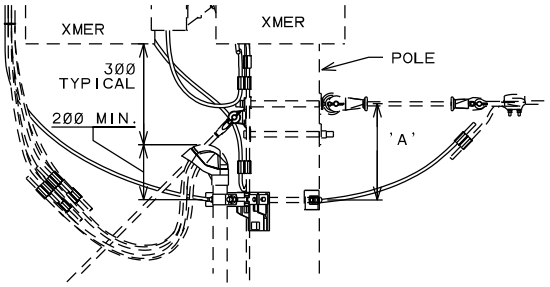
May 4, 2021 Replaced item numbers:
5132401 BOLT, HEX, 1/2 X 1-1/2, GALV with
5139385 BOLT, HXHD CPSCRW, ZINC PLTD 1/4 X 1/2

5142502 WASHER, SINGLE HELIX SPRING LOCK, 1/2" with
5142990 WASHER, LOCK, ZINC PLATED 1/4"

5142102 WASHER, ROUND, 9/16" HOLE, 1-3/8" RIM with
5141217 NUT, CHANNEL, 1/4"

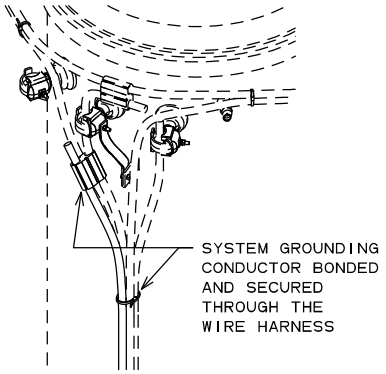
REMARKS:
1. Meter box and secondary cables are not included in the BOM, order 1637 as required.
2. Where local conditions dictate, supply and install each service in 2" rigid PVC conduit and bell end mounted on standoff brackets.



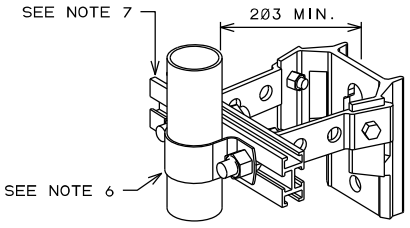


DISTANCE 'A' = 350mm FOR 2 INCH PVC
DISTANCE 'A' = 600mm FOR 4 INCH PVC

WEATHER HEAD / NEUTRAL DETAIL



REDUNDANT GROUND DETAIL



STANDOFF BRACKET DETAIL

Engineering Stamp

PROFESSIONAL LICENSEE (ENGINEERING) ALBERTA
NOEL SMITH
242399

APEGA Permit No. P07387

Description

- ADDED NEW DISTANCE 'A' DIMENSIONS FOR WEATHER HEAD / NEUTRAL DETAIL

Authenticated and Validated original filed with the Engineering Department

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
25-04-04	09-08-31
REVISION Checked	ORIGINAL Design / Checked
REVISION Approved	ORIGINAL Approved

SECONDARY CONDUIT STANDOFF BRACKET

FORTIS ALBERTA

Drawing Number	Sheet
2624	1 / 2

NOTE:

1 - BURIAL DEPTH OF UNDERGROUND CABLE TO THE SERVICE POLE MUST BE 900mm OR GREATER. THE CUSTOMER TO LEAVE A 1m DEEP BY 1m WIDE TRENCH AT THE SERVICE POLE FOR MOUNTING THE CONDUIT

2 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH

3 - FOR OPERATIONAL REASONS 2/3 OF THE POLE MUST BE FREE FOR CLIMBING. SEE SECTION 10.3.2 OF THE SERVICE AND METERING GUIDE FOR THE APPLICATION OF CONDUIT AND STANDOFF BRACKETS

4 - ON POLES JOINTLY USED FOR SUPPLY AND COMMUNICATION PLANTS PROTECTIVE CONDUIT SHALL BE PROVIDED AND EXTENDED AT LEAST 1m ABOVE THE COMMUNICATION PLANT

5 - THE REQUIRED CABLE LENGTH AT THE POLE SHALL BE MEASURED FROM POLE BASE TO THE TRANSFORMER SECONDARY TERMINALS

6 - FOR MOUNTING ON STANDOFF BRACKETS, FORTIS WILL SUPPORT THREE CONDUIT SIZES; 2 INCH, 2.5 INCH, AND 4 INCH
- THE CUSTOMER TO SUPPLY 40 FEET OF RIGID PVC PIPE
- FORTIS TO SUPPLY STANDOFF BRACKETS, 4 WAY T-SLOT BRACKETS AND CONDUIT STRAPS

7 - TO AVOID CREATING A LADDER, CUT T-SLOT BRACKET TO SIZE OF CONDUIT PLUS STRAP

8 - FOR DIRECT MOUNTING OF THE CONDUIT TO THE POLE THE CABLE SHALL BE INSTALLED IN THE FIRST 10-FOOT SECTION OF CONDUIT AND MOUNTED ON THE POLE. THE REMAINDER OF THE CABLE SHALL BE COILED UP AND SECURED TO THE POLE AT THE TOP OF THE FIRST 10-FOOT SECTION OF THE CONDUIT. THE REMAINING STRAPS TO BE LEFT AT THE POLE TEMPORARILY ATTACHED TO THE POLE AT A HEIGHT NO HIGHER THAN THE TOP OF THE 10-FOOT SECTION OF CONDUIT. ALL CONDUIT STRAPS MUST BE METAL, PLASTIC STRAPS ARE NOT ACCEPTABLE

9 - THE BONDING CONDUCTOR IN TECK 90 CABLE IS INTENDED TO BE USED AS AN EQUIPMENT-BONDING CONDUCTOR. WHERE ARMORED CABLES ARE INSTALLED AS THE CUSTOMERS SERVICE ENTRANCE; THE BONDING CONDUCTOR CAN BE USED AS THE SYSTEM GROUNDED CONDUCTOR ON THE LINE SIDE OF THE SERVICE WHEN NO NEUTRAL CURRENTS (ON BALANCED LOAD) ARE PRESENT.
AS PER PART 1 OF THE CANADIAN ELECTRICAL CODE

10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS

Engineering Stamp
PROFESSIONAL LICENSEE (ENGINEERING) ALBERTA
NOEL SMITH
242399
APEGA Permit No. P07387

Description
- REVISED REFERENCE FOR NOTE 3 & NOTE 6

Authenticated and Validated original filed with the Engineering Department

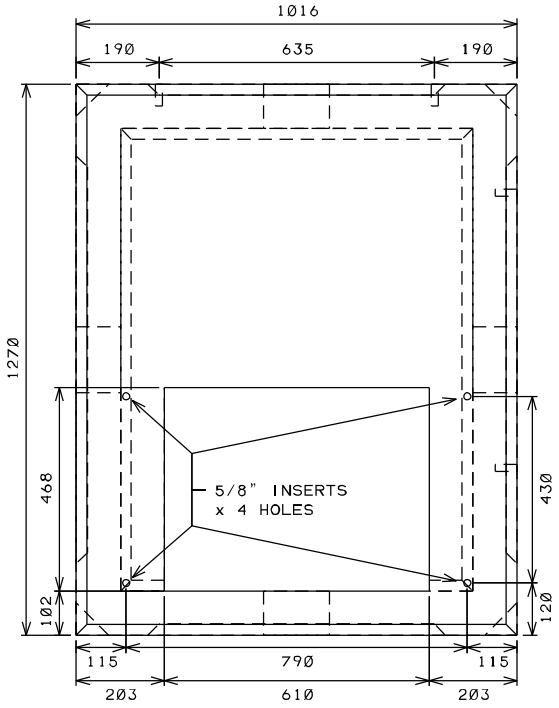
Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
25-04-04	18-10-18
REVISION Checked: JM	ORIGINAL Design / Checked: HN
REVISION Approved: NS	ORIGINAL Approved: CM

SECONDARY CONDUIT STANDOFF BRACKET

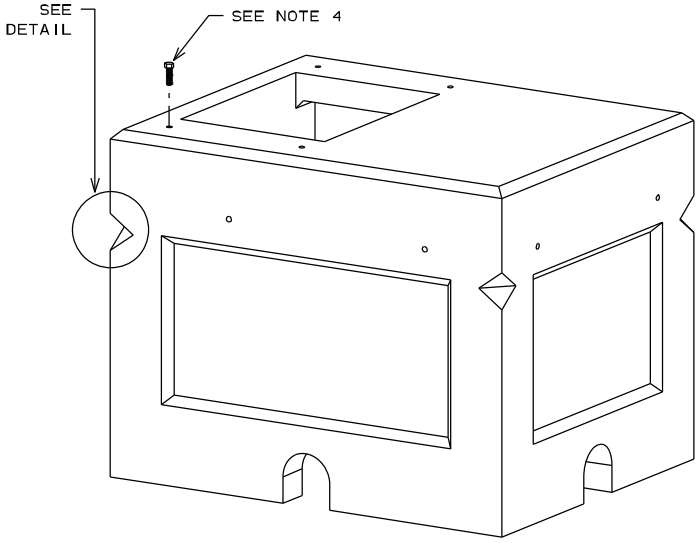
FORTIS ALBERTA

Drawing Number	Sheet
2624	2 / 2

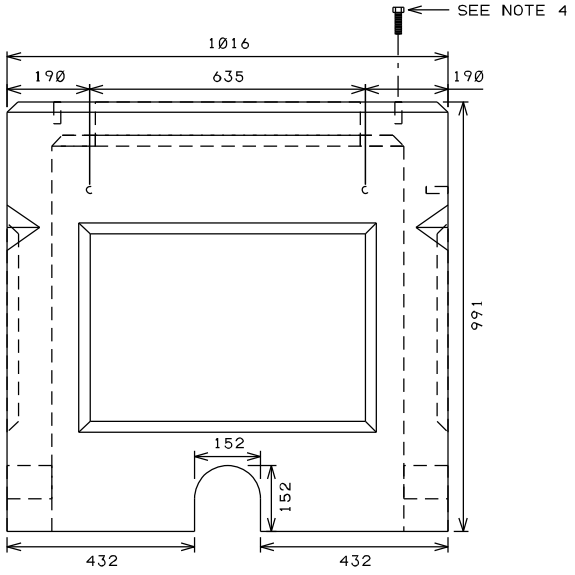
Material Item Drawings (IT)



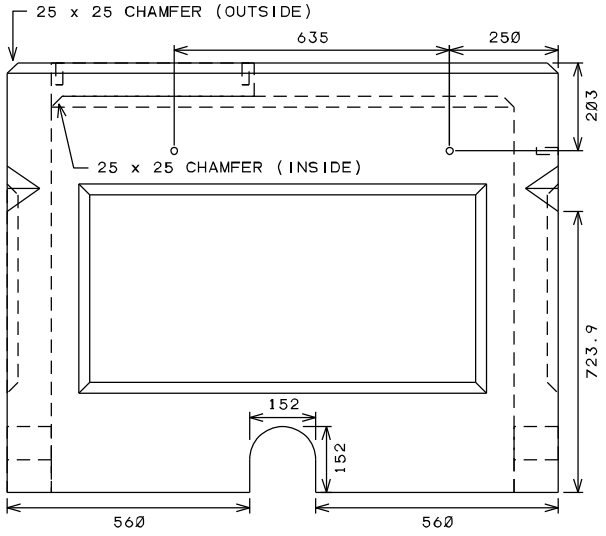
TOP VIEW



ISOMETRIC VIEW



FRONT VIEW



SIDE VIEW

NOTE:

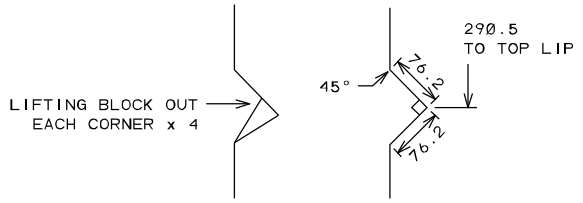
1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT

2 - MAXIMUM SUPERIMPOSED LOAD IS 1000kG ON THE PERIMETER OF THE PRECAST BASE

3 - THE FINISHED MASS OF THE PRECAST BASE SHALL BE INDICATED ON THE BASE

4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT

5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



LIFTING BLOCK OUT DETAIL

Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA
KEVIN NOBLE

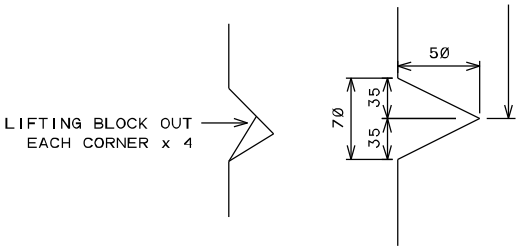
Description
- UPDATED NOTES
- ADDED 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
15-11-12	12-10-26
REVISION Checked NS	ORIGINAL Design / Checked NS
REVISION Approved KN	ORIGINAL Approved HN

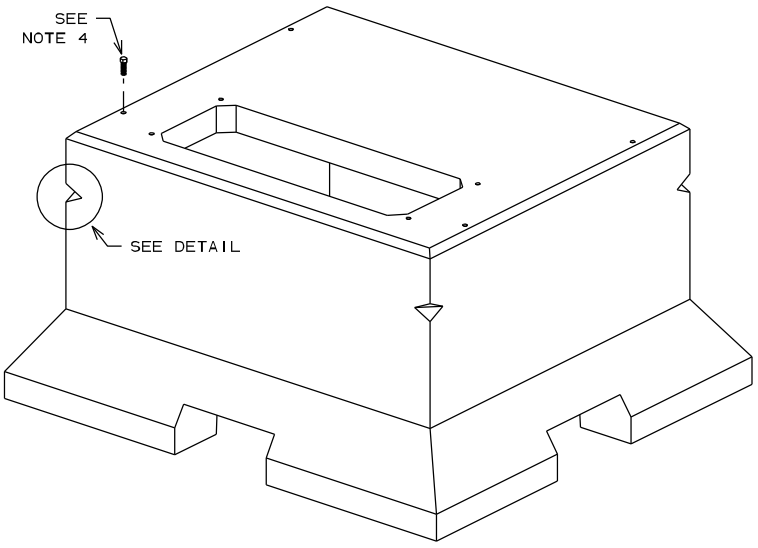
PRECAST CONCRETE PAD FOR SINGLE PHASE MINI-PADMOUNT TRANSFORMER UP TO 167kVA

FORTIS ALBERTA

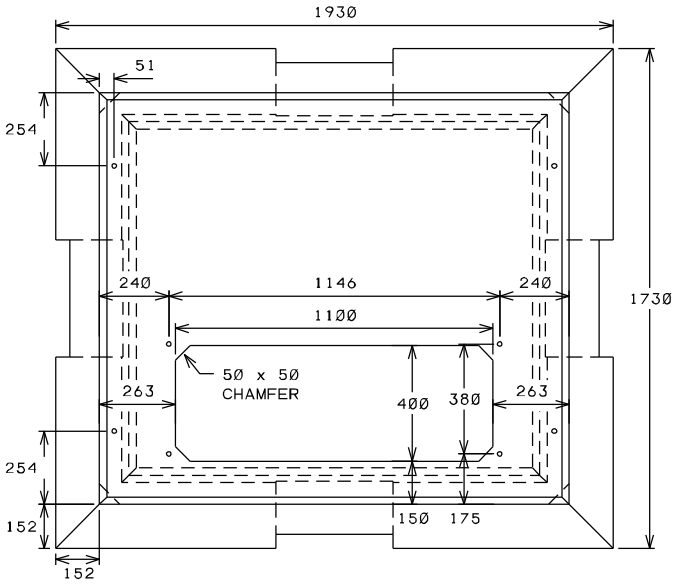
Drawing Number	Sheet
755-0505	1 / 1



LIFTING BLOCK OUT DETAIL



ISOMETRIC VIEW



TOP VIEW

NOTE:

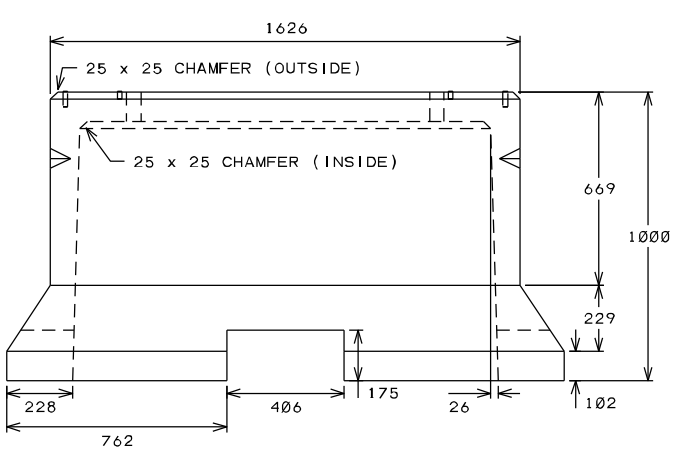
1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT

2 - MAXIMUM SUPERIMPOSED LOAD IS 3,300kG ON THE PERIMETER OF THE PRECAST BASE

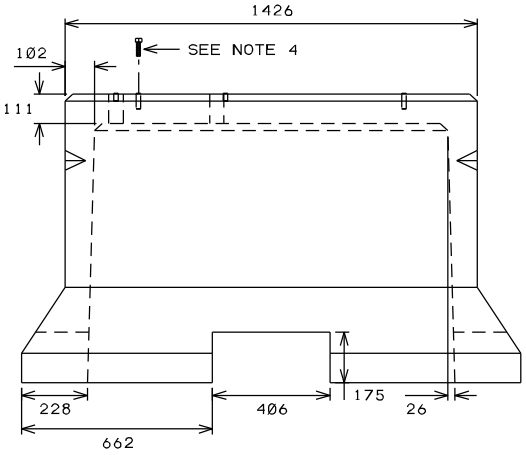
3 - THE FINISHED MASS SHALL BE INDICATED ON THE PRECAST BASE

4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT

5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



FRONT VIEW



SIDE VIEW

Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA H. NAVIS

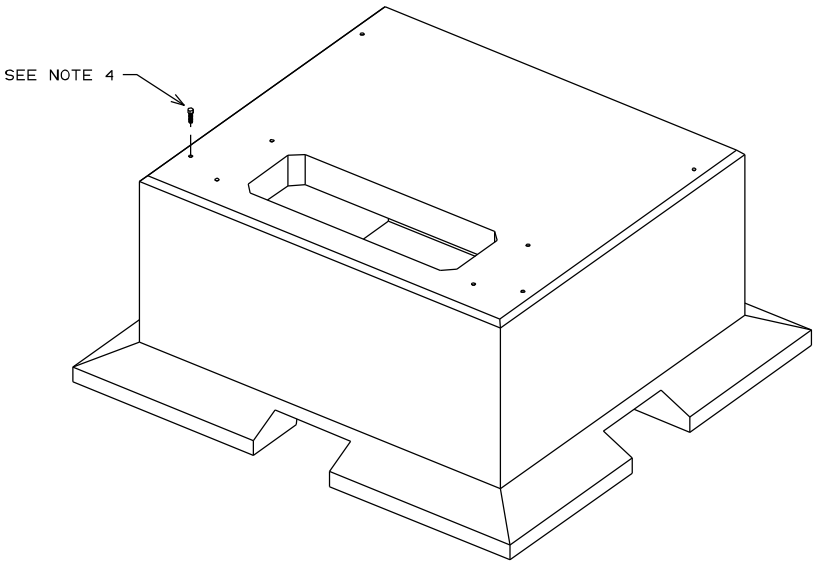
Description
- CORRECTED NOTE 2, THE LOAD SHOULD BE 3,300KG NOT 1000KG

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
16-09-13	10-03-02
REVISION Checked NS	ORIGINAL Design / Checked NS
REVISION Approved HN	ORIGINAL Approved D.M.

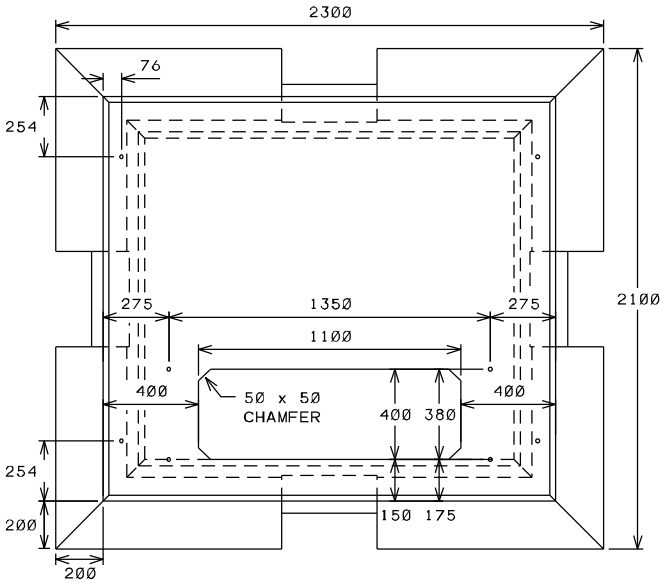
PRECAST TRANSFORMER PAD FOR 3-PHASE 500kVA AND BELOW

FORTIS ALBERTA

Drawing Number	Sheet
755-0507	1 / 1



ISOMETRIC VIEW



TOP VIEW

* APPLICATION *
FOR TRANSFORMERS WITH
208-600V SECONDARIES

NOTE:

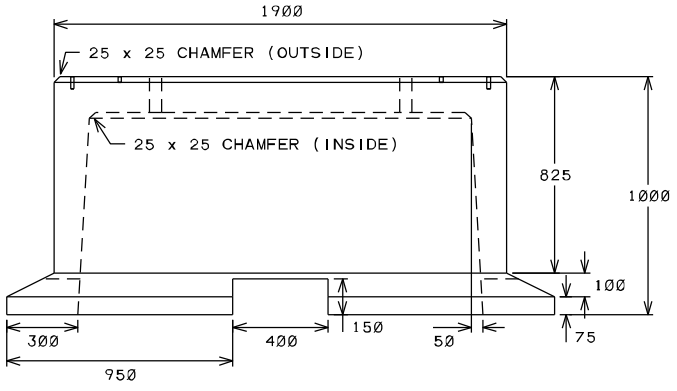
1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT

2 - MAXIMUM SUPERIMPOSED LOAD IS 9,000kG ON THE PERIMETER OF THE PRECAST BASE

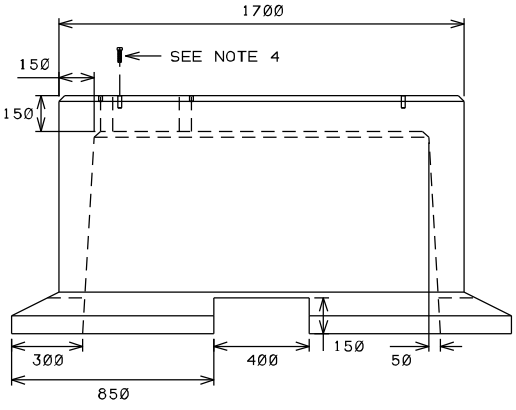
3 - THE FINISHED MASS SHALL BE INDICATED ON THE PRECAST BASE

4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT

5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

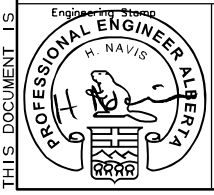


FRONT VIEW



SIDE VIEW

Engineering Stamp



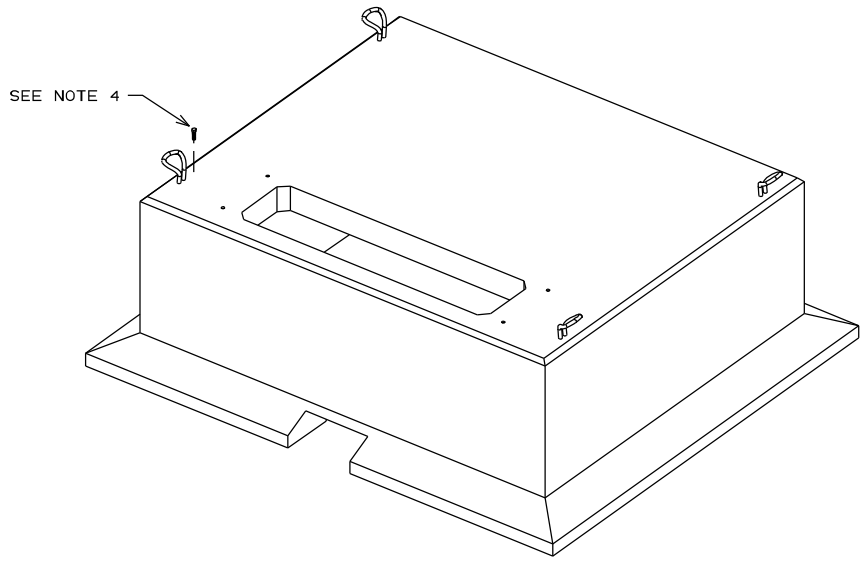
Description
- CORRECTED NOTE 2, THE LOAD SHOULD BE 9,000KG NOT 1000KG

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
16-09-13	04-07-02
REVISION Checked NS	ORIGINAL Design / Checked NS
REVISION Approved HN	ORIGINAL Approved

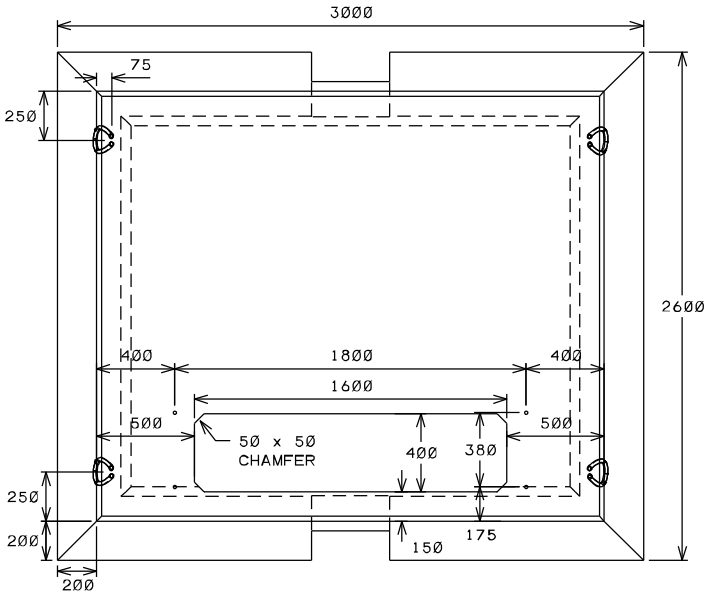
PRECAST TRANSFORMER PAD FOR 3-PHASE 750kVA TO 3,000kVA

FORTIS ALBERTA

Drawing Number	Sheet
755-0512	1 / 1



ISOMETRIC VIEW



TOP VIEW

* APPLICATION *
FOR ALL TRANSFORMERS WITH 4.16kV SECONDARIES, AND 4000kVA TRANSFORMERS WITH 600V SECONDARIES

NOTE:

1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT

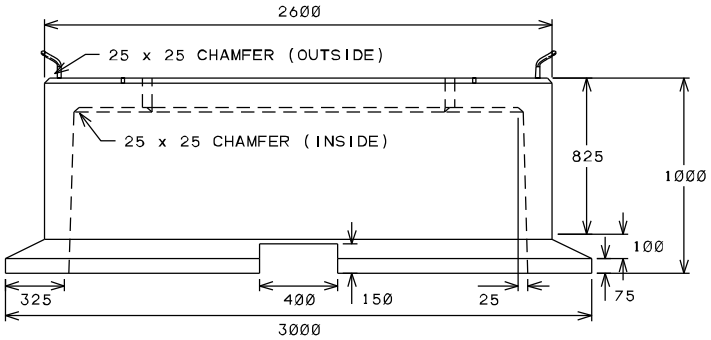
2 - MAXIMUM SUPERIMPOSED LOAD IS 30,000kG ON THE PERIMETER OF THE PRECAST BASE

3 - THE FINISHED MASS AND THE MAXIMUM SUPERIMPOSED LOAD SHALL BE INDICATED ON THE PRECAST BASE

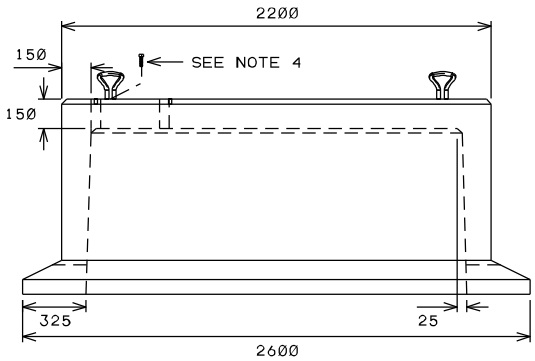
4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT

5 - MIN. ALLOWABLE SOIL BARING CAPACITY = 125kPa

6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



FRONT VIEW



SIDE VIEW

Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA
H. NAVIS
APEGGA Permit No. P07387

Description

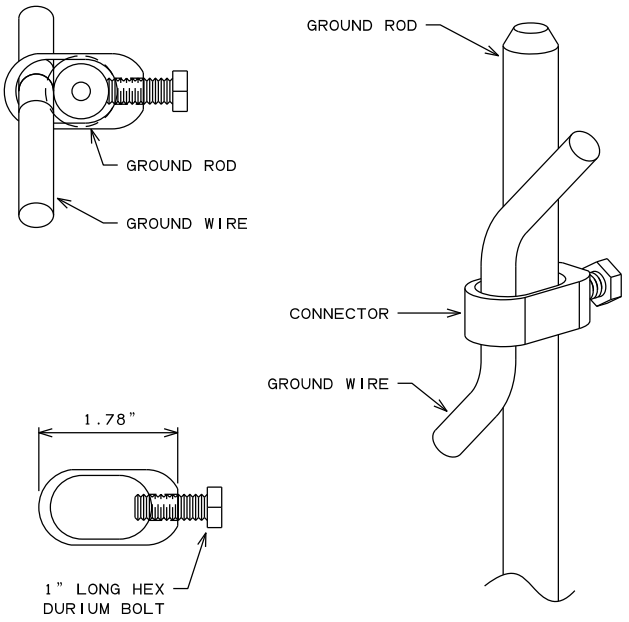
Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
	19-05-16
REVISION Checked	ORIGINAL Design / Checked NS
REVISION Approved	ORIGINAL Approved HN

PRECAST TRANSFORMER PAD FOR 3-PHASE 1,000kVA TO 20,000kVA

FORTIS ALBERTA

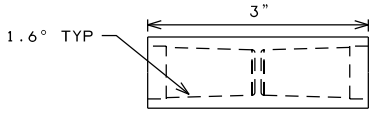
Drawing Number	Sheet
755-0516	1 / 1

Sketch Drawing (SKT)



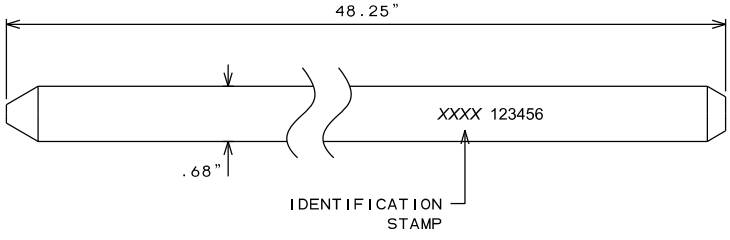
MATERIAL: COPPER ALLOY
ITEM NUMBER #557-1311

GROUND ROD CONNECTOR DETAIL



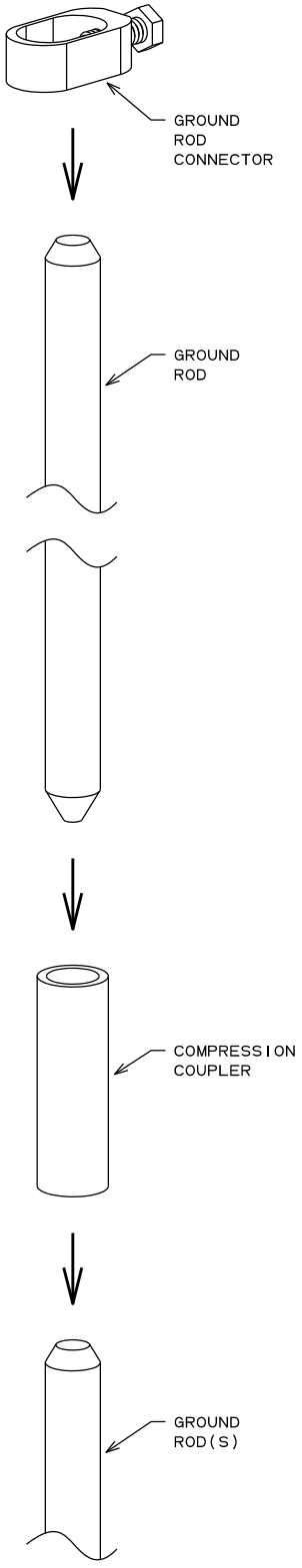
MATERIAL: SILICON BRONZE
ITEM NUMBER #557-1525

COMPRESSION COUPLER DETAIL



MATERIAL: COPPER CLAD STEEL
ITEM NUMBER #557-1421

GROUND ROD DETAIL



CONNECTION ASSEMBLY

Engineering Stamp

PROFESSIONAL ENGINEER ALBERTA
H. NAVIS
APEGGA Permit No. P07387

Description

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD) 20-01-27
REVISION Checked	ORIGINAL Design / Checked NS
REVISION Approved	ORIGINAL Approved HN

SECTIONAL GROUND RODS AND ASSOCIATED MATERIAL

FORTIS ALBERTA

Drawing Number SKT 1499

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