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DESIGNED J. AGNOLIN	RECOMMENDED 	ACCEPTED 	ENGINEER OF RECORD 	<b>NOTICE FROM THE</b> <b>EXECUTIVE VICE PRESIDENT</b> <b>TRANSMISSION AND DISTRIBUTION</b> <b>AND CUSTOMER SERVICE</b>	
DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: MAY 2004 ORIGINALLY ISSUED: NOV 1980		PAGE 1 OF 2	ES43/53/54/55/65 A1-01.01	
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## Scope

This manual is one of a series containing standards for construction of the BC Hydro electrical distribution plant within the service area of BC Hydro. A new distribution plant shall be designed, constructed, owned, operated, maintained and repaired to these standards.

## Purpose of Standards

BC Hydro objectives require standardization to:

- a) Ensure uniform safety requirements comply with BC statutes and regulations.
- b) Provide uniform system reliability.
- c) Provide uniform operating practices.
- d) Permit economic bulk purchasing of materials.
- e) Achieve optimum life cycle cost of plant construction.
- f) Effect efficient quality assurance.

## Responsibility

The Distribution Standards Department prepares these standards and verifies that specified plant and procedures will perform adequately under all normally expected conditions encountered throughout the province of British Columbia. These standards are approved by Professional Engineers. It is the responsibility of BC Hydro Managers to ensure that the standards are followed unless abnormal conditions are encountered that require variations. These variations should be kept to a minimum and their performance shall be the responsibility of the Professional of Record in charge of the project, who will record and seal the variation based on satisfactory qualifications and experience to do so. As per the latest revision of the BC Hydro Distribution Owner's Engineer Guide, these variations must be accepted by BC Hydro's Owner's Engineer.

## Use of Stock Materials

The electrical distribution plant covered by these standards is built using stock materials approved by a Professional Engineer as required by law. The use of non-stock materials for special and unusual situations must be approved by Distribution Standards or the BC Hydro Engineer responsible for the project.

## Revisions to Manual

These standards are revised from time to time to improve the safety, performance, workability, cost effectiveness or appearance of the plant. The existing plant built to previous standards need not be updated unless so specifically advised by BC Hydro. When maintenance or other work, such as voltage conversion or conductor change is being done, updating plant to current standards is encouraged.

## Mailing Addresses

The manual has been issued to a corporation or firm rather than to an individual. The corporation or firm is responsible for the safekeeping of the manual, and for keeping it current. Changes of address or in number of copies required must be reported promptly.

Suggestions for changes in the manual, or required changes of address may be made on the pre-addressed comment sheet included in the Manual and with each issue of revision.

DESIGNED J. AGNOLIN	RECOMMENDED F. DENNERT	ACCEPTED G. REIMER	ENGINEER OF RECORD 	NOTICE FROM THE EXECUTIVE VICE PRESIDENT TRANSMISSION AND DISTRIBUTION AND CUSTOMER SERVICE	R 4
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## Information Bulletin: Revisions to ES54 S2-01 Standards and Customer Secondary Service Equipment

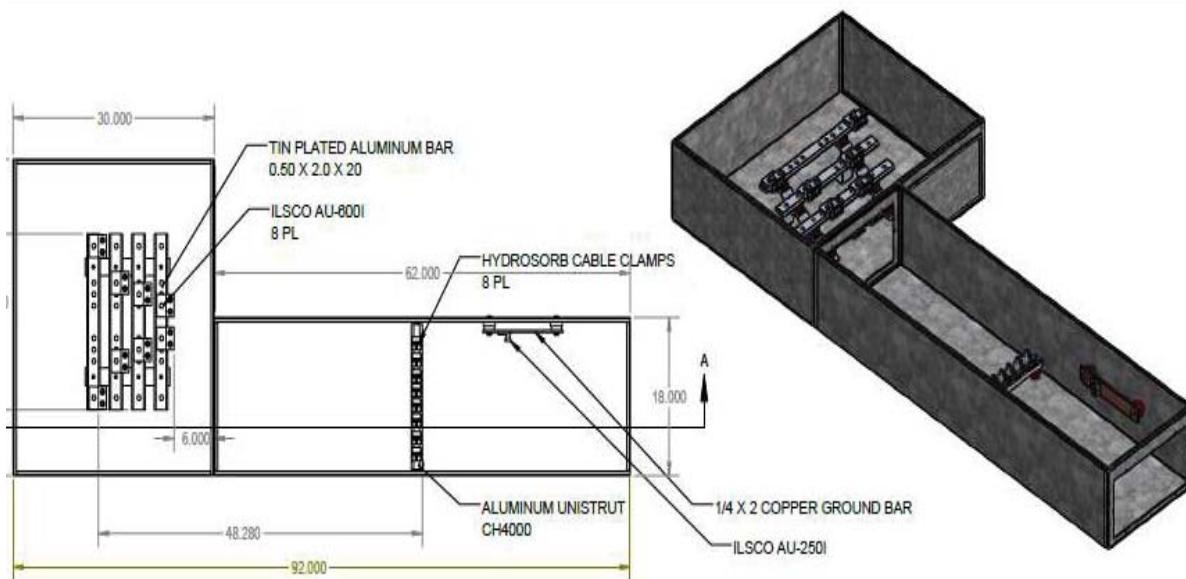
### 1.0 Items Covered

ES54 S2-01 Secondary Three-phase Services 120/208 V and 347/600 V Up To 1600 A Private Property Installation  
RM Guide BC Hydro Requirements for Secondary Voltage Revenue Metering (750 V and less)

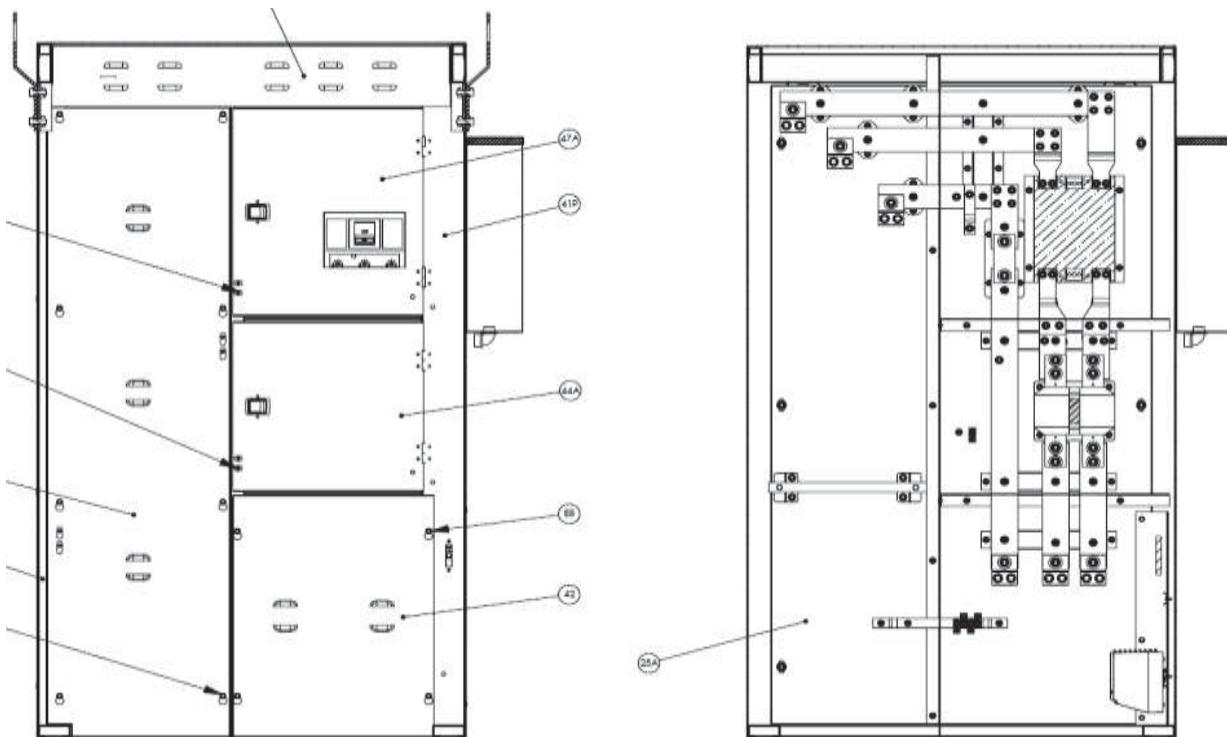
### 2.0 Overview

This bulletin provides a summary of changes to the BC Hydro requirements for customer-owned three-phase underground secondary services and changes to the jurisdiction and installation issues for such services, as follows:

- a. All civil work, equipment and materials on private property installed for the function of customer underground supply service, up to the point of utility connection, is exempt from BC Electrical Code. No installation permit is required for this utility work from local inspection authorities per Technical Safety BC Directive D-EL 2017-01 and Information Bulletin IB-EL 2017-04  
<https://www.technicalscitybc.ca/alerts/directive-exemptions-public-utilities>  
<https://www.technicalscitybc.ca/alerts/information-bulletin-electrical-safety-regulation-application-public-utilities>
- b. Due to liability and restricted access, BC Hydro no longer terminates utility supply cables directly into customer-owned service main switch or breaker lugs. Past BC Hydro requirements for oversized "L-boxes" have been replaced with CSA certified splitter and utility cable compartment – see Figure 1 below.
- c. BC Hydro Distribution Standards cooperated with several equipment manufacturers to develop new standard and fulfill demand for customer-owned outdoor-type secondary kiosk for pump houses, commercial buildings, farms, etc. Figure 2 below shows an example of such kiosk rated for 1600 A.
- d. Based on positive results for primary customer service connections, for improved safety and cable restraint, BC Hydro requires C-channel and CSA type cable clamps inside secondary three-phase utility cable compartment.



**Figure 1 – Utility cable compartment and CSA type splitter**  
(Courtesy Code EI.)



**Figure 2 – Integrated outdoor-type secondary kiosk**  
(Courtesy Foxfab Metal Works.)

- e. BC Hydro has recorded several incidents of the cast-type grounding studs breaking during the installation of personnel safety grounds. To eliminate this safety problem, BC Hydro requires machined-type grounding studs.
- f. Table 1 showing minimum sizes for ducts, pullboxes and wireways has been substantially revised and all references to single-phase services removed.
- g. Revised standards show mid-run pullboxes installed inside or outside customer-owned buildings for various configurations of the service duct run. For added flexibility of installation, service ducts could be embedded on the outside of the building foundation wall – see page 11 for details.
- h. Customer building elevators are not acceptable as the only means of access by BC Hydro crew performing utility work.
- i. The customer shall provide adequate service duct building drainage per BC Electrical Code rules.
- j. The customer is responsible for the supply and installation of all concrete inserts and hardware for the attachment of removable BC Hydro pulling equipment.

### 3.0 Action

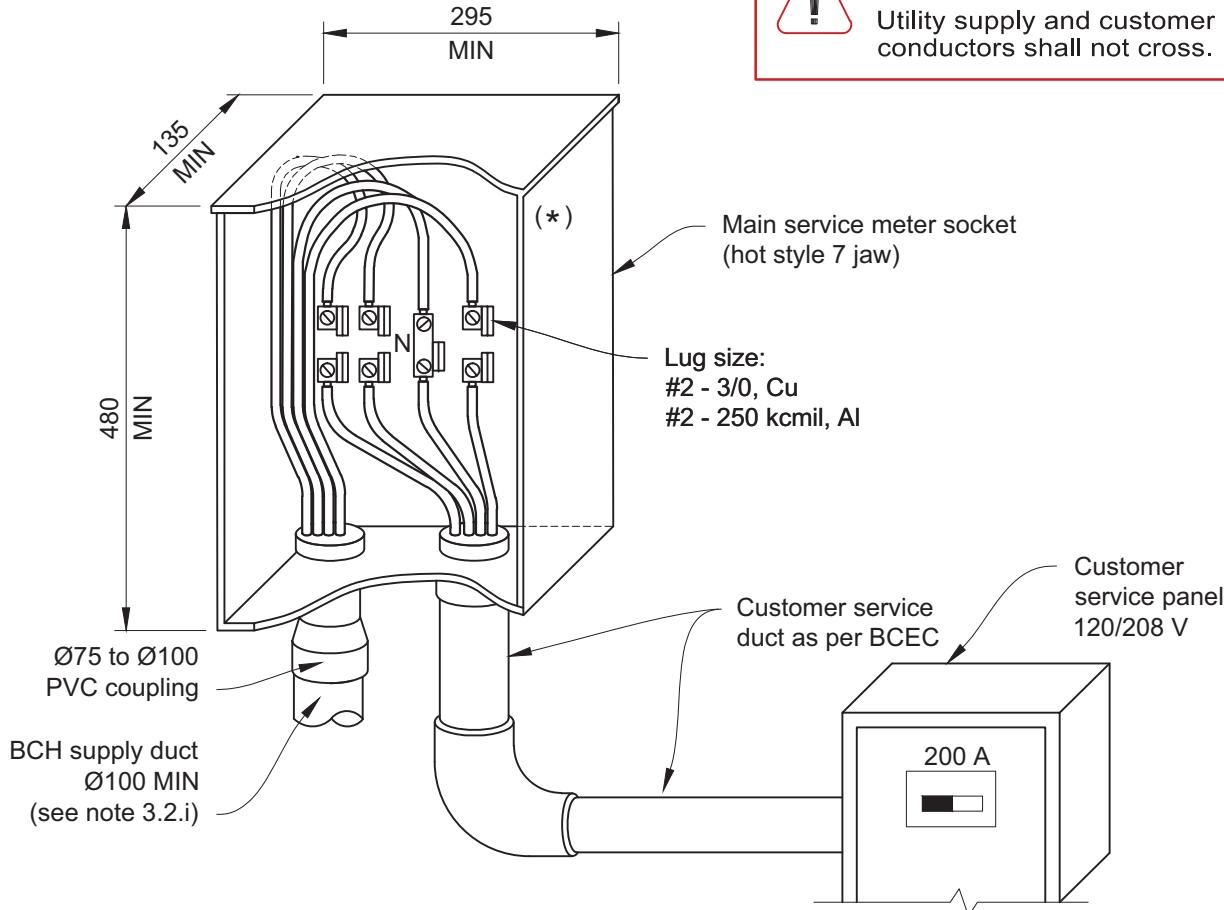
- 1. Effective March 1, 2019, all customer underground supply 3-phase service connections up to 1600 A 120/208 V and 347/600 V, shall comply with the minimum BC Hydro requirements per ES54 S2-01 Revision 7 standards.
- 2. For approved or pending design of customer-owned secondary services already in progress, where service equipment has been reviewed by BC Hydro and scheduled for the utility supply connection after February 1, 2019, contact BC Hydro designer or representative for the area.

### 4.0 Distribution Standards Contact

Name: Mark Kelvin	email: <a href="mailto:mark.kelvin@bchydro.com">mark.kelvin@bchydro.com</a>
Phone #: 604-529-5679	Cell #: 604-220-3905

### 5.0 Approval

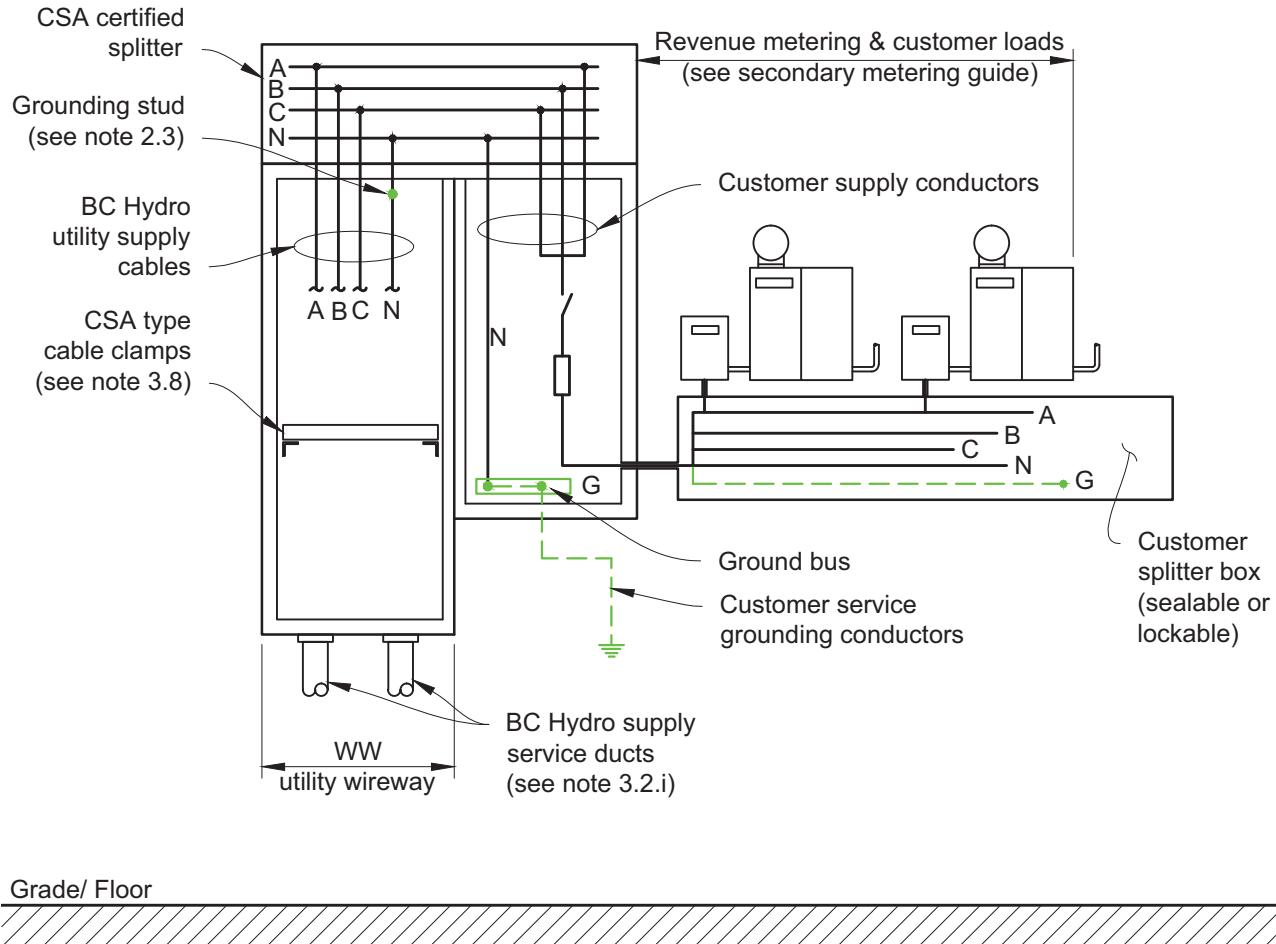
Recommended	Reviewed	Approved
 M. KELVIN	 C. PICASSI	 F. DENIVENTER
Date: 2018-11-07	Date: 2018-11-07	Date: 2018-11-07



(\*) All 347/600 V 200 A services meter sockets shall be cold style metering regardless of available fault level.

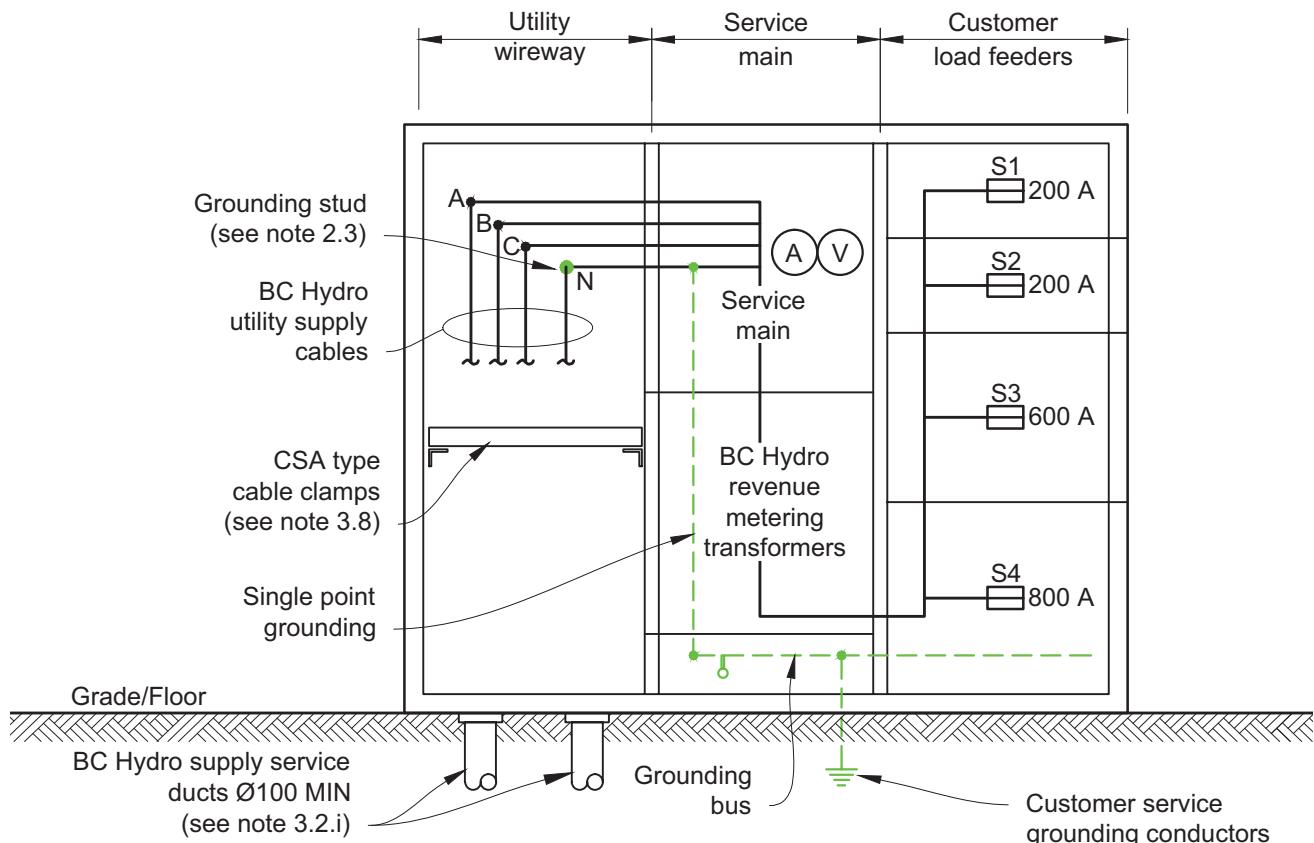
### Single 200 A Three-Phase Service for 120/208 V Fault Level < 10kA

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY THREE-PHASE SERVICES
				120/208 V AND 347/600 V UP TO 1600 A PRIVATE PROPERTY INSTALLATION
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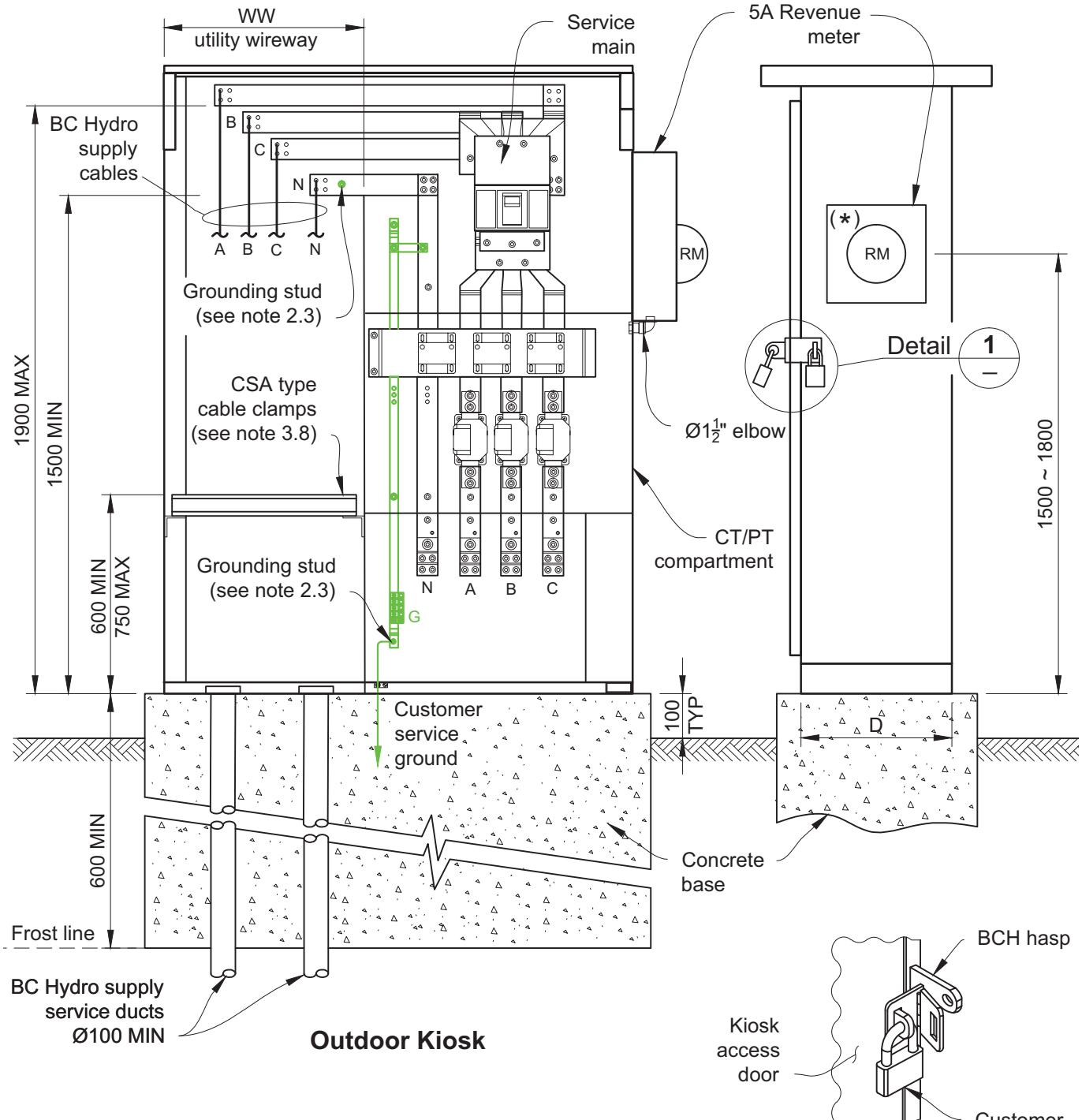
**Schematic Diagram - Multiple Main Splitter Box  
Three-Phase Up to 1600 A - Field Assembled**

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			 M. KELVIN PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA 2018-11-06	
M. KELVIN	C. PICASSI	F. DENNERT		PAGE 2 OF 18
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**Schematic Diagram - Service Switchboard  
Up to 347/600 V, 1600 A - Field Assembled**

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				120/208 V AND 347/600 V UP TO 1600 A	
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ISSUED: JUN 1987			2018-11-06		



DESIGNED RECOMMENDED ACCEPTED

M. KELVIN C. PICASSI F. DENNERT



**SECONDARY THREE-PHASE SERVICES**  
120/208 V AND 347/600 V UP TO 1600 A  
PRIVATE PROPERTY INSTALLATION

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**Table 1**  
**Size of Pull Boxes and Wireways Installed in a Building**  
**at Service Entrance Equipment or Mid-Cable Run**

Main Switch/ Breaker Size	Duct Size and Qty**	Minimum Pull Box Size (mm)				Minimum Wireway Bottom Entry Size (mm)	Minimum Height (H)***		
		Side & Top Entry		Rear Entry					
		Width (W)	Depth (D)	Width (W)	Depth (D)				
Up to 200A	1 x 4"	800	500	500	800	300*	300	1500	
400 A	1 x 4"	800	500	500	800	300*	300	1500	
600 A	2 x 4"	800	500	500	800	450	300	1500	
800 A	2 x 4"	800	500	500	800	450	300	1500	
1200 A	3 x 4"	800	500	500	800	600	450*	1500	
1600 A	4 x 4"	800	500	500	800	750	450*	1500	

\* 300 mm minimum wireway width acceptable for vertically staggered bus extensions.

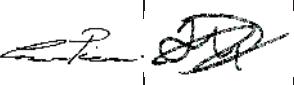
450 mm minimum wireway width required for horizontally staggered bus extensions.

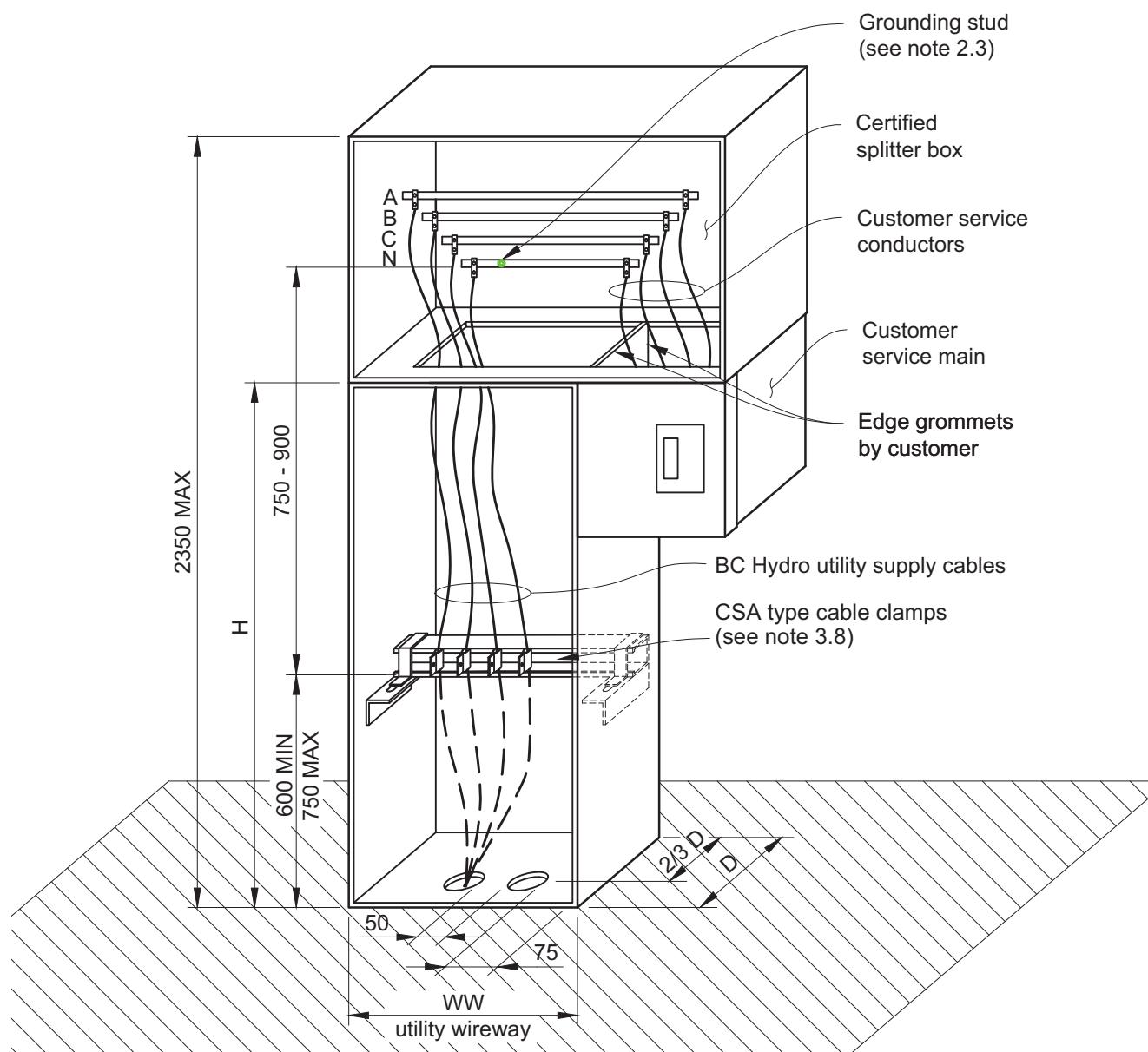
450 mm minimum wireway depth required for all 1200 A and 1600 A services.

\*\* 900W x 1800H x 800D minimum size for any customer-owned mid-run pull boxes wall-mounted inside customer building.

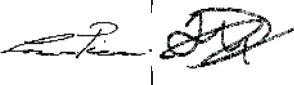
\*\* 632 Box minimum size for mid-run pull boxes placed inside the building floor slab or in an outside yard – subject to BC Hydro Field Manager approval.

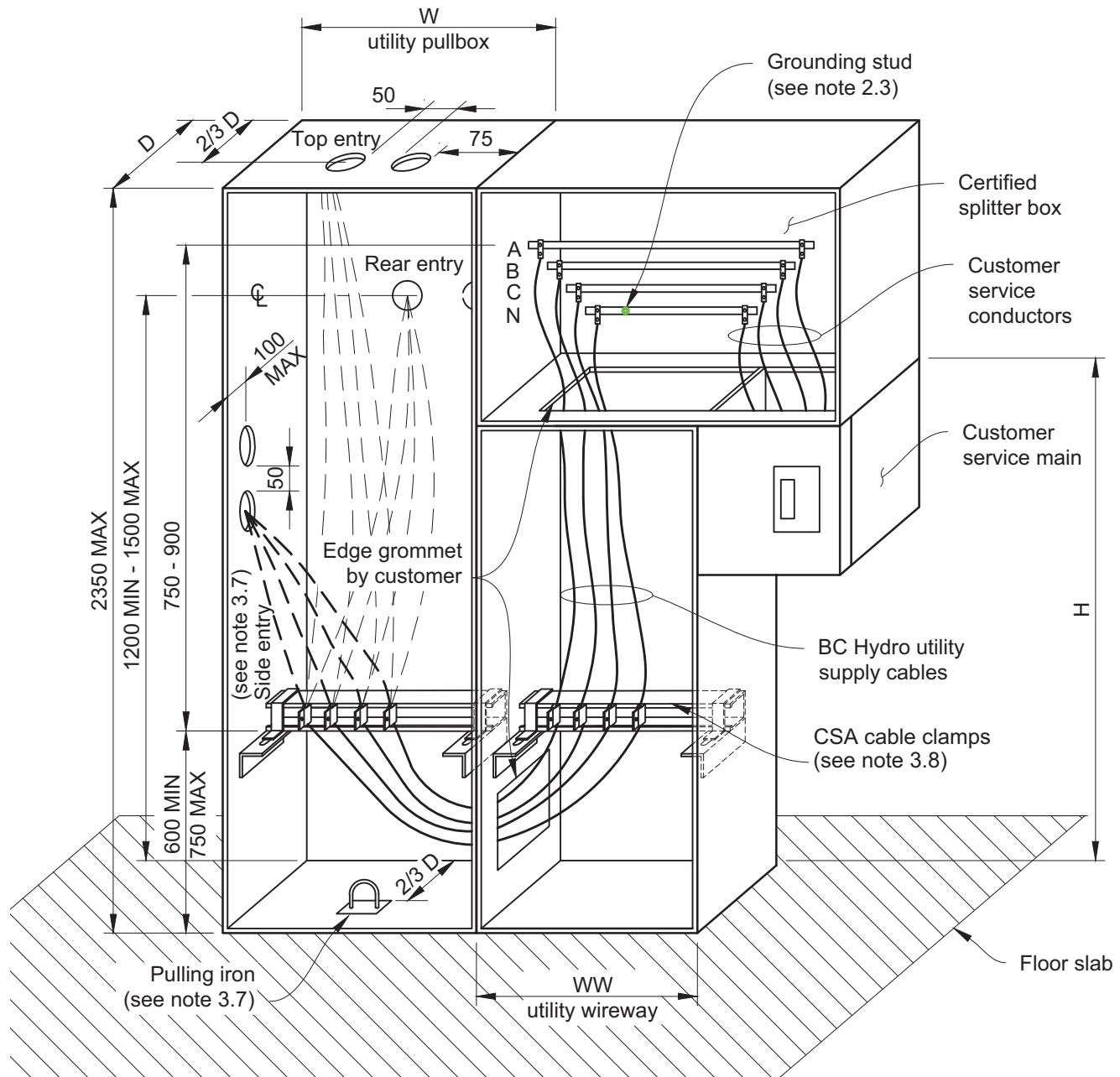
\*\*\* Minimum height refers to the height of pullbox, wireway or bottom of the lowest switchboard bus.

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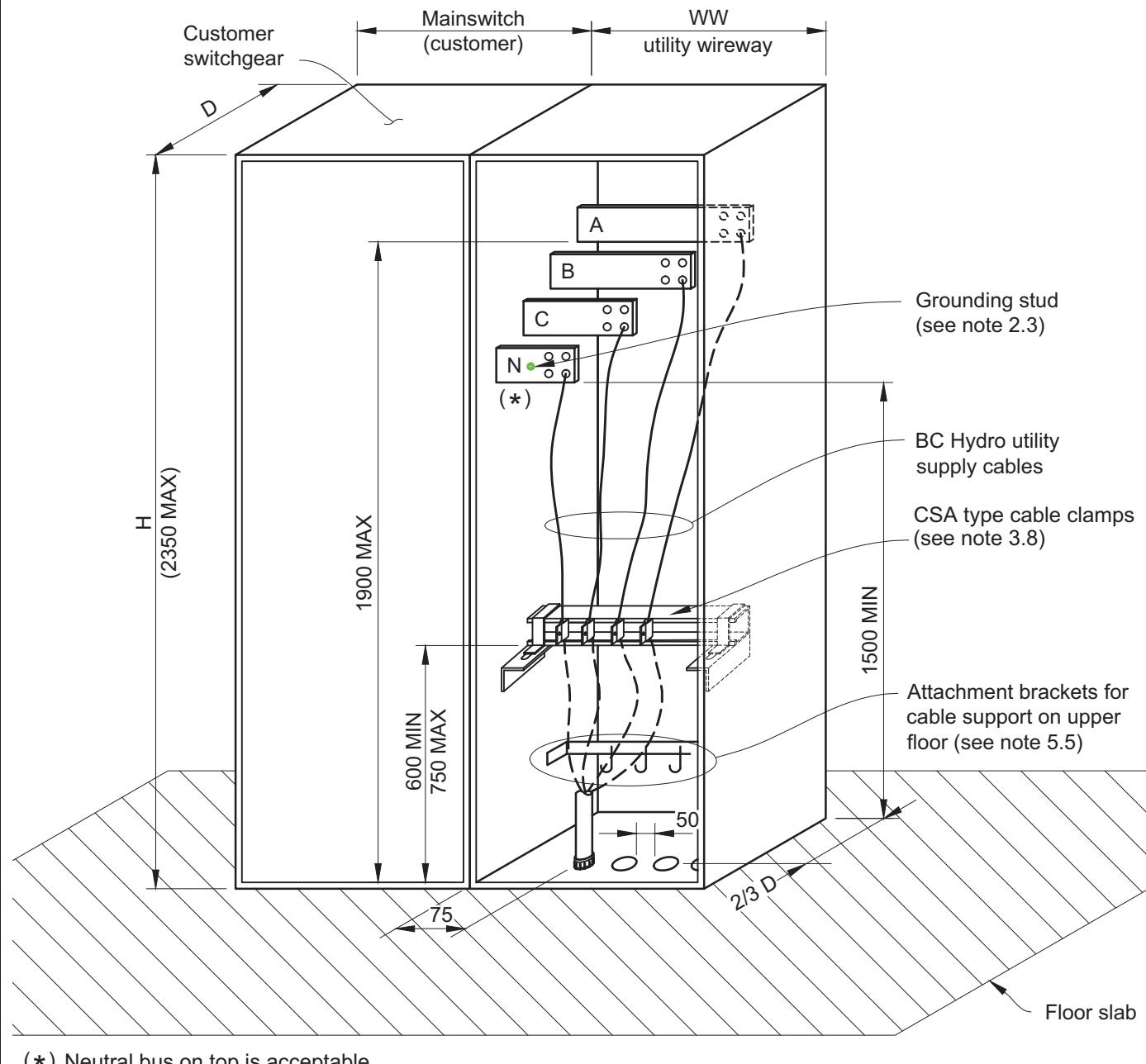
**Customer Service Main - Field Assembled  
Bottom Entry**

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	ORIGINALLY ISSUED: JUN 1987		2018-11-06		



### Customer Service Main Top, Rear or Side Entry

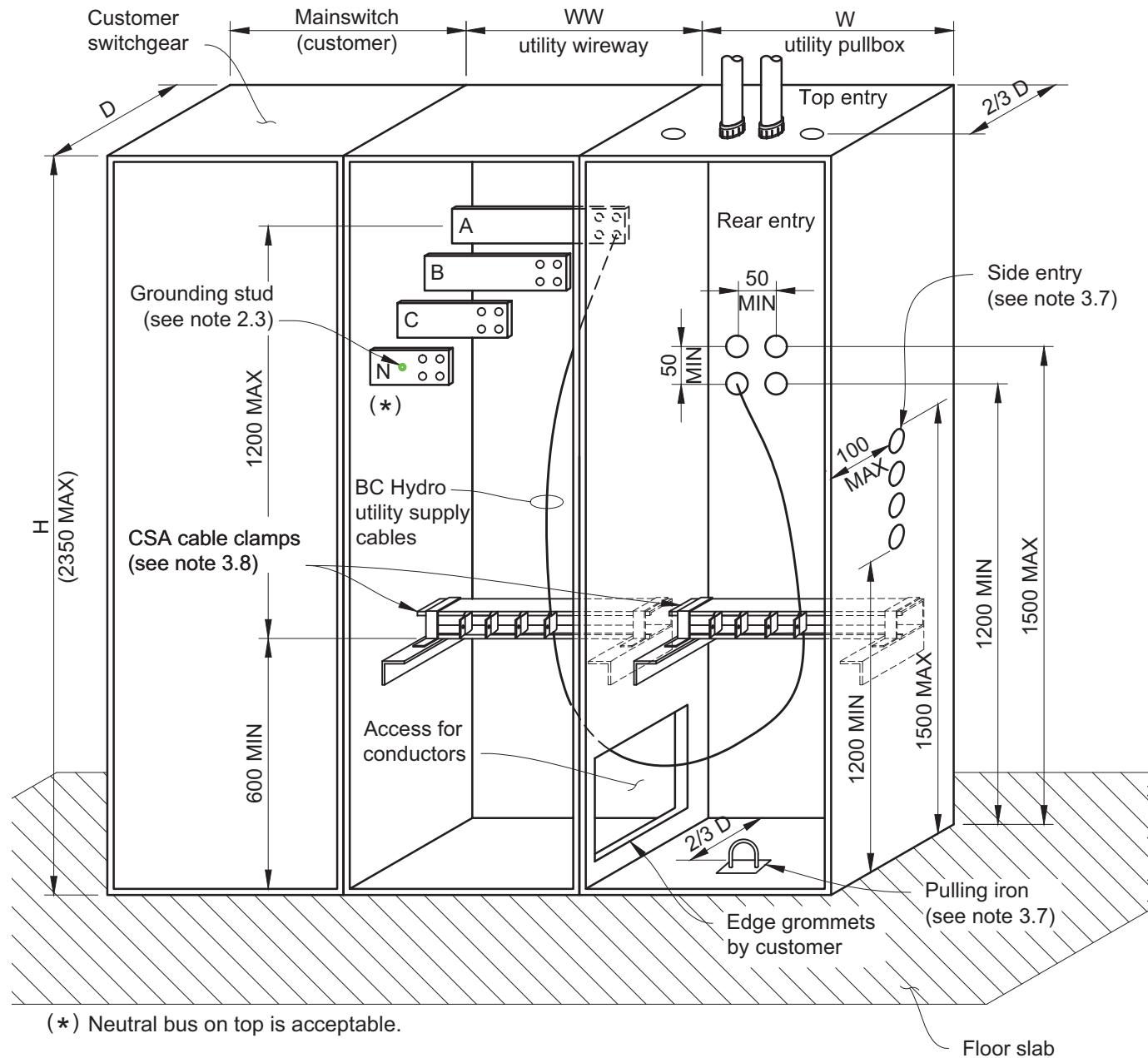
DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY THREE-PHASE SERVICES
				120/208 V AND 347/600 V UP TO 1600 A PRIVATE PROPERTY INSTALLATION
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(\*) Neutral bus on top is acceptable.

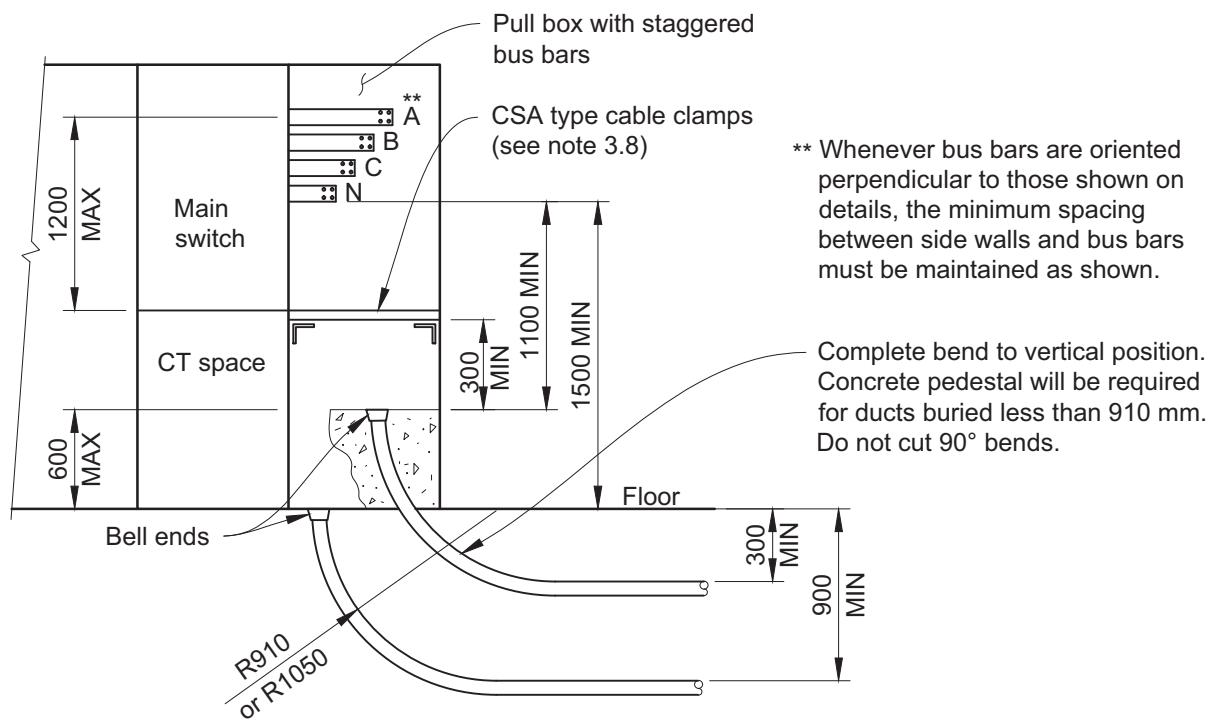
### Customer Service Switchboard - Field Assembled Bottom Entry

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY THREE-PHASE SERVICES	
			 M. KELVIN PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA 2018-11-06	120/208 V AND 347/600 V UP TO 1600 A PRIVATE PROPERTY INSTALLATION	
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<b>DISTRIBUTION STANDARDS</b> 	ISSUED: OCT 2018 REPLACES: FEB 2017 ORIGINALLY ISSUED: JUN 1987				R 8

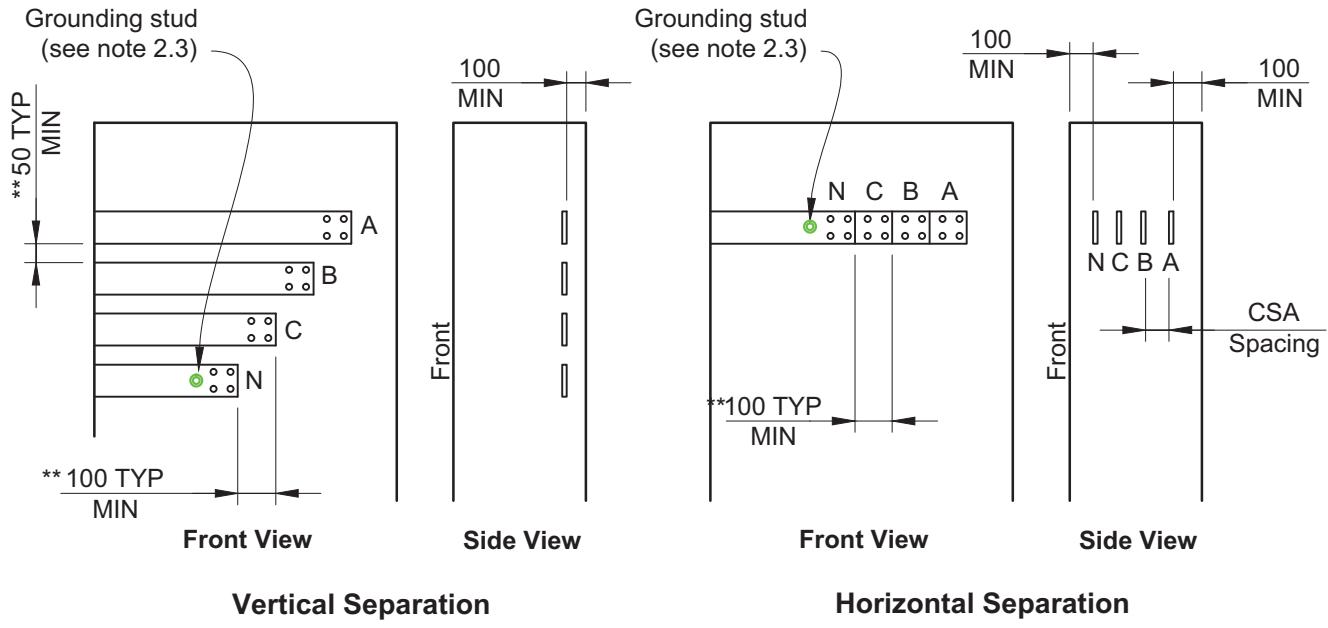


### Customer Service Switchboard Top, Rear or Side Entry

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				R 8



### Bottom Entry Duct Details

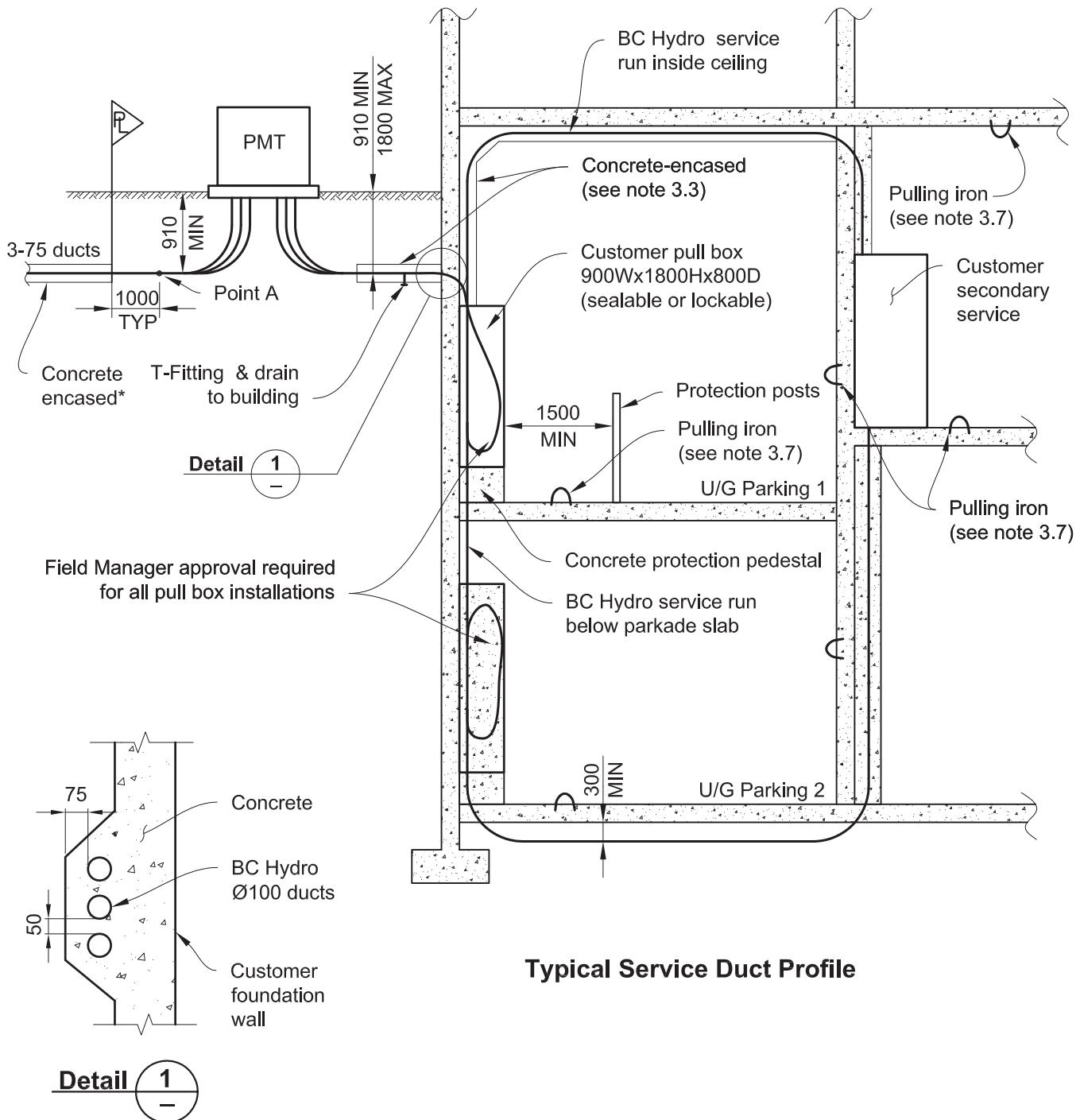


### Vertical Separation

### Horizontal Separation

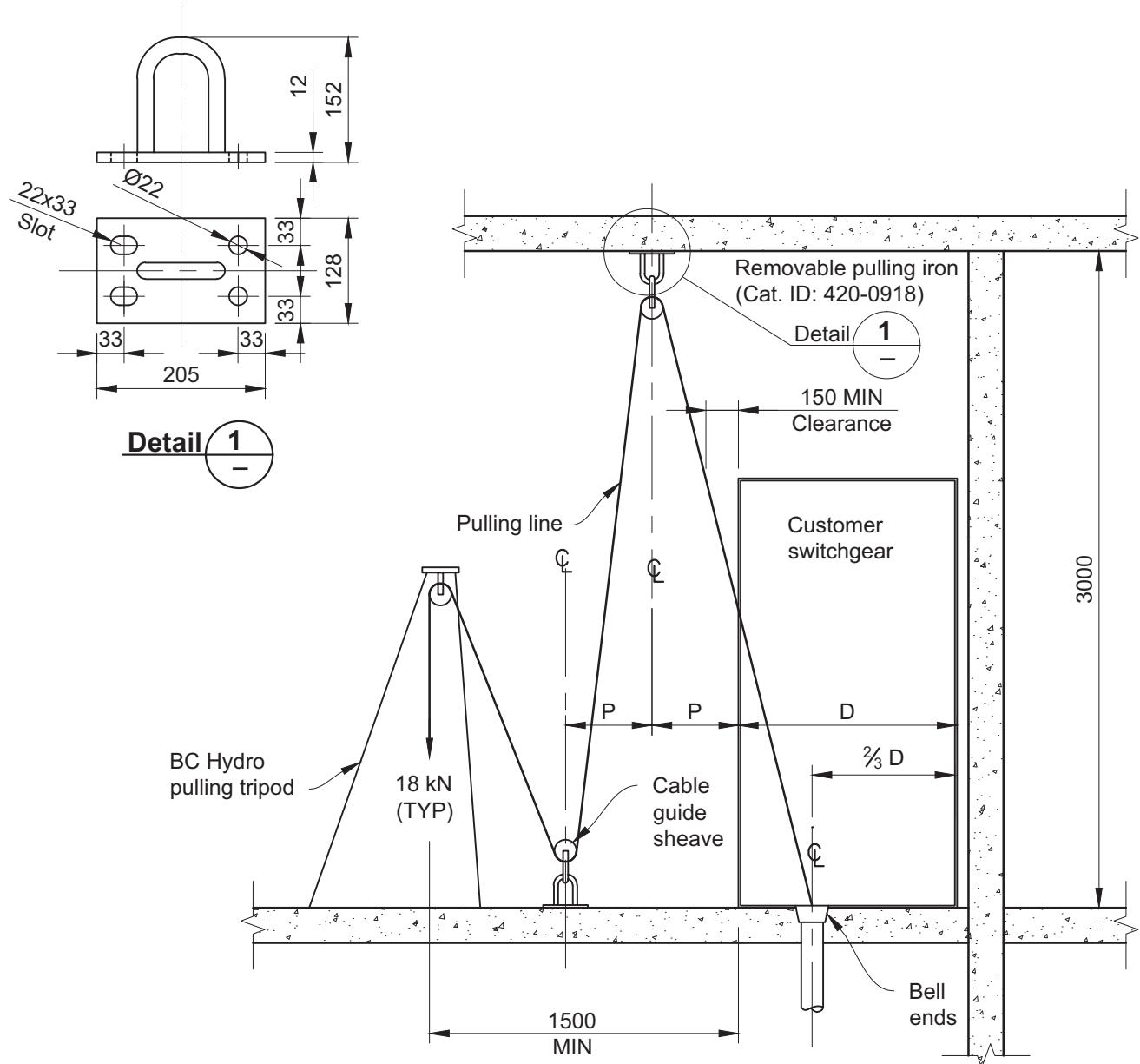
### Staggered Bus Bars Details

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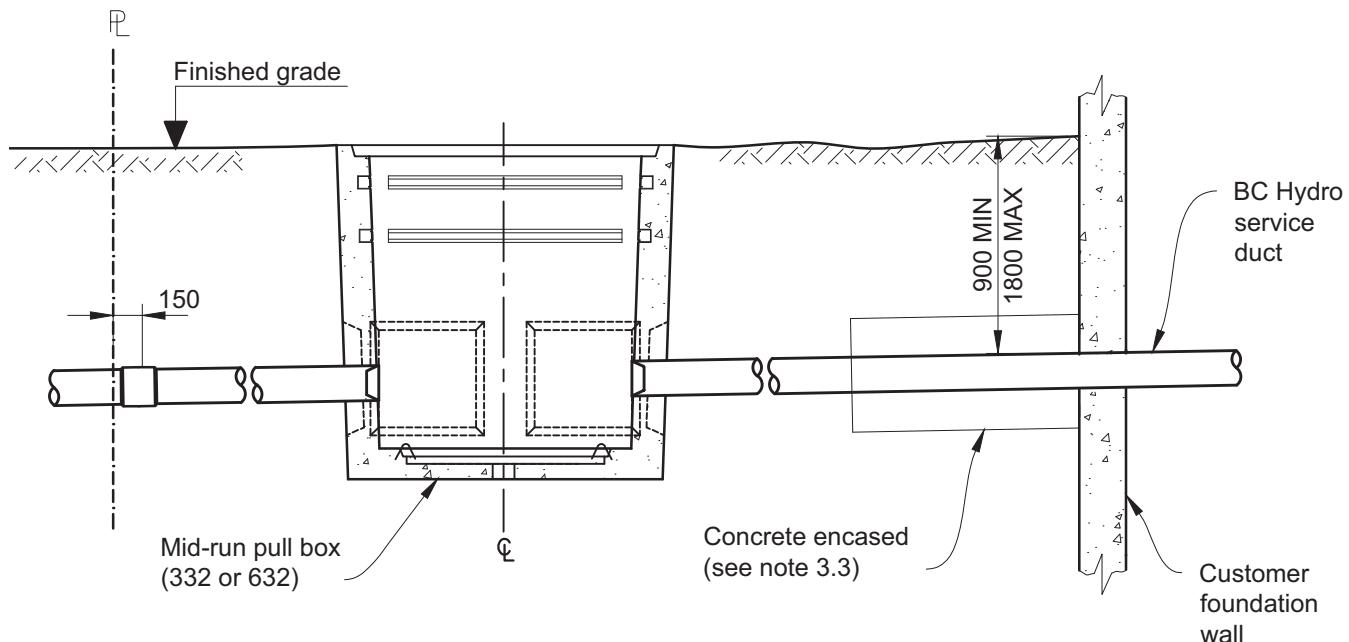
### Service Duct Inside Wall (See ES54 S3-04)

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### Service Cable Pulling Requirements (See Note 3.7)

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			 M. KELVIN PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA 2018-11-06	120/208 V AND 347/600 V UP TO 1600 A PRIVATE PROPERTY INSTALLATION	
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**Mid-Run Pull Box  
Inside or Outside Building**

## Notes

### 1 Scope

This standard details three-phase electrical services up to 1600 A for 120/208 V and 347/600 V supply.

### 2 Materials

2.1 All materials from the stub-off on private property shall be supplied and installed by the customer.

2.2 All materials installed on private property, including the meter socket, service panels and switchgear, shall be CSA certified. However, all material and electrical equipment, up to the utility's point of connection to customer-owned equipment, is exempt from the BC Electrical Safety Regulation including all grounding, duct work, etc. This equipment is not within the jurisdiction of electrical inspection authorities and permits are not required for this work.

2.3 Grounding stud shall be supplied as indicated and installed per manufacturer's instructions. The following grounding stud is acceptable to BC Hydro: HC-30029-2 fabricated by MacLean Power Systems.

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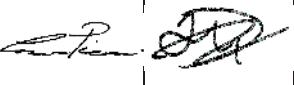
### 3 Installation Requirements

#### 3.1 General

- a. All civil work and grounding installations shall be the responsibility of the customer.
- b. All civil and grounding installations shall comply with BC Hydro standards, the BCEC and applicable bulletins issued by the TSBC.
- c. The trench shall be in a direct line-of-sight from the property line stub-off to the service conduit entry into the building. The base of the trench shall be graded to the depth of the BC Hydro duct stub-off.
- d. The service location on the building shall be on the wall closest to Point A or within one metre back from that wall on either side.
- e. For building parkade vehicle access shall be 2100 mm minimum.
- f. No customer building elevators shall be as the only means of access by BC Hydro crew to perform utility work or to carry out their duty in its function as utility per BC Electrical Safety Regulation.

#### 3.2 Service in Duct

- a. The **customer shall couple their duct** onto the BC Hydro duct stub-off at Point A, except as stated in note 3.2 (c), and discard any markers and/or duct caps.
- b. If the **length of service run** between Point A and the meter socket enclosure exceeds 50 m, a pull box may be required by the BC Hydro Designer with approval by the Field Manager.
- c. If the **aggregate bends of service duct** installed on private property to the meter socket exceed 135°, a pull box may be installed in consultation with the BC Hydro Designer.
- d. The **minimum radius** of any service duct bend shall be 900 mm.
- e. The customer is responsible for the installation of adequate service duct drainage per the BCEC, because large BC Hydro service cables may act as water conduit. BC Hydro crew shall seal service duct after installing service cables. Customer is responsible for sealing customer ducts to prevent ingress of dangerous earth gases.
- f. A #8 minimum diameter polypropylene **pull string** shall be installed in the service duct and tied securely at the meter socket enclosure and to the string in the BC Hydro duct stub-off. **If no string** is found in the stub-off, the customer shall **notify BC Hydro** for further instructions.
- g. Throughout its length, the service duct shall be kept free of any obstructions and foreign material, including sand and gravel. The duct shall be proved by **mandrelling before the final connection** is made to the BC Hydro duct and before a pull string is installed.

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h. The service duct shall be protected from damage caused by settlement of the foundation and excavation backfill. To minimize settlement and subsequent damage to service duct and service cables, select backfill shall be used per Section W and compacted in 150 mm layers.

i. Underground service duct shall be installed outside building foundation walls and run on the surface of finished building walls. Service duct installed inside a building, or inside building walls, shall be encased in concrete 75 mm minimum thickness.

### 3.3 Wall Entry

a. At locations where service ducts enter into a building foundation wall and at locations where differential settlements are expected to occur, the customer shall ensure a smooth transition to avoid any damage to the service ducts and service cables caused by differential settlement. BC Hydro designer may request the customer to specify estimated settlement of the building and the required service cable slack. The customer shall submit an engineered design of the concrete encased duct and rebar reinforced wall entry for acceptance by BC Hydro designer.

### 3.4 Pull Boxes - General

a. The term "pull box" describes the compartment necessary for cable installation crews to safely and effectively pull in the required cable. Pull boxes shall be required at all service entrance equipment locations, except for meter bases and switchgear rated 200 A and less.

b. Mid-run pull boxes located outside a building shall be a BC Hydro equivalent 632 or 332 Box, as determined by the BC Hydro Designer and approved by the local Field Manager.

c. Mid-run pull boxes, wall-mounted inside a building, shall be 900W x 1800H x 800D mm minimum.

d. Pull boxes must be **located** in consultation with BC Hydro Designer and approval by the local Field Manager. A minimum 1.5 m clearance shall be provided for working space in front - to accommodate pulling equipment and the BC Hydro crew.

### 3.5 Pull Boxes Located at the Service Entrance of Wireways

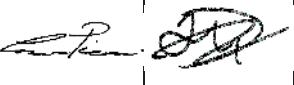
a. Wireways can be either top, bottom, back or side entry, and have either a wireway or integral pull box. The requirements outlined herein apply to all service entry assemblies except where noted.

b. **Suitable cable supports** shall be provided in all wireways and pullboxes as per paragraph 3.8.

c. **Bus bars** shall be extended into the wireway, and shall be staggered and separated horizontally or vertically as shown in various details on page 10.

d. **Service entry ducts** shall be placed within the wireway, pullbox or cable entrance compartment.

e. **Wireway and pullbox dimensions** shall be in accordance with Table 1 on page 5.

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### 3.6 Utility Wireway

**CAUTION:** Due to liability and restricted access, BC Hydro will no longer terminate utility supply cables directly onto a customer-owned service main switch or breaker lugs.

All customer-owned three-phase services, except for the 200 A 120/208 V meter socket, require a separate utility compartment for securing and terminating BC Hydro supply cables. All supply lugs within the BC Hydro utility wireway shall be tunnel type, clearly visible and shall be vertically oriented to permit direct conductor access for termination

**Note:** 1.5 m minimum clearance shall be provided in front of all wireways and pullboxes.

### 3.7 Pulling Irons

Availability of pulling equipment varies across BC Hydro's service area and may change over time. Pulling irons, when required, are installed to ensure that service supply cables may be pulled in safely and without damage to the cables or to the customer's equipment. Page 12 shows a pulling iron position on the floor to rig the pull when a pulling tripod with capstan shall be used.

The customer shall provide engineered threaded inserts or attachments to the building structure for BC Hydro removable pulling irons as determined by BC Hydro designer. The customer shall supply and install bolts and all hardware deemed necessary by the customer's engineer and shall be left threaded in place for use by BC Hydro during cable pulling crew.

Expected maximum pulling line tensions shall be supplied by the BC Hydro designer. For secondary service supply cables, maximum pulling line tensions should be less than 18 kN. However, for some special installations, higher pulling tensions may be allowed if within the capacity of local BC Hydro pulling crew – subject to approval of the local BC Hydro Line Manager.

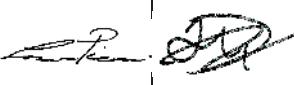
For side entry utility pull boxes and wireways, cable positioning sheaves may be large (400 mm to 675 mm) to meet large service cable bending radius. For such installations, the wireway or pull box shall be large enough to rig a suitable cable guide sheave for each of the cable runs, without requiring removal of or other conflict with another existing service supply cable previously installed.

### 3.8 Cable Clamps

Cable clamps for the support of BC Hydro service cables shall be CSA type, 600 V class, separately mounted for the support of individual service cable.

The cable clamps shall have integral cushioning layer to protect the cable insulation from damage caused by thermal cycling of load demand.

The cable clamps shall be installed in 1-5/8" x 1-5/8" C-channel mounted on a slotted adjustable angle bracket, suitable for facing either outward or upward. Slotted angles shall provide back/forth adjustment of the C-channel within 100 mm of front or the back the enclosure.

DESIGNED 	RECOMMENDED 	ACCEPTED 	ENGINEER OF RECORD 	SECONDARY THREE-PHASE SERVICES 120/208 V AND 347/600 V UP TO 1600 A PRIVATE PROPERTY INSTALLATION
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The customer shall supply all threaded hardware and components required for the support of BC Hydro service cables – refer to ES54 S3-03.06 standard.

## **4 Information to be Supplied by Customer**

The customer shall submit for approval by BC Hydro copies of the proposed duct service run from the property line to the point of utility connection, containing the following information:

- a. All duct lengths and degrees of all duct bends.
- b. The location and size of all pull boxes and the service entrance enclosure, as well as the position of incoming and outgoing service duct at each pull box - in both plan view and profile.

The customer shall also submit all information about other adjacent utilities - existing or proposed, located in the vicinity of the proposed BC Hydro service ducts.

## 5 Restrictions

1. Service duct entry from the top and bottom, back or side.
2. See Table 1 in ES54 S2-01.05 for pull box dimensions.
3. The maximum installation capacity for a pole dip supply configuration is 800 A, consisting of two runs of 500 kcmil cables. Underground supply 1600 A services shall be limited to those installations which can be supplied from pad-mounted transformers.
4. The maximum installation capacity for 1600 A underground secondary supply service comprises four runs of 500 kcmil cables.
5. For upper level installations, customer shall provide means for cable restraining grip support in the wireway compartment - refer to ES54 S2-01.8.
6. Customer shall ensure that proper bonding is installed between the pullbox and wireway cubicles.
7. Utility wireways and pullboxes shall be reserved for utility purposes only and restricted access for utility personnel.

## Reference Document

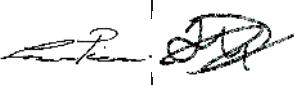
Secondary Metering "Secondary Voltage Revenue Metering 750 V and Less"

DI S10-4 Electric Service Connections - Voltages

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<b>DISTRIBUTION STANDARDS</b> 	ISSUED:OCT 2018 REPLACES:FEB 2017 ORIGINALLY ISSUED:JUN 1987		2018-11-06	PAGE 17 OF 18	<b>ES54 S2-01.17</b> <sup>R</sup> 8

## Reference Standards

ES54 U4	Construction in Unstable Ground
ES54 H2-04	Concrete Encasement Reinforcing Details
ES54 H1-01	General Trenching Details, URD and UD Installations
ES54 Section F	Transformer Pads and Vaults
ES54 Section B	Pull/Splice, Service and Junction Boxes
ES55 D3	Cable Pulling
ES53 U1-01	Cable and Conductor Data, New Construction
ES53 S2-01	Secondary Services, Three-Phase to 1600 A, 208 V and 600 V, Service Entrance Enclosure Details
ES54 Section W	Construction Specifications

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# **Requirements for Secondary Voltage Revenue Metering (750 V and less)**

October 2018



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## 1. Overview

This document contains BC Hydro's requirements for revenue metering installations operating at 750 V and less. These requirements also apply to revenue metering installations in the City of New Westminster.

*If needed, any BC Hydro related information and/or Standards referred to in this Requirement should be inquired upon from local BC Hydro Design.*

*Comments are written in italics.*

*New additions and changes from previous version are denoted with a vertical line preceding the sentence.*

## 2. Disclaimer

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The information contained in this document is subject to change and may be revised at any time. Any user of this document is advised to confirm the current version and consult with BC Hydro on the applicability of its provisions. Without limiting BC Hydro may refuse service, and energization of the metering installation, if in its view the Customer's facilities, including the service entrance and metering equipment, are unsafe, hazardous, or otherwise does not comply with the Requirements set out in this document.

### 3. General

#### 3.1 Approval

- a) The proposed metering equipment locations and voltage shall be approved by BC Hydro prior to installation. If the design is subsequently changed, re-approval is required prior to energization.
- b) The metering equipment shall be certified and installed in accordance with the latest edition of the Canadian Electrical Code. If special permission for a deviation from the Canadian Electrical Code, that impacts metering, is requested from the provincial or municipal inspection authority, special written approval shall first be obtained from BC Hydro.

#### 3.2 Location

##### 3.2.1 General

1. Shall be installed in a clean readily accessible location free from severe or continual vibration;  
*For rural applications, meter location shall be readily accessible by vehicles at all times;*
2. Shall not be installed in locations which may be hazardous to persons installing, testing, reading or maintaining the equipment;
3. Shall be protected from damage due to vandalism, vehicles etc.;
4. Shall not be installed in garages or carports;
5. Shall not be installed in a location which requires ladder or manhole access;
6. Grouped Sub Service Metering and multiple meters shall be installed inside a designated electrical/meter room, and at least one meter socket shall be mounted as per section 6.16.
7. Exterior meter(s), not mounted inside a metal enclosure, no conduit arrangement is required for the purpose of meter communication;
8. Meter(s) inside wood frame construction above grade, no conduit arrangement is required for the purpose of meter communication;
9. Per CEC, part I and local Building Codes, termination boxes shall be suitable for the environment in which they are placed.
10. There has to be min 0.3 m separation distance between the meter base and closest obstruction/equipment.
11. Each termination/pull box located inside the building shall be securely fastened to the wall with sufficient room for an additional termination box.
12. A minimum of 1 m working space by 2.2 m headroom shall be provided and maintained in front of all metering equipment, and to the sides and back, where access is required.

13. If an existing metering location going through a service upgrade and/or meter alteration does not meet the above criteria, the Customer shall relocate the metering equipment to a location that meets the above criteria.
14. Single phase detached single family residential metering equipment shall not be located indoors except in the case of power shed or service closet as approved in advance by BC Hydro.
15. Buildings requiring conduit(s) and termination box(es) for Meter Communications shall be defined as per Section 3.2.2.

See section 5.1.1.1 and section 5.1.1.2 for 1 phase services over 200 A and section 5.1.2.1 for a possible exception for 3 phase services over 200 A.

### **3.2.2      Meter Communications**

BC Hydro revenue meters must be able to transmit data to and from the BC Hydro IT network. The data is transmitted by radio frequency (similar to cell phones). Radio frequency waves cannot transmit through concrete, metal, or earth; therefore some buildings will require electrical conduit(s) and termination box(es) to enable meter communication through wires.

Soft copy, dimensioned PDF drawing(s) shall be provided by the customer to BC Hydro prior to construction showing conduit configurations, and physical locations of terminations and pull boxes. BC Hydro conduits for the use of BC Hydro Meter Communications shall be clearly labelled on the drawing(s).

#### **A. Conduit and Termination Box Applications for Meter Communications:**

- Meter(s) below grade (parkade) require conduit(s) and termination box(es);
- Concrete and/or metal clad buildings require conduit(s) and termination box(es);
- Mixed wood/concrete and any other structure not covered above, requires consultation with BC Hydro Design prior to any design work;

#### **B. Conduit and Termination Box Requirements:**

##### **1. For structures having less than 4 floors:**

- a) Buildings having a single meter room at or below grade (parkade);

the conduits and termination boxes shall be run from the meter room to an exterior wall as per section 6.17.

b) For a building with an underground parkade, the exterior termination box shall be mounted under the parkade entrance overhang:

- within two metres of the parkade entrance opening; and
- outside of the parkade entrance gate; and
- a minimum of two metres from any planned parkade entrance gate controller or sensor.

c) If the building contains more than one meter room at or below grade (parkade), conduits and termination boxes shall be run to connect each at or below grade meter room in a star configuration to a single meter room. This single meter room shall also include the conduit and termination box to the exterior of the building as per section 6.17.

2. For concrete structures having 4 or more floors:

- In addition to the requirements in above section, an additional conduit and termination box shall be run from the top-most meter room/closet to an external face of a rooftop mechanical room or equivalent as per section 6.17; and
- Where no rooftop mechanical room exists above the roof line, each meter room/closet shall be interconnected with the main meter room via conduit similar to what is shown in section 6.18.

3. Concrete buildings having a single meter room at or below grade (parkade) or wood frame buildings having a single meter room below grade (parkade); the conduit and termination boxes shall be run from the meter room to an exterior wall as per section 6.17. The determination of which exterior wall the conduit and termination box are mounted on shall be as follows;

For a building with an underground parkade, under the parkade entrance overhang as per installation requirements below.

- within two metres of the parkade entrance opening; and
- outside of the parkade entrance gate; and
- a minimum of two metres from any planned parkade entrance gate

controller or sensor.

For a building with no underground parkade, on the exterior wall which has line of sight to the neighbouring buildings across the street or alley. If no neighbour across the street or alley, then it is up to the customer's preference whether to face the street or alley.

4. If the building contains more than one meter room on the same level, or below grade (parkade), conduits and termination boxes shall be run to connect each meter room in a star or daisy chain configuration to the main meter room as per section 6.18. The main meter room shall also include the conduit and termination box to the exterior of the building as per section 6.17.
5. The main meter room would be the meter room closest to ground level containing one or more transformer-type meters and/or house meter.
6. In addition to the requirements above, Indoor Meter Closets on multiple levels shall be interconnected via a daisy chain of conduits run vertically from one Indoor Meter Closet on one level to one Indoor Meter Closet on the next level with the conduit terminating in each Indoor Meter Closet as per section 6.19.
  - If any floor above grade has more than one Indoor Meter Closet on that floor, conduit shall be run horizontally from the additional Indoor Meter Closet(s) to the Indoor Meter Closet containing the vertical daisy chained conduits as per section 6.19.
  - Conduits are not required beyond the 7<sup>th</sup> floor Indoor Meter Closet(s) unless there is a vertical gap of 4 or more floors in between the Indoor Meter Closets. If there is no Indoor Meter Closet on and beyond the 7<sup>th</sup> floor the conduits shall be run to the 6<sup>th</sup> floor Indoor Meter Closet(s).
  - If there is a vertical gap of 4 or more floors in between Indoor Meter Closets, provide conduit to bridge the gap between these Indoor Meter Closets i.e. provide conduit from the topmost Indoor Meter Closet in the lower floor, to the bottommost Indoor Meter Closet in the next-higher floor. Provide conduit in this manner for every gap of 4 or more floors.
7. Conduits entering each Indoor Meter Closet and meter room shall be terminated in a termination box and multiple conduits into the room or

closet can be terminated in the same box (maximum 4 conduits per box) as per section 6.17.

C. Conduit and Termination Box Specifications:

1. All material requirements for installation of conduits and termination boxes are the responsibility of the customer. Each termination box and conduit shall be permanently marked/labelled for exclusive use of BC Hydro Meter Communications.
2. All material and connections from termination box to the meter is the responsibility of BCH per section 6.17.
3. Conduit(s) shall be metallic or rigid PVC, with an inside diameter not less than 35.00 mm (or 1½ inch trade size) installed per CEC and local Building Code. If the conduits(s) will be run within a concrete slab, it may be non-metallic Coreline (ENT) or rigid PVC.
4. The conduit from the meter room shall be run from a location within 0.3 - 2 m of the **Transformer-Type Meter Socket** used as house meter. If no such meter socket is present in the meter room, the conduit shall be run from a location within 0.3 - 2 m of another meter socket present at that location in the following order of preference:
  - i. Any Transformer-Type Meter Socket
  - ii. Meter Socket used as house meter
  - iii. Any Meter Socket

The above meter socket shall be mounted on a 19 mm (¾") plywood backing as per section 6.17.

*The plywood backing shall be securely fastened to the wall. Shooting, or otherwise mounting this meter socket, directly to the wall is not permitted.*

5. The conduit termination on the exterior of the building shall be no less than 2.75 m or more than 4 m above finished grade unless mounted under the parkade entrance overhang, with a minimum amount of bends. The maximum degree of bends between termination/pull boxes shall not exceed 270°, and if the maximum length between termination boxes exceeds 100 m, an additional pullbox is required. Each end of the

conduit shall terminate in a 150x150x150 mm (minimum) metallic or PVC enclosure with a cover for future use by BC Hydro to install signaling cables. All metallic enclosures shall be bonded and all PVC enclosures shall come with bonding conductor (with min #10 Cu). A maximum of 4 conduits can terminate in one termination box. Each conduit shall come with a permanent label attached to both ends of the conduit. Both labels will be marked with the same unique identifier to distinguish that conduit from all others.

6. Each conduit shall be equipped with a continuous length of poly pull string and every termination/pull box shall be identified as for use by "BC Hydro Meter Communications". The pull string shall be minimum #8, polypropylene, and installed in each conduit.

### 3.3 Access

- a) BC Hydro shall have reasonable access to the metering equipment to permit its reading, testing and maintenance.
- b) Where the meter socket is not accessible due to locked doors or alarm systems, keys shall be provided to BC Hydro.
- c) Where it is proposed to locate metering equipment indoors, or within other secure areas, the accessibility arrangements, systems, equipment etc. shall be agreed upon by BC Hydro prior to approval of the proposed location.

*Equipment and systems may include keys, lock boxes, key fobs, smart cards etc.*

- d) Electrical rooms on ground floor or parkade level containing metering equipment shall be accessible by a vertically hinged, lockable door leading directly to the exterior or the parkade level of the building (roll-up or overhead garage doors are not acceptable as access doors);
- e) Where building does not come with parkade, meters shall be located in the main electrical room where the supply service is terminated. The main electrical room shall be at ground level and come with a door leading directly to the exterior of the building as per 6.16.
- f) Indoor Meter Closet(s) are only allowed in MURBs and/or CRUs where building comes with a main electrical room. The house meter or meters shall be located inside this electrical room per d) and e) above.
- g) Where a Premises come with multiple buildings with main and sub-electrical rooms, meters are allowed to be installed in each of the electrical rooms.

### 3.4 Illumination

When metering equipment are installed indoors, i.e. meter room, power shed, service closet, Indoor Meter Closet, etc., lighting fixture(s) shall be installed:

- a) in the same space containing the metering equipment and shall be controlled by a wall switch at the room entrance; and
- b) with a minimum illumination of:
  - 100 to 200 lux horizontal at 750 mm above grade; and
  - 100 lux vertical at the front face of the meter.

*Hallway lighting, motion sensor controlled light, and pull chains on light is not acceptable.*

### **3.5 Existing Installations**

- a) Any existing installations undergoing service upgrade or meter related work as a result of an alteration shall comply with the latest version of this requirement.
- b) Alterations shall not be made to existing metering installations without the prior written approval of BC Hydro.
- c) Load increases shall be per BC Hydro Electric Tariff section 7.1. Any load increases greater than what is allowed shall not be made without prior written approval of BC Hydro.

*This is to ensure the supply service and metering equipment has adequate capacity for the new load.*

- d) Any civil work and/or electrical changes affecting metering and billing, e.g. one meter per unit, on a Premises shall not take place without BC Hydro's approval. Any alteration work is the responsibility of the customer.
- e) Procedures are available from BC Hydro for the temporary and emergency disconnection of Self-Contained meters. This may only be carried out by qualified electrical contractors to permit alterations or repairs. Approval from BC Hydro shall be obtained in advance on an individual job-by-job basis.

### **3.6 Drawings**

When drawings, specifications and site plans are submitted to BC Hydro, details of the proposed metering equipment and locations shall be included.

Electrical room layout drawings, specifications and site plans shall be submitted to BC Hydro for approval. The electrical room layout drawing shall include the location, dimension, plan and front elevation for the following equipment:

- Main service box, wireway, pullbox, and sub-service disconnect devices
- Meter sockets and/or Transformer-Type Meter Sockets
- Instrument transformer enclosures and/or switchgear instrument transformer compartment, including CT and VT locations
- Meter centres
- Conduit(s) and termination box(es) for meter communication

### 3.7 Definitions

Except where noted below, definitions shall be in accordance with section 2 of the Canadian Electrical Code.

**Instrument Transformer** means a high accuracy **Voltage Transformer (VT)** or **Current Transformer (CT)** that transforms the circuit voltage and current to lower levels for connection to an instrument transformer type meter.

**Instrument Transformer Metering** means a metering installation where the meter is connected to the metered circuit conductors via instrument transformers.

**Meter Cabinet** means the previously BC Hydro supplied cabinet for mounting a 3 phase instrument transformer meter. **Meter cabinet is currently no longer supplied by BC Hydro.**

**Meter Socket** means the Customer supplied device for mounting a Self-Contained meter. The meter socket is referred to as the meter mounting device in the Canadian Electrical Code.

**Indoor Meter Closet** means a small electrical room with one or more meter centre(s) and may consist of a dry-type transformer.

**Network Service** means a service consisting of two phase conductors plus a neutral conductor supplied from a 3 phase, 4 wire power system.

**Premises** means a building, a separate unit of a building, a dwelling or machinery, together with the surrounding land.

**Self-Contained Metering** means a metering installation where the meter is installed directly in series with the circuit conductors.

**Transformer-Type Meter Socket** means the Customer supplied meter socket c/w test switch compartment in various jaw configurations required to install BC Hydro supplied test switch and meter for Instrument Transformer Metering. The meter socket is referred to as the meter mounting device in the Canadian Electrical Code.

### 3.8 Underground Main Service

Underground main service meter sockets shall be in accordance with section 6.1. Contact BC Hydro and refer to the ES53 Series Underground Electrical standards and the ES54 Underground Civil standards for underground main service conduit,

wireway and pull box requirements.

Overhead service meter socket dimensions are not specified since BC Hydro does not install or terminate the service conductors at the meter socket.

### **3.9 Net Metering**

For net metering applications, refer to the BC Hydro requirements at <https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering.html>.

### **3.10 Metering Type and Sequence**

- a) **Self-Contained Metering**, in accordance with section 4 and the following table, is required for all loads of **200 A or less**. Except that, Instrument Transformer Metering is required for 480V and 600 V, 3 Phase, 3 Wire, Delta services of 200 A or less.
- b) **Instrument Transformer Metering**, in accordance with section 5 and the following table, is required for:
  - All loads **over 200 A**; and
  - Any 600 V and 480V, 3 Phase, 3 Wire, Delta services.

## Metering Type and Location Summary Table

Current	Metering Type	Voltage	Service	Fault Current	Metering Location See Note 1	Neutral See Note 2
200 A or less	Self-Contained	300 V or less	Main	10,000 A or less	Line (Hot)	Bonded
				Over 10,000 A	Load (Cold)	Isolated
			Sub	Any Level	Load (Cold)	Isolated
	277/480Y V 3 Phase 4 Wire	Main or Sub	Any Level	Load (Cold)	Isolated	
		Main or Sub	Any Level	Load (Cold)	Isolated	
	Instrument Transformer	480 V 3 Phase 3 Wire Delta	Main or Sub	Any Level	Load (Cold)	NA
	Instrument Transformer	600 V 3 Phase 3 Wire Delta	Main or Sub	Any Level	Load (Cold)	NA
Over 200 A	Instrument Transformer	See Schematic Drawings, section <u>4.7</u> and <u>5.2</u> .				

1. The metering location is relative to the main service box or sub service disconnect device. Line side metering is referred to as “hot” metering. Load side metering is referred to as “cold” metering.
2. In accordance with section 10-624 of the Canadian Electrical Code, where a meter socket is located on the line side of the main service box, the neutral shall be bonded to the meter socket. In accordance with sections 10-204 and 10-624 of the Canadian Electrical Code, where a Self-Contained meter socket is located on the load side of the main service box, the neutral shall be isolated from the meter socket.
3. Where a 3 phase, 4 wire supply, serves a 3 phase, 3 wire load, the neutral shall be part of the metering circuit and shall be extended to the point-of-metering.
4. Where metering is cold style, line side disconnect shall be located adjacent to the meter base. Adjacent is side-by-side in the same physical location.

## 4. Self-Contained Metering

Self-Contained Metering is required for all loads of 200 A or less. Except that, instrument transformer type metering is required for 480V and 600 V, 3 Phase, 3 Wire, Delta services of 200 A or less.

### 4.1 General

- a) The Customer shall supply the meter socket and sealing ring. They shall be certified in accordance with CSA Standard C22.2 No. 115, *Meter Mounting Devices* and they shall be approved by BC Hydro.
- b) The sealing ring shall be a screw type in accordance with section 6.2.

*Ringless meter sockets are not permitted.*

- c) The neutral terminal on 5 jaw meter sockets shall be in the 9 o'clock position.

*Prior to 2005 the neutral terminal on some 5 jaw meter sockets was required to be in the 6 o'clock position. When adding a new 5 jaw sub service meter socket to an existing installation, the new meter socket neutral terminal shall be in the 9 o'clock position, even if the existing neutral terminals are in the 6 o'clock position.*

- d) The meter tilt shall not exceed 3° from vertical.
- e) Metered and unmetered conductors shall not be installed in the same raceway, pull box or distribution gutter box.
- f) The supply service conductor conduit shall be continuous and without access fittings or junction boxes on the line side of a meter socket, except where a sealable LB fitting is used beside the Meter Socket;
- g) Line and load side conductors shall not be crossed in the meter socket.
- h) Where a 3 phase, 4 wire supply, serves a 3 phase, 3 wire load, a 7 jaw, 3 phase, 4 wire meter socket shall be installed and the neutral shall be extended to the meter socket.

The neutral conductor:

- Shall be white and insulated; and
- Shall carry the same ampacity of the line and load conductor; and
- Shall not be smaller than No. 6 AWG and meet the minimum conductor size rating of the meter socket neutral terminal;

- i) Other devices, including surge arrestors, generator transfer switches, etc. shall not be installed within the meter socket or between the meter socket and the BC Hydro meter.
- j) Power quality and load management devices including power factor correction capacitors, surge protective devices, etc. shall not be installed on the line side of the BC Hydro billing meters.
- k) Prior to the installation of the meter, the Customer shall provide a durable temporary weather resistant cover over the meter socket opening.
- l) When the service is to be temporarily energized prior to the installation of the meter, CSA approved jumper bars shall be installed in the meter socket. Proper electrical and mechanical contact must be maintained between the meter socket jaws and the meter terminals after the removal of the jumpers.
- m) Underground service meter sockets shall be in accordance with section 6.1.  
*Overhead service meter socket dimensions are not specified since BC Hydro does not install the conductors.*

## 4.2 Individual Meter Sockets

### 4.2.1 Meter Socket Cover Removal

Removal of the meter socket cover shall not be possible unless the following sequence is followed:

- Removal of the sealing ring;
- Removal of the meter;
- Operation of the meter socket cover latch;
- Removal of the meter socket cover.

*Configurations that rely on seals, in addition to the BC Hydro sealing ring seal, or padlocks to prevent removal of the meter socket cover are not permitted.*

### 4.2.2 Mounting Height

a) The meter's centre line shall be 1500 mm to 1800 mm above finished grade in accordance with section 6.3 and 6.4.

Municipal kiosks, Meter Centres, Grouped Sub Service Metering, Service Pedestals mounting heights are per section 4.2.3, 6.6, 6.7 and 4.6 respectively.

b) If the Customer intends to build up the grade after the meter has been installed, a platform or ramp shall be provided during the interim period. The platform shall not be less than 900 mm by 900 mm.

### 4.2.3 Enclosures for Permanent Meter Sockets (Kiosk)

a) Permanent meter sockets shall not be installed within a steel or aluminum enclosure. By special written approval from BC Hydro, the meter socket may be installed within an steel or aluminum enclosure provided if:

- Special written approval is obtained from BC Hydro; and
- The enclosure has a hinged door; and,
- The enclosure and door do not interfere with the installation, reading or removal of the meter; and
- The enclosure and door do not interfere with the installation or removal of the meter socket cover; and,
- The clearance of 254-305 mm (10-12 inch) is provided between the inside of the closed enclosure door and the meter socket cover; and,
- The enclosure has a 152-178 mm (6-7 inch) round or square

- Lexan or equivalent Polycarbonate viewing window installed on the enclosure door directly in-line with the front of the meter; and,
- The enclosure shall have a 16 mm (5/8 inch) hole which is,
  - complete with tamperproof and weatherproof knockout plug on the enclosure roof; and,
  - located as close as possible to the front of the enclosure and within 24 inch radius of the meter; and,
  - at least 6 inch away from all edges;
- b) If it is proposed to lock the enclosure, the details of the locking should include double padlocking provision as approved by local BC Hydro design.
- c) Municipal kiosk meter's centre line is allowed to be 915 mm to 1800 mm above finished grade.

*Approval for the installation of permanent meter socket within enclosure is typically only given where the meter may be subject to vandalism and accidental damage where it reasonably cannot be alleviated.*

*Temporary construction power meter sockets may be installed within enclosures.*

#### 4.2.4 Recessed Mounting

Meter sockets may be recessed within exterior walls provided:

- The associated underground supply service conductors are permitted to be installed within the exterior wall per BC Hydro Distribution Standards drawings;
  - The recess depth is less than the depth of the meter socket, i.e. the meter socket cover shall project a minimum of 25 mm beyond the finished exterior wall surface; or
  - A minimum of 25 mm wide by 25 mm depth spacing shall be provided between the finished exterior wall surface and on two sides and bottom side of the meter socket;
- Recessing does not interfere with the installation, reading or removal of the meter; and
- Recessing does not interfere with the installation or removal of the meter socket cover.

*The overhead service mast and conductors are consumer service conductors. Section 6-208 of the Canadian Electrical Code restricts the installation of consumer service conductors within an exterior wall. The meter shall be installed on the outside of the finished exterior wall for detached single family residential services.*

#### **4.2.5      Ground Connections**

Where permitted by the Canadian Electrical Code, grounding and its connections for other systems, such as telephone, cable TV, or etc., shall:

- Not terminate within the meter socket; and
- Not terminate or routed through BC Hydro's wireway/pullbox; and
- Not interfere with the installation, reading or removal of the meter; and
- Not interfere with the installation or removal of the meter socket cover.

#### **4.2.6      Meters Mounted on Poles**

Meter sockets shall be located on the side of the pole that is not subject to vehicle damage. If this is not practicable, protection posts shall be installed 600 mm in front of the meter socket in accordance with section 6.3

#### **4.2.7      Gas Meters and Propane Meters**

Meter sockets shall not be installed within 1000 mm of gas meters or within 3000 mm of propane meters, regulators, tanks, or relief devices. See section 6.4.

### **4.3            Multiple Main Meter Sockets**

When, in accordance with section 6-104 of the Canadian Electrical Code multiple meter sockets connected to one supply service are installed on the exterior of a building; BC Hydro only permits a maximum of FOUR, 1 phase meter sockets. The multiple main meter sockets:

- a) Shall be part of a certified manufactured assembly; and

*Site fabricated assemblies are not permitted.*

- b) Shall be installed in accordance with section 6.5; and

- c) Shall meet the requirements of individual meter sockets in section 4.2; and

- d) Shall not have spare meter sockets except the spare meter socket is assigned to a unit that is in construction and to be completed within 6 – 12 months; A clear polycarbonate cover plate (e.g. Lexan) with tabs that plugs into meter socket jaws and a meter sealing ring shall be supplied and installed; and

- e) If they have a separate supply service compartment, removal of the supply service compartment cover, shall require operation of a latch that can only

be accessed by the removal of the adjacent meter.

Assemblies that require the installation of a padlock or non-meter ring seal to secure the supply service compartment cover are not permitted.

f) Prior to the installation of the meters by BC Hydro:

- 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; and
- All suite doors, complete with their permanent address or suite numbers, shall be installed.

*Multiple main meter sockets are “hot style” and are located on the line side of their respective main service boxes. “Hot style” metering may only be used where the fault current is less than 10,000 A. Where fault current levels are over 10,000 A; use “cold style” metering.*

## 4.4 Meter Centres

- a) Meter centres shall be installed in accordance with section 6.6; and
- b) Meter centres shall be certified in accordance with CSA Standard C22.2 No. 229 *Switching and Metering Centres* and shall be approved by BC Hydro; and
- c) Meter centres shall be cold style with the meter socket located on the load side of the associated circuit breaker; and
- d) The circuit breaker shall have provision for locking in the open position; and
- e) The centre-to-centre dimension of adjacent meter sockets shall not be less than 220 mm and the centre to any adjacent equipment, structure or obstruction shall be not less than 220 mm and;
- f) Prior to the installation of the meters by BC Hydro:
  - 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; and
  - All suite doors, complete with their permanent address or suite numbers, shall be installed.
- g) Meter centres may be located behind a hallway door provided the door frame does not restrict the required 1 m clearance, or access to any of the meter sockets. The following clearance shall be provided between the closed door and each meter socket cover:
  - 250 mm for all meter types.

### 4.4.1 Surplus Meter Positions

Meter positions that exceed the required number for the completed project are defined as surplus meter positions, (i.e. 47 total units but 48 meter positions supplied because meter centres/stacks come in fixed numbers). Contractors installing new meter centre(s) must remove/disable the surplus meter with the following option:

- Remove surplus socket components and install manufacturer supplied metal blanking plate to cover socket opening and breaker section.

*BC Hydro will not allow more than one surplus in the above circumstances.*

#### 4.4.2 Spare Meter Positions

Meter positions that are required for future additional loads, where areas already assigned, to complete a project are defined as spare meter positions. Meter Centres shall not have spare meter sockets except the spare meter socket is assigned to a unit that is in construction and to be completed within 6 – 12 months;

Contractors are required to supply and install the following:

- A clear polycarbonate cover plate (e.g. Lexan) with tabs that plug into meter socket jaws and a meter sealing ring.

#### 4.5 Grouped Sub Service Metering

- a) Grouped, field constructed sub service meter assemblies shall be in accordance with section 6.7; and
- b) The individual meter sockets shall be in accordance with section 4.2. Except that the meter sockets may be from 700 mm to 1800 mm above finished grade; and
- c) Instrument Transformer Metering shall be in accordance with section 5; and
- d) The grouped sub service metering shall be cold style with each meter socket located on the load side of a sub service disconnect device; and

*The main service box is not an acceptable means for isolating a sub service meter socket. Each sub service meter socket therefore requires its own disconnect device.*

*Additions to existing non-conforming installations shall be in accordance with this requirement.*

- d) The sub service disconnect device shall have provision for locking in the open position; and
- e) In accordance with section 4.1, metered and unmetered conductors shall not be installed in the same raceway or distribution gutter box; and
- f) The distribution gutter box shall have provision for the installation of BC Hydro seals; and
- g) The centre-to-centre dimension of adjacent meter sockets shall not be less

than 220 mm and the centre to any adjacent equipment, structure or obstruction dimension, shall be not less than 220 mm and;

h) Each meter socket shall be:

- Adjacent to, and as close as practicable to, the controlling sub service disconnect device; and
- In the same room as the controlling sub service disconnect device; and

*It shall be immediately obvious from the conduit configuration which sub service disconnect device is controlling each meter socket. It is unacceptable to supply the meter sockets from circuit breakers located in a panelboard.*

i) Each sub service disconnect device shall be:

- Adjacent to, and as close as practicable to, the distribution gutter box; and
- In the same room as the distribution gutter box; and

j) Prior the installation of the meters by BC Hydro:

- Each Customer suite address or suite number shall be permanently and legibly marked on the interior of each meter socket, the exterior of each meter socket cover, and the sub service disconnect device; and
- All suite doors, complete with their permanent address or suite numbers, shall be installed; and

k) Where a 3 phase, 4 wire supply, serves a 3 phase, 3 wire load, a 7 jaw, 3 phase, 4 wire meter socket shall be installed and the neutral shall be extended from the distribution gutter box to the meter socket.

The neutral conductor:

- Shall be white and insulated; and
- Shall carry the same ampacity of the line and load conductor; and
- Shall not be smaller than No. 6 AWG and meet the minimum conductor size rating of the meter socket neutral terminal;

## 4.6 Service Pedestals

Service Pedestal is a free standing meter socket permanently mounted on a concrete platform, rated for outdoor use, and come with separate line and load side wireways per BC Hydro Distribution Standards drawings and the followings:

a) Service Pedestals shall not be subject to vehicle or vandalism damage; and

- b) Meter socket shall be in accordance with section 4.2 and section 6.8; and
- c) Shall have a continuous barrier between the unmetered supply conductors and the metered load conductors; and
- d) Shall permit access to the unmetered supply conductors only after performing the following removal sequence:
  - Meter sealing ring; then
  - Meter; then
  - Meter socket cover; then
  - Unmetered supply conductor cover.

*Pedestals that require the installation of a padlock or non-meter ring seal to secure the unmetered conductor cover are not permitted.*

- e) The Service Pedestal unmetered supply conductors shall be installed in a continuous conduit between the BC Hydro point of supply and the service pedestals. Intermediate underground enclosures, or other potential points of access, are not permitted.
- f) Service Pedestal meter's centre line shall be between 1500 mm and 1800 mm above finished grade.
- g) Service Pedestal with meter's centre line at minimum 915 mm are only allowed for mobile home parks and subdivisions, and municipal street lights and/or traffic lights per section 6.8.
- h) Customer service grounding requirements in the main breaker section shall comply with the latest section 6.0 of the BC Electrical Code.

## 4.7 Schematic Drawings

Self-Contained meter sockets shall be in accordance with the schematic drawings in this section.

*In accordance with section 3.10, “hot” metering, with the meter socket on the line side of the service box, is only required for the following **main services** where the fault current is 10,000 A or less:*

- 120/240 V, 1 phase, 3 wire; or
- 120/208 V, Network (very limited application); or
- 120/208Y V, 3 phase, 4 wire; or
- 240 V, 3 phase, 3 wire delta.

*All other **main services** require “cold” metering, with the meter socket on the load side of the service box.*

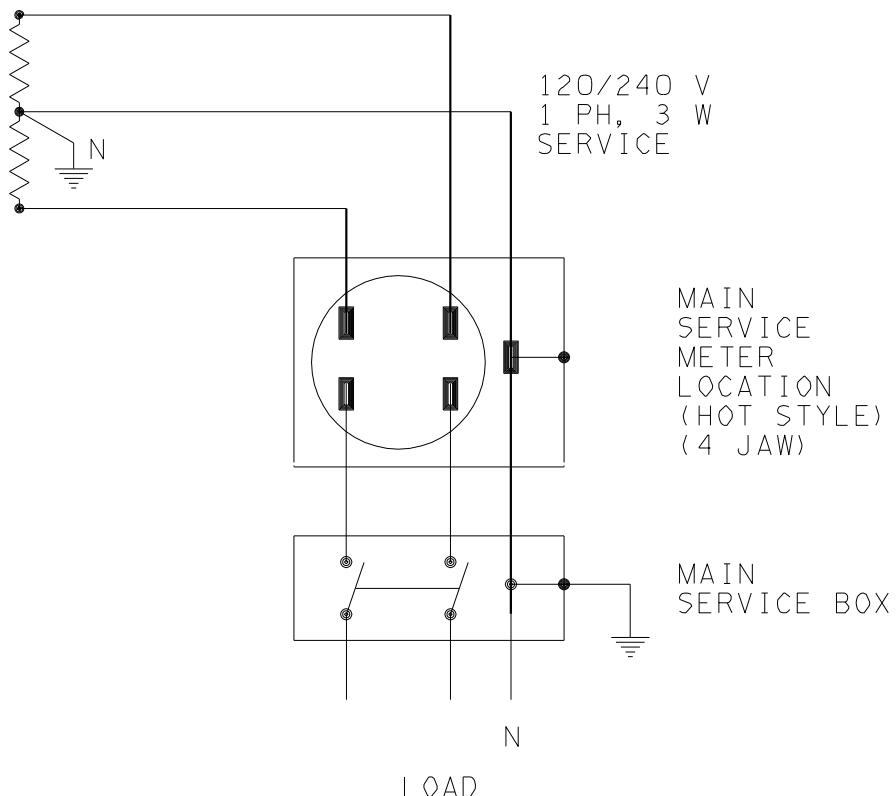
*All **sub services** require “cold” metering, with the meter socket on the load side of the sub service disconnect device.*

*For “hot” metering, the neutral shall be bonded to the meter socket.*

*For “cold” metering, the neutral shall be isolated from the meter socket.*

*In accordance with section 4.1, where a 3 phase, 4 wire supply, serves a 3 phase, 3 wire load, a 7 jaw, 3 phase, 4 wire meter socket shall be installed and the neutral shall be extended to the meter socket.*

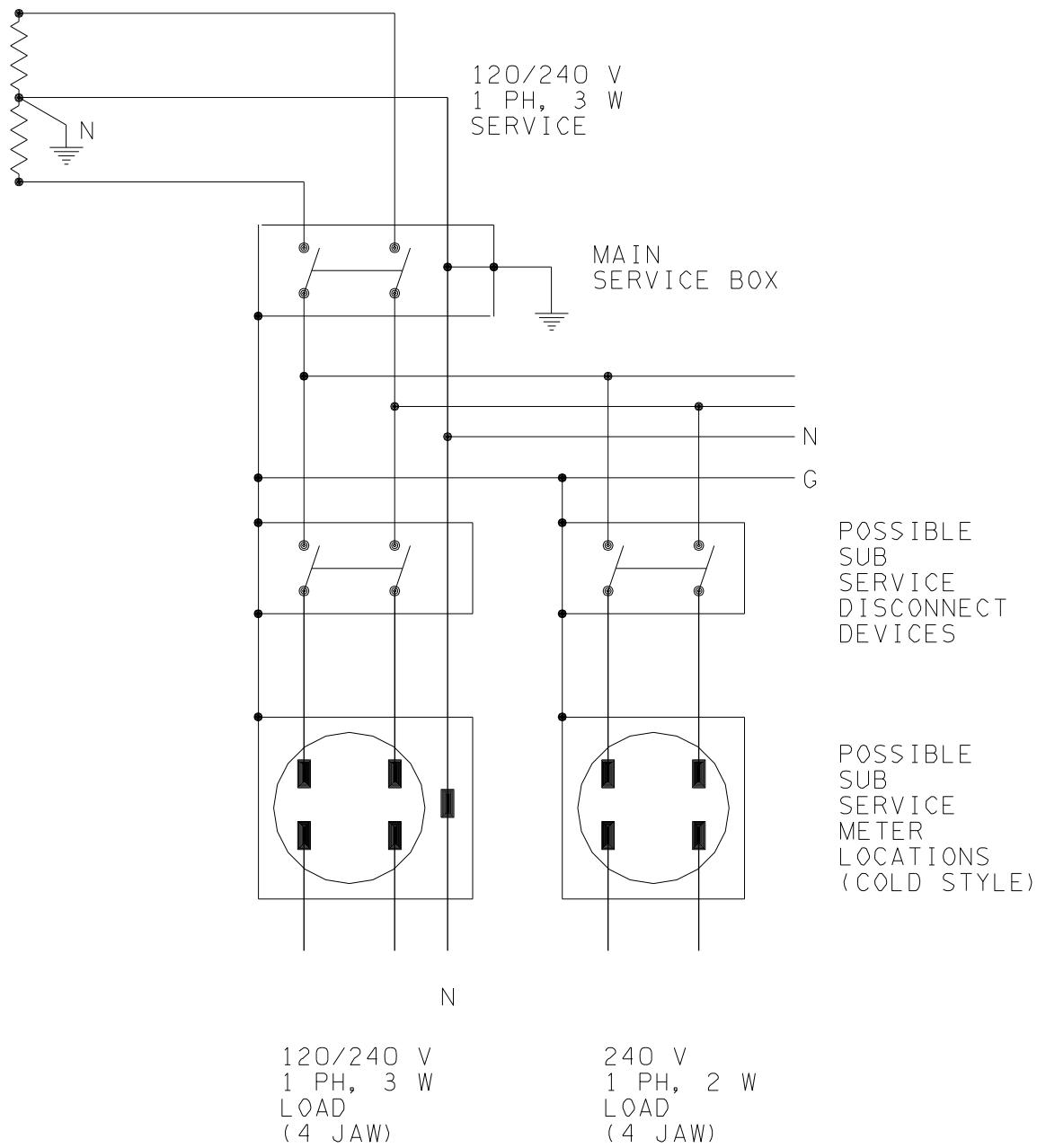
#### 4.7.1 120/240 V, 1 Phase, 3 Wire, Main Service



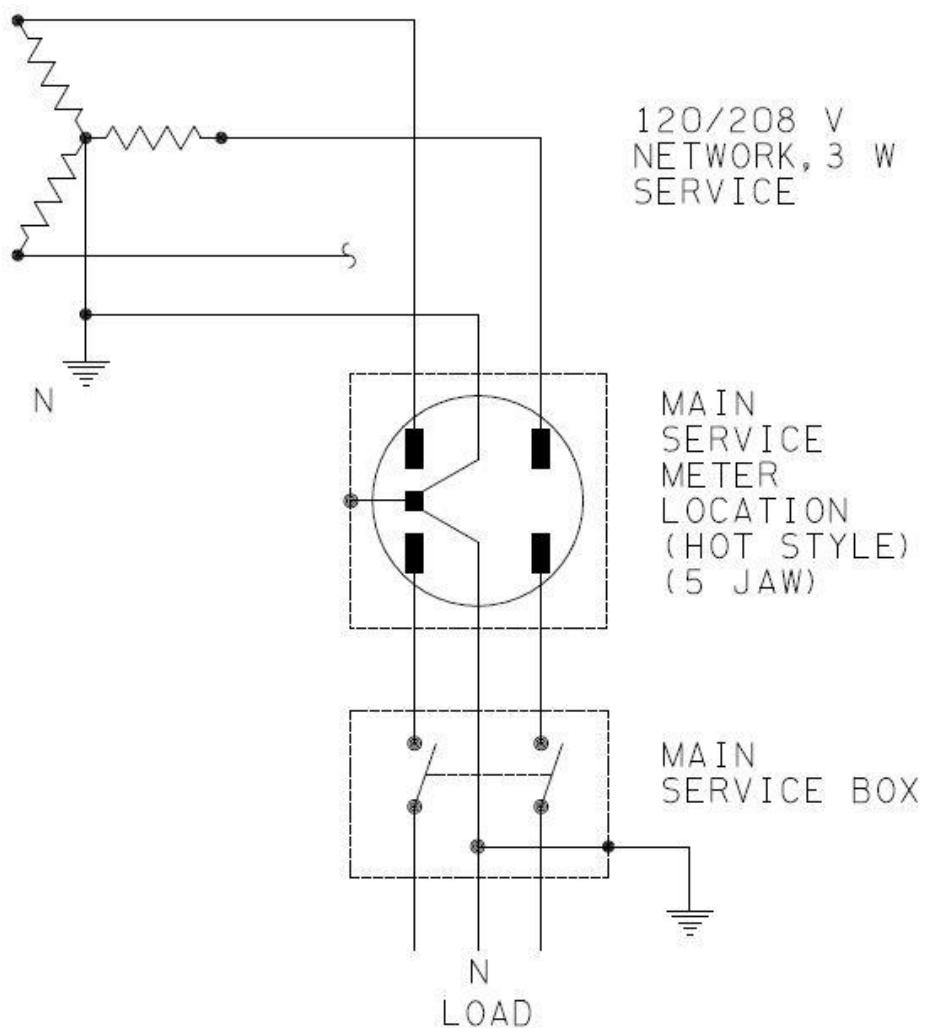
##### Notes:

1. This is a typical residential service. In accordance with section 3.2, for detached single family residential services, the meter socket shall not be located indoors.
2. 120 V, 1 phase, 2 wire services are no longer provided.
3. The above hot style configuration is applicable if the service fault current is 10,000 A or less. **If the service fault current is greater than 10,000 A:**
  - The meter shall be on the load side of the main service box (cold style); and
  - The neutral shall not be bonded at the meter.

#### 4.7.2 120/240 V, 1 Phase, 3 Wire, Sub Services



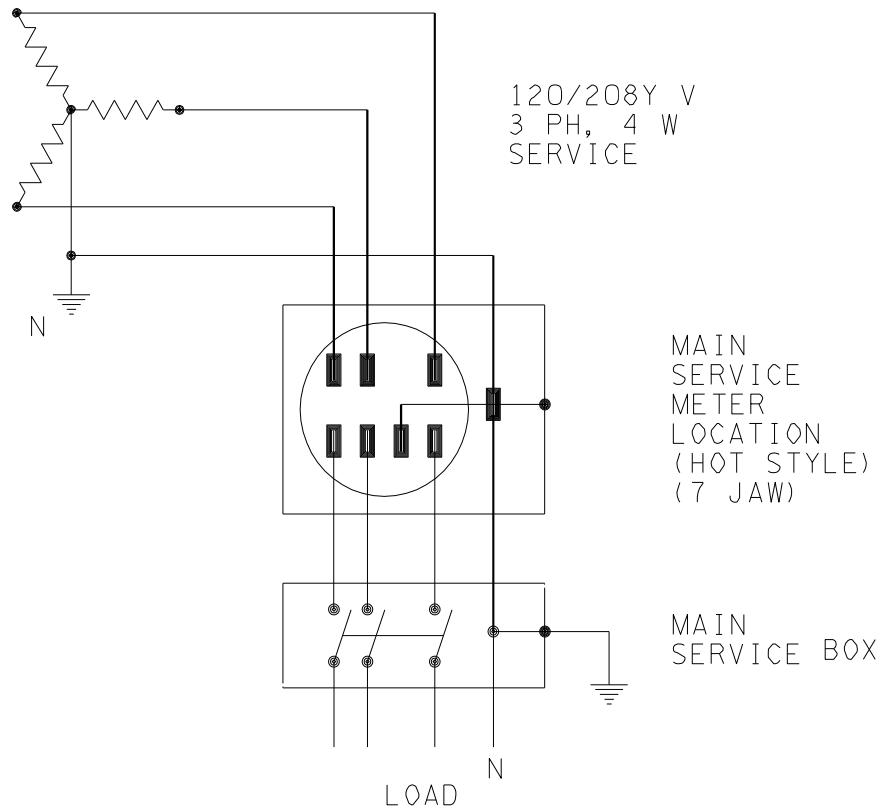
#### 4.7.3 120/208 V, Network, Main Service



Notes:

1. A 120/208 V, network service consists of two phase conductors plus a neutral conductor supplied from a 120/208Y V, 3 phase, 4 wire power system.
2. 120/208 V network main services are restricted to downtown Victoria and a very limited number of other locations.
3. The above hot style configuration is applicable if the service fault current is 10,000 A or less. **If the service fault current is greater than 10,000 A:**
  - The meter shall be on the load side of the main service box (cold style); and
  - The neutral shall not be bonded at the meter.

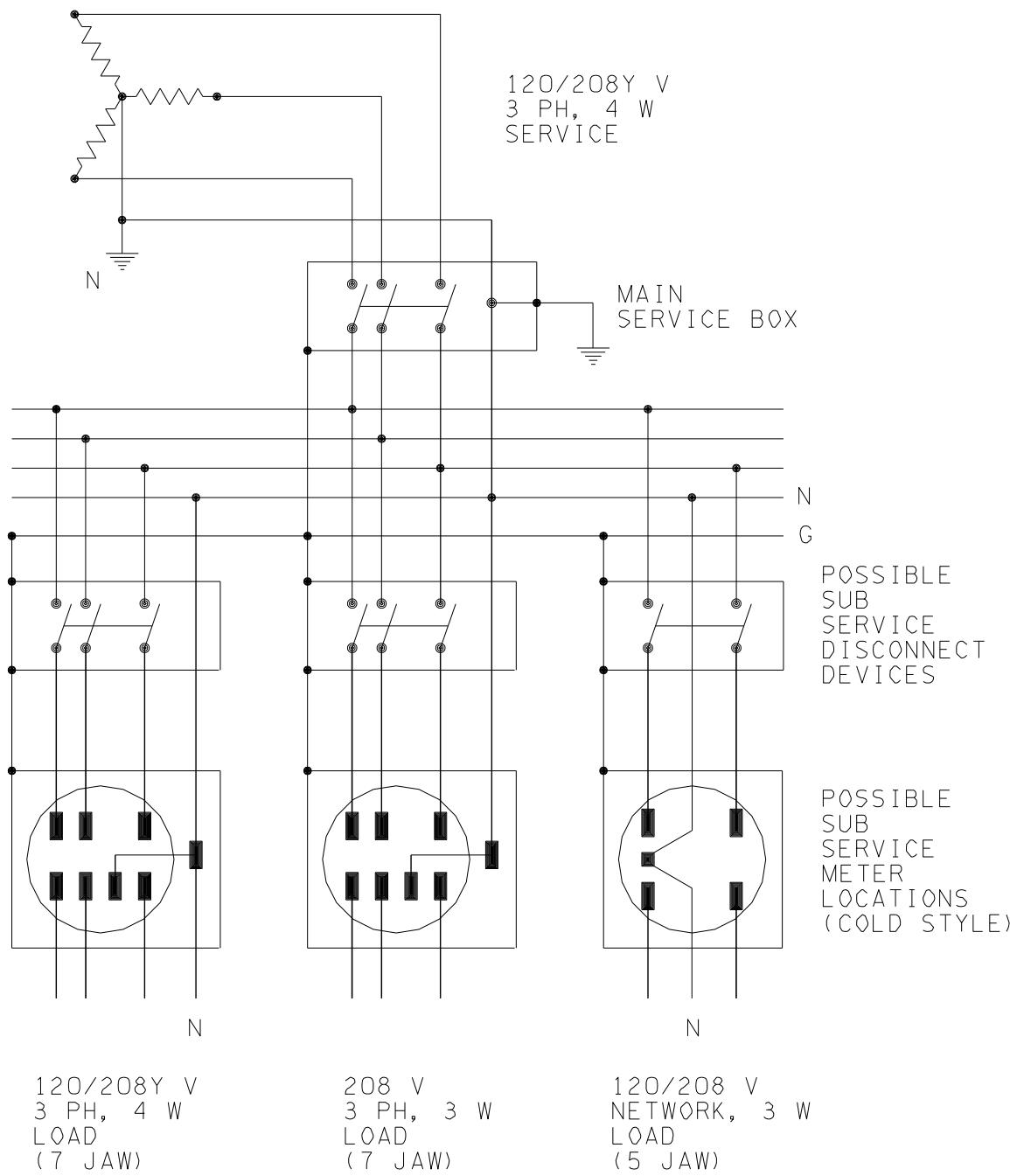
#### 4.7.4 120/208Y V, 3 Phase, 4 Wire, Main Service



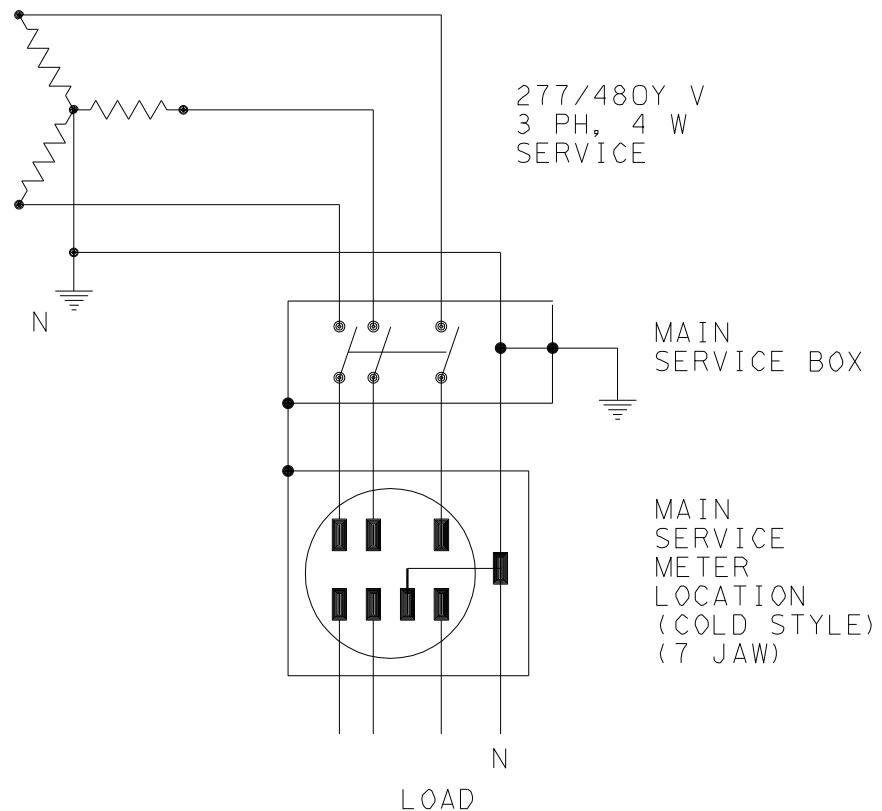
Notes:

1. The above hot style configuration is applicable if the service fault current is 10,000 A or less. **If the service fault current is greater than 10,000 A:**
  - The meter shall be on the load side of the main service box (cold style); and
  - The neutral shall not be bonded at the meter.

#### 4.7.5 120/208Y V, 3 Phase, 4 Wire, Sub Services



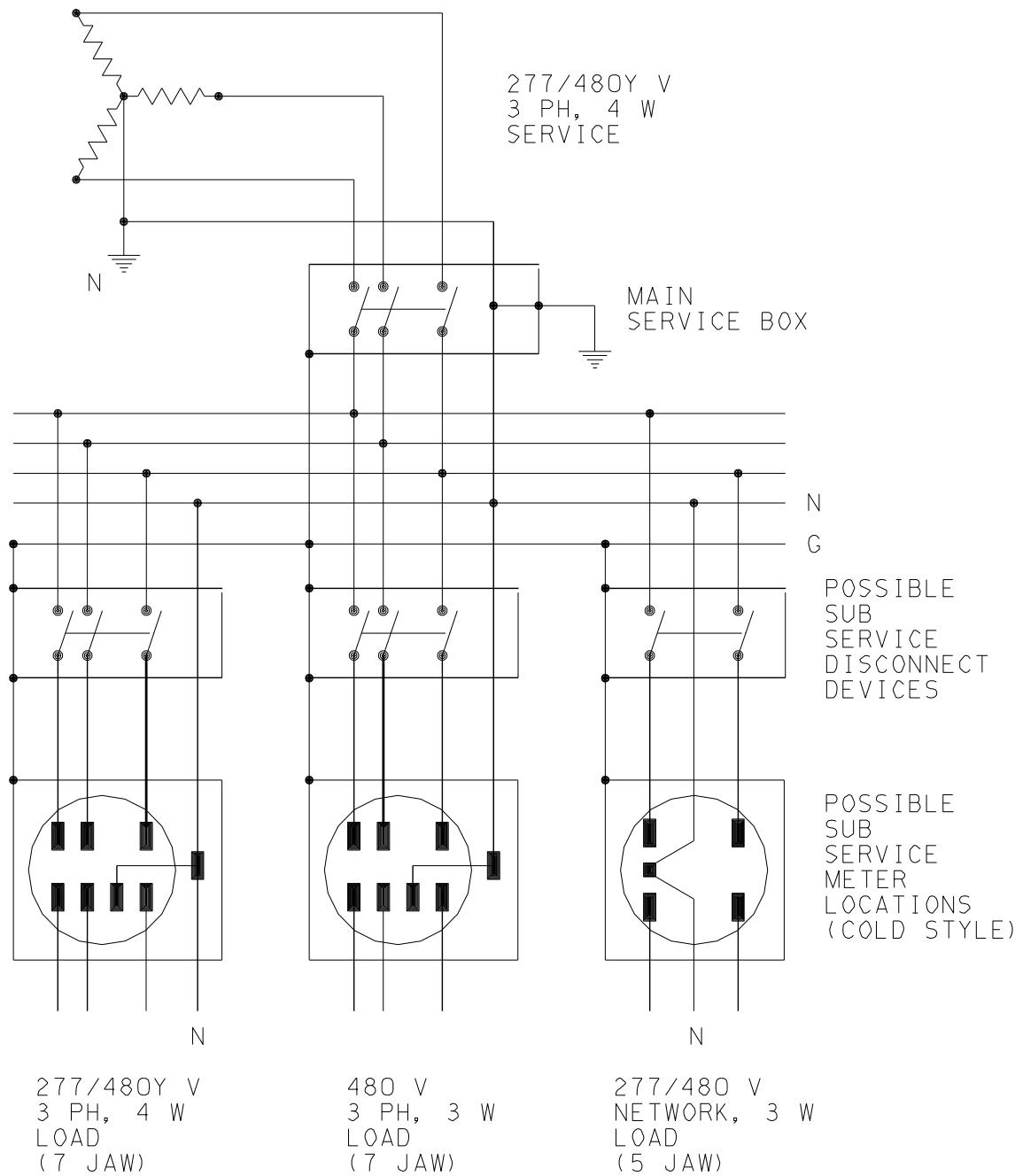
#### 4.7.6 277/480Y V, 3 Phase, 4 Wire, Main Service



#### Notes:

1. This is not a standard BC Hydro service voltage. However, if the Customer provides the power transformers, BC Hydro will provide the meter.

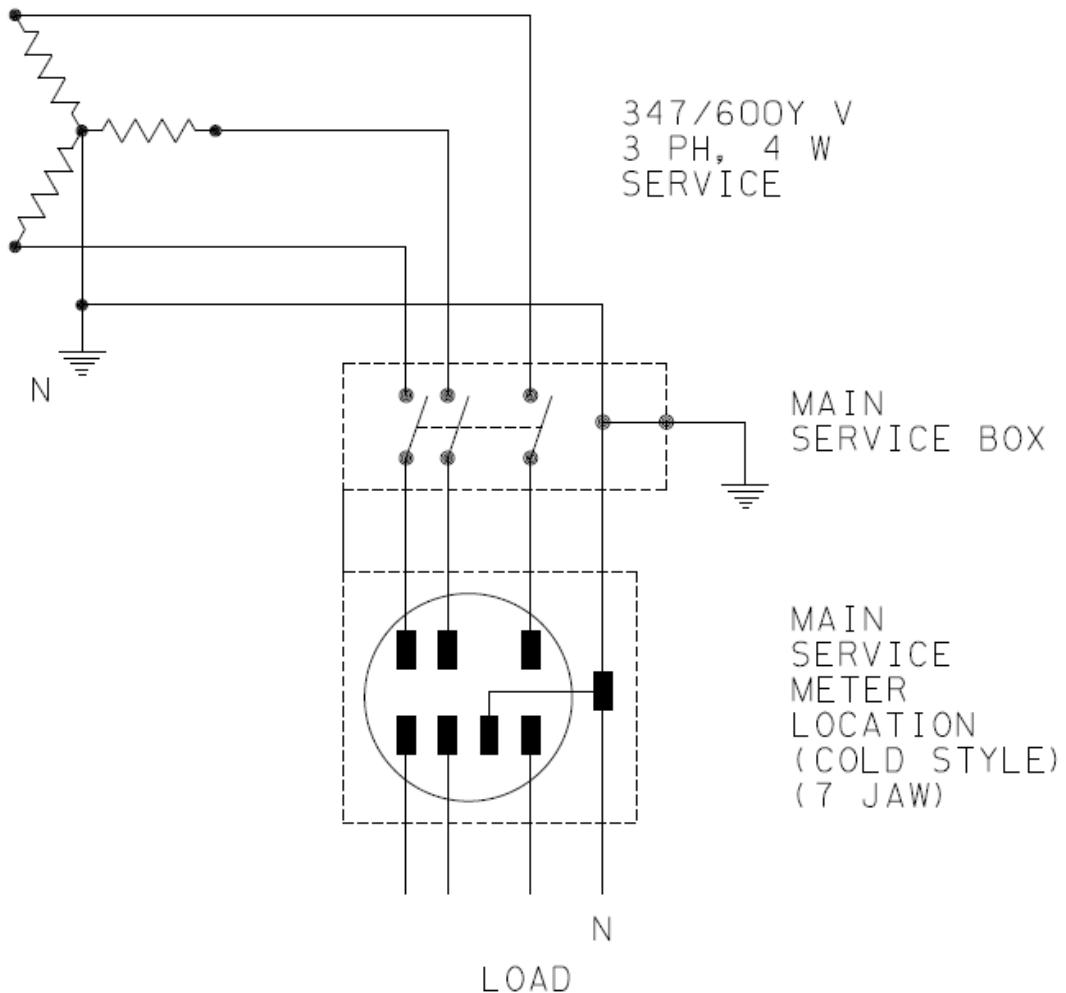
#### 4.7.7 277/480Y V, 3 Phase, 4 Wire, Sub Services



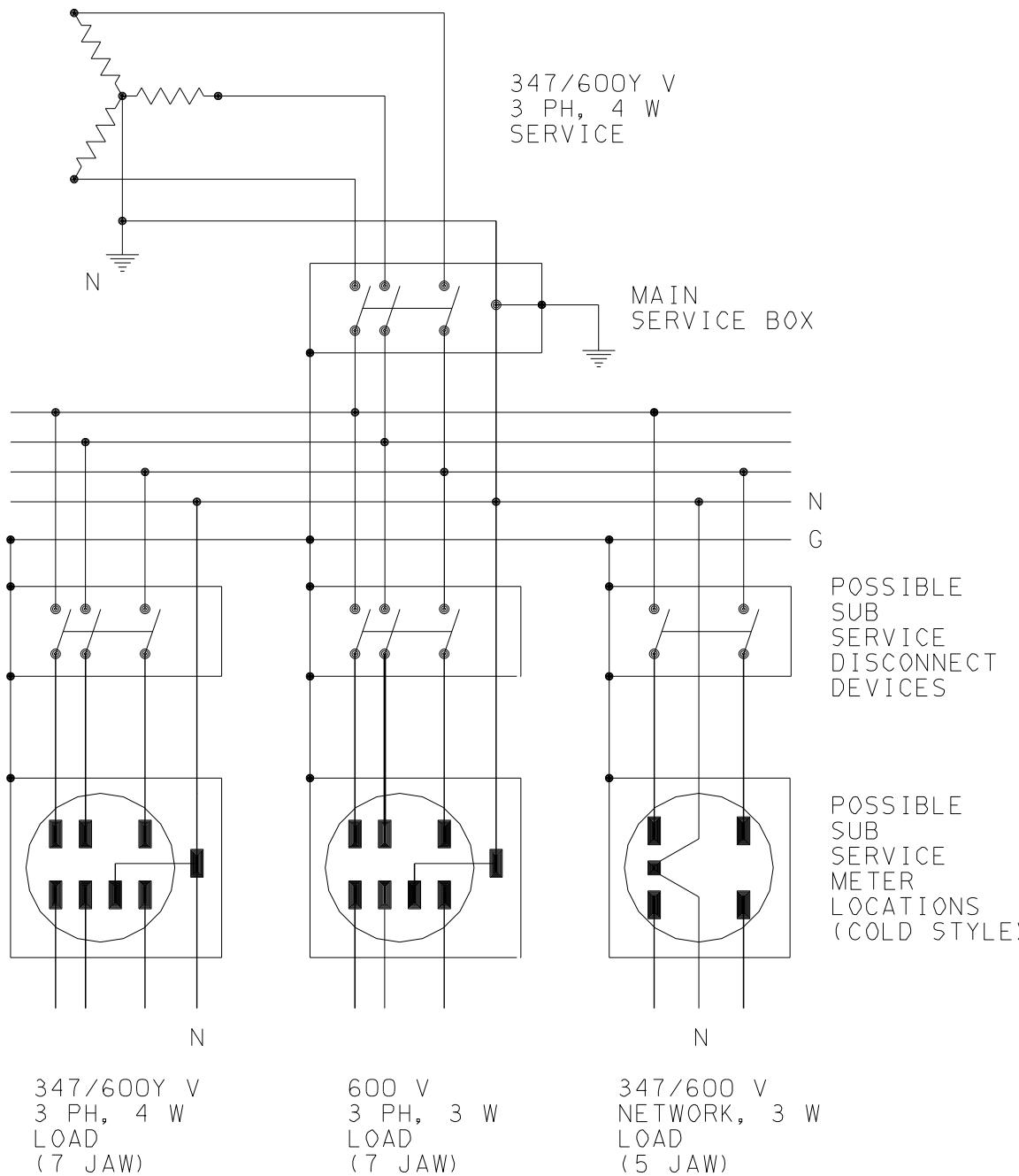
#### Notes:

This is not a standard BC Hydro service voltage. However, if the Customer provides the power transformers, BC Hydro will provide the meter.

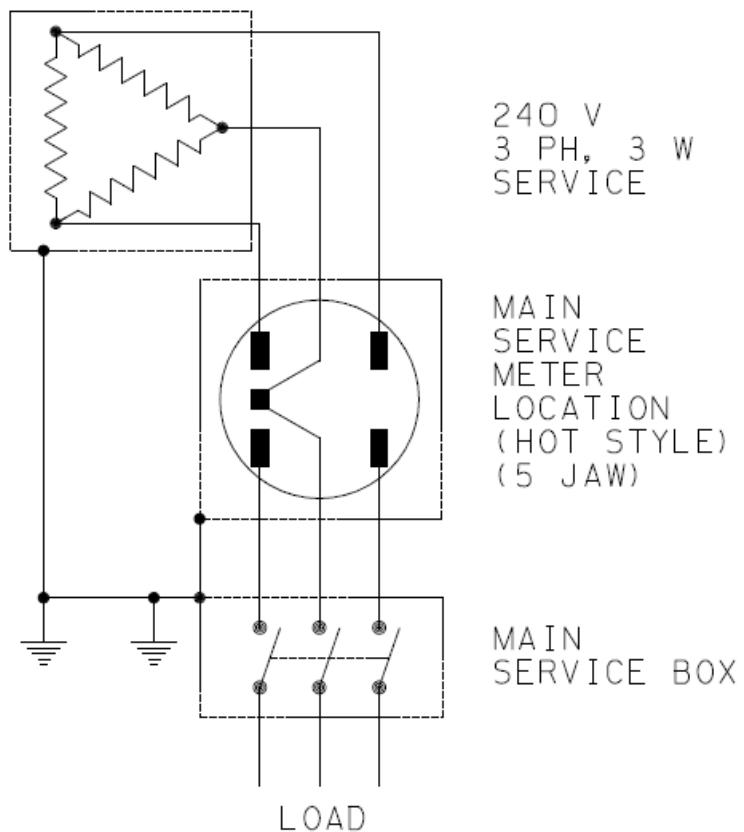
#### 4.7.8 347/600Y V, 3 Phase, 4 Wire, Main Service



#### 4.7.9 347/600Y V, 3 Phase, 4 Wire, Sub Services



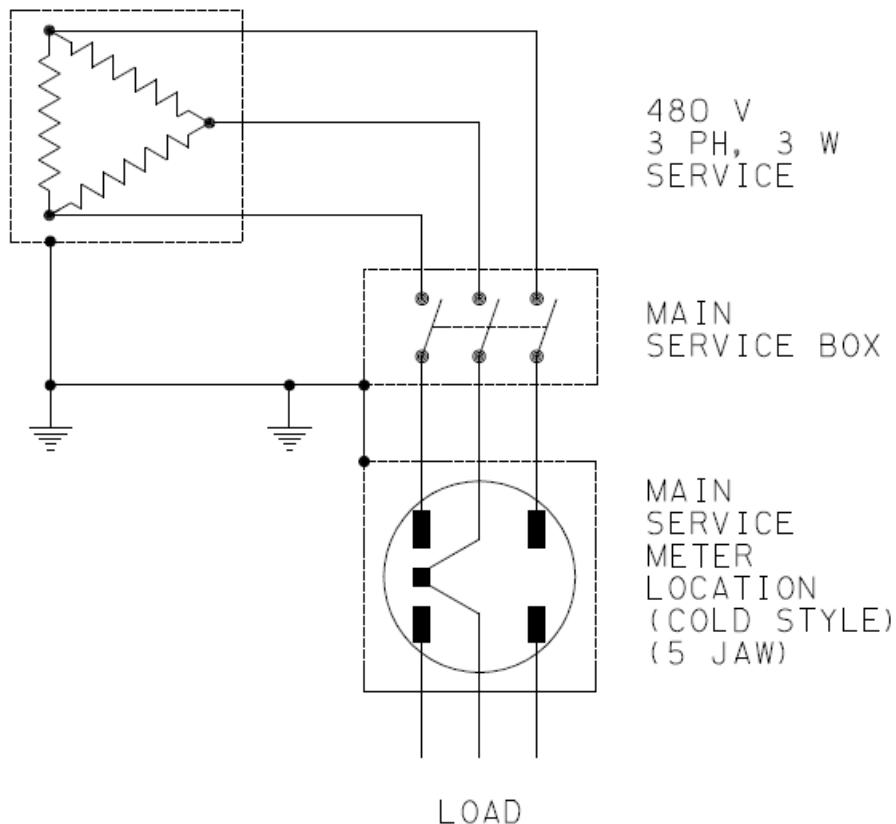
#### 4.7.10 240 V, 3 Phase, 3 Wire Delta, Main Service



Notes:

1. This is not a standard BC Hydro service voltage. However, if the Customer provides the power transformers, BC Hydro will provide the meter.
2. Since there is no neutral (grounded service conductor), alternative methods shall be used to insure that the meter socket is bonded to ground. See section 10-604, 10-606 and 10-624 of the Canadian Electrical Code.
3. The above hot style configuration is applicable if the service fault current is 10,000 A or less. **If the service fault current is greater than 10,000 A, the meter shall be on the load side of the main service box (cold style).**

#### 4.7.11 480 V, 3 Phase, 3 Wire Delta, Main Service



Notes:

480 V, 3 Phase, 3 Wire Delta is not a standard BC Hydro service voltage. However, if the Customer provides the power transformers, BC Hydro will provide a 480 V, 3 Phase, 3 Wire Delta Instrument Transformer Metering. See section 5.2.6.

#### 4.7.12 600 V, 3 Phase, 3 Wire Delta, Main Service

600 V, 3 Phase, 3 Wire Delta is not a standard BC Hydro service voltage and BC Hydro does not provide Self-Contained 600 V, 3 Phase, 3 Wire Delta meters for new services. However, if the Customer provides the power transformers, BC Hydro will supply 600 V, 3 Phase, 3 Wire Delta Instrument Transformer Metering. See section 5.2.6.

## 5. Instrument Transformer Metering

Instrument Transformer Metering is required for:

- All loads over 200 A; and
- 600 V, 3 Phase, 3 Wire, Delta services 200 A or less,
- 480 V, 3 Phase, 3 Wire, Delta services 200 A or less,
- Fire pump services >67h.p. (50 kW) – use ‘donut’ or ‘window’ type CTs only  
(See drawings 6.14 and 6.15)

### 5.1 General

- a) Metered and unmetered conductors shall not be installed in the same raceway, pull box or distribution gutter box.
- b) The unmetered service conductor after main switch shall be continuous and without access fittings or junction boxes up to the point of metering. This precludes distribution gutter box as depicted in section 6.7.
- c) Customer devices shall not be connected to BC Hydro VT and CT secondary winding circuits and installed in designated BC Hydro compartment.
- d) Power quality and load management devices including power factor correction capacitors, surge protective devices, etc. shall not be installed on the line side of BC Hydro billing meters.
- e) The switchgear panel shall not have spare breakers except designated for future metering of an area under construction and to be completed within 6 – 12 months.

*| For any spare breaker not meeting above, it shall be removed and covered by manufacturer supplied metal blanking plate.*

#### 5.1.1 1 Phase

##### 5.1.1.1 Residential 1 Phase Services – Over 200A

Detached single family residential 1 phase services, over 200 A, shall only be metered in an outdoor location using the following options:

- 120/240V 1 phase 400A meter socket assembly with an integral CT in accordance with section 5.5; or
- Instrument transformer enclosure and **Transformer-Type Meter Socket** in accordance with section 5.3 and 5.7; or
- Switchgear instrument transformer compartment and **Transformer-Type**

**Meter Socket** in accordance with section 5.4.

*The above are preferred point of metering arrangements. However, other arrangements such as, located inside power shed or service closet on customer's property may be acceptable subject to approval from BC Hydro.*

***The above installations must be installed on the load side of customer owned service equipment and as such must meet the latest requirements of BC Hydro, the local electrical inspection authority and the BC Electrical Code Regulation. Get approval from BC Hydro and the local inspection authority prior to finalizing plans for these services.***

#### **5.1.1.2 Other 1 Phase Services Over 200A**

1 phase services, other than detached single family residential, shall be metered in an indoor or outdoor location using the following options:

- Instrument transformer enclosure and **Transformer-Type Meter Socket** in accordance with section 5.3 and 5.7; or
- Switchgear instrument transformer compartment and **Transformer-Type Meter Socket** in accordance with section 5.4; or
- 120/240V 1 phase 400A meter socket assembly with an integral CT in accordance with section 5.5.

*Other arrangements such as, located inside a power shed or service closet on customer's property may be acceptable subject to approval from BC Hydro.*

***The above installations must be installed on the load side of customer owned service equipment and as such must meet the latest requirements of BC Hydro, the local electrical inspection authority and the BC Electrical Code Regulation. Get approval from BC Hydro and the local inspection authority prior to finalizing plans for these services.***

*In accordance with section 5.8, where the instrument transformer enclosure/compartment is located indoors, the Transformer-Type Meter Socket or the meter cabinet shall be located indoors in the same electrical/meter room as the instrument transformer enclosure/compartment.*

The instrument transformer enclosure/compartment and Transformer-Type Meter Socket may be located indoors provided:

- They are located in an electrical/meter room with a vertically hinged, lockable door leading directly to the exterior of the building (roll-up or overhead garage doors are not acceptable as access doors);

- The accessibility arrangements for the exterior hinged door are agreed upon by BC Hydro prior to approval.

## 5.1.2 3 Phase

### 5.1.2.1 Residential 3 Phase Services Over 200A

Detached single family residential 3 phase services shall be metered in an indoor or outdoor location using the following options:

- Instrument transformer enclosure and **Transformer-Type Meter Socket** in accordance with section 5.3.1; or
- Switchgear instrument transformer compartment and meter **Transformer-Type Meter Socket** in accordance with section 5.4;

*Indoor detached single family residential metering is not preferred, however if agreed to be inside an electrical/meter room, direct access shall be arranged with BC Hydro prior to approving proposed location. Other arrangements such as, located inside a power shed or service closet on customer's property may be acceptable subject to approval from BC Hydro.*

***The above installations must be installed on the load side of customer owned service equipment and as such must meet the latest requirements of BC Hydro, the local electrical inspection authority and the BC Electrical Code Regulation. Get approval from BC Hydro and the local inspection authority prior to finalizing plans for these services.***

The instrument transformer enclosure/compartment and Transformer-Type Meter Socket may be located indoors provided:

- They are located in an electrical/meter room with a vertically hinged, lockable door leading directly to the exterior of the building (roll-up or overhead garage doors are not acceptable as access doors);
- The accessibility arrangements for the exterior hinged door are agreed upon by BC Hydro prior to approval.

*In accordance with section 5.8, where the instrument transformer enclosure/compartment is located indoors, the Transformer-Type Meter Socket shall be located indoors in the same electrical/meter room and within 3m of the instrument transformer enclosure/compartment.*

### 5.1.2.2 Other 3 Phase Services Over 200A

3 phase services, other than detached single family residential, shall be metered in an indoor or outdoor location using the following options:

- Instrument transformer enclosure and **Transformer-Type Meter Socket** in accordance with section 5.3 and 5.7; or
- Switchgear instrument transformer compartment and **Transformer-Type Meter Socket** in accordance with section 5.4; or

*Other arrangements such as, located inside a power shed or service closet on customer's property may be acceptable subject to approval from BC Hydro.*

***The above installations must be installed on the load side of customer owned service equipment and as such must meet the latest requirements of BC Hydro, the local electrical inspection authority and the BC Electrical Code Regulation. Get approval from BC Hydro and the local inspection authority prior to finalizing plans for these services.***

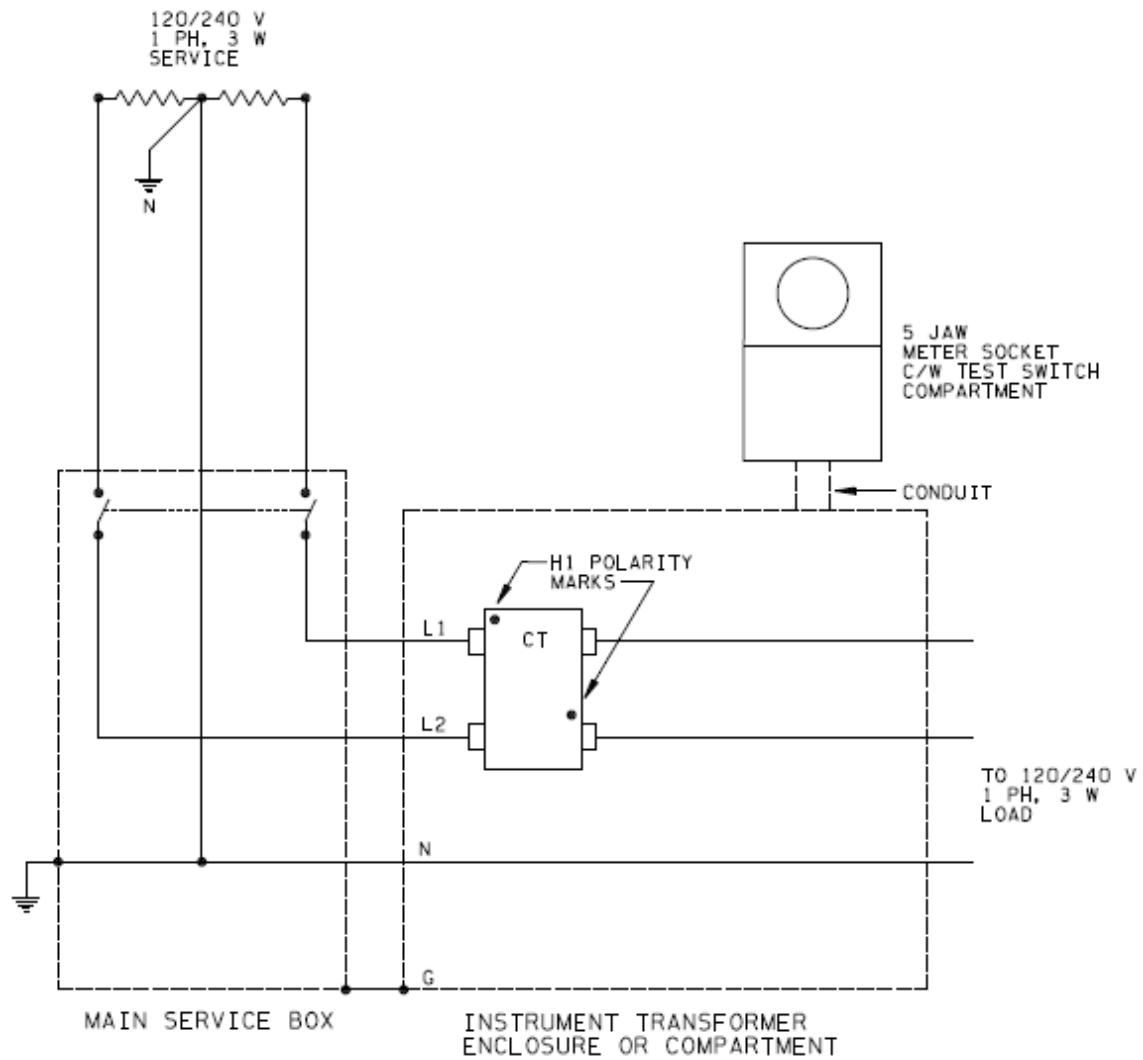
The instrument transformer enclosure/compartment and Transformer-Type Meter Socket may be located indoors provided:

- They are located in an electrical/meter room with a vertically hinged, lockable door leading directly to the exterior of the building (roll-up or overhead garage doors are not acceptable as access doors);
- The accessibility arrangements for the exterior hinged door are agreed upon by BC Hydro prior to approval.

## 5.2 Schematic Drawings

Instrument Transformer Metering shall be installed in accordance with the schematic drawings in this section. The drawings illustrate a "main service box". For sub service applications, substitute a "sub service disconnect device" for the "main service box" and remove the neutral ground at the "sub service disconnect device".

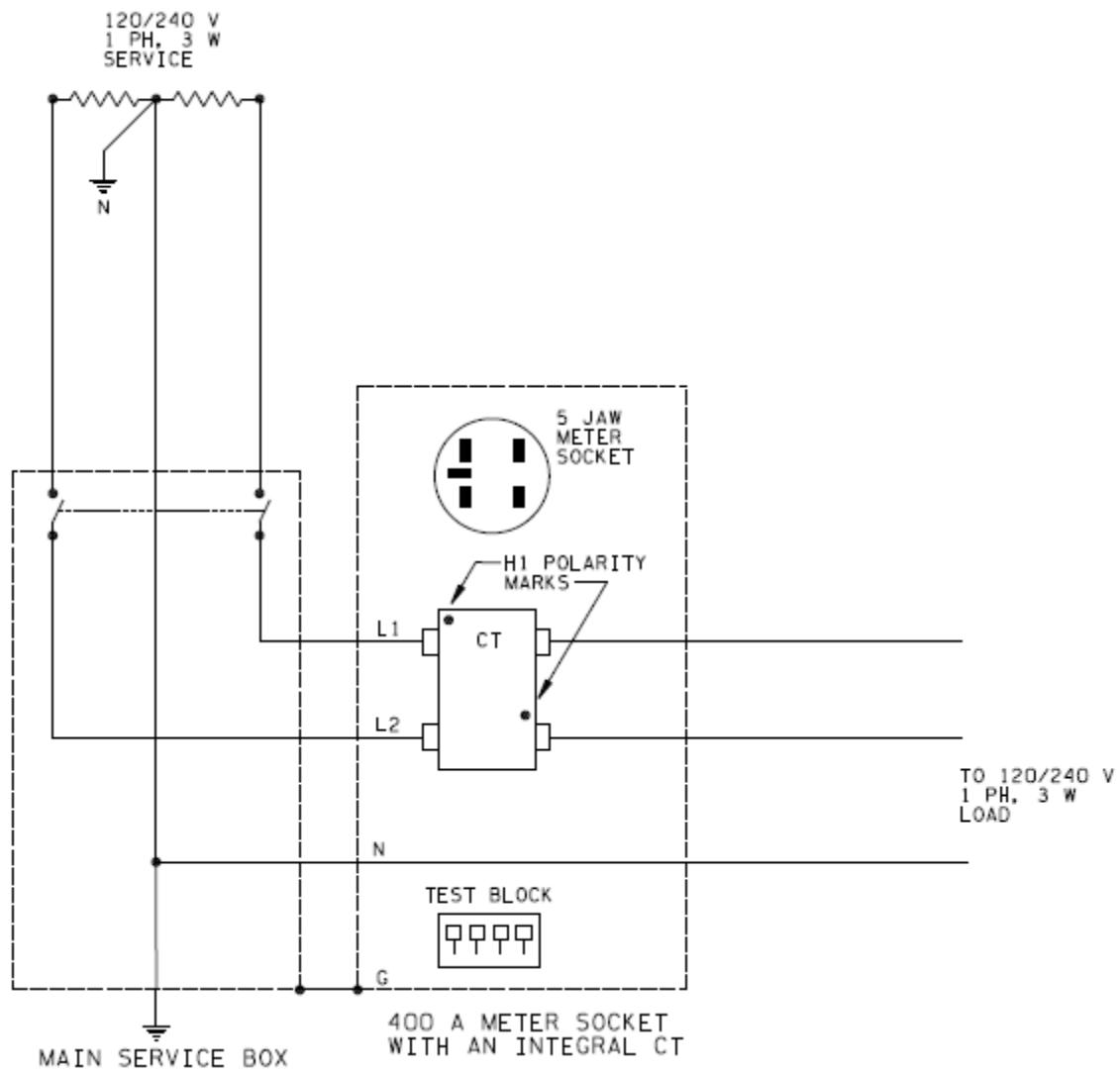
### 5.2.1 120/240 V, 1 Phase, 3 Wire Service – Instrument Transformer Enclosure or Compartment



#### Notes:

1. See section 5.3.1.1 and 5.3.2.1.
2. Approved sockets, CTS405PW-BC or CT105-L.

## 5.2.2 120/240 V, 1 Phase, 3 Wire Service – 400 A Meter Socket Assembly with an Integral CT



### Notes:

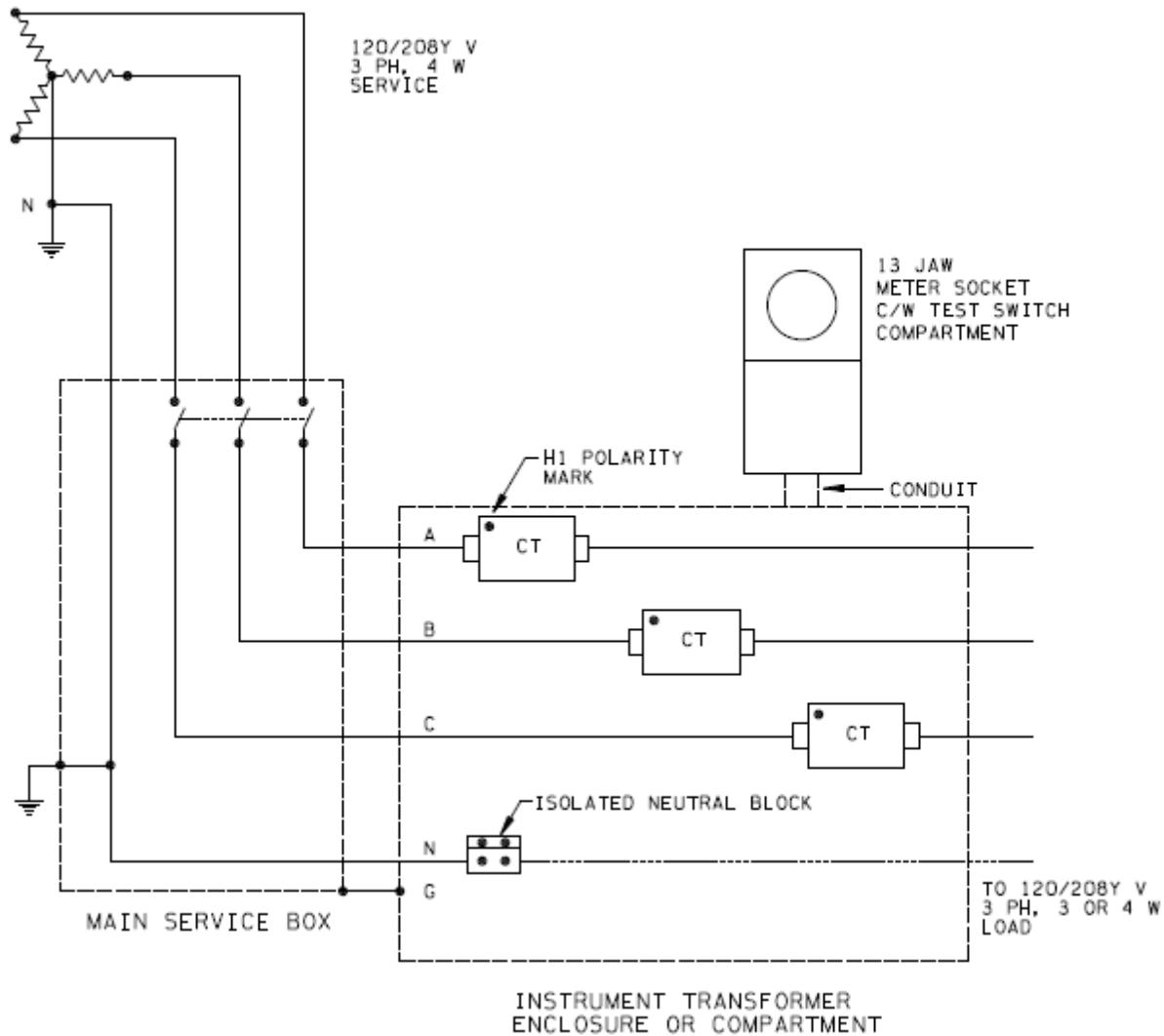
1. See section 5.5 and 5.3.2.1.
2. Approved sockets, CT4-BC-INK or JS4B-STW and JS4B-4STW

New approved meter socket assembly with integral CT c/w Circuit Breaker are;

- Hydel CT4-WS0H-BC
- Hydel CT4-WS-BC

*The above shall be per BC Hydro Distribution Standards Equipment Advisory dated January 30, 2015. Inquire from Local BCH design regarding this advisory.*

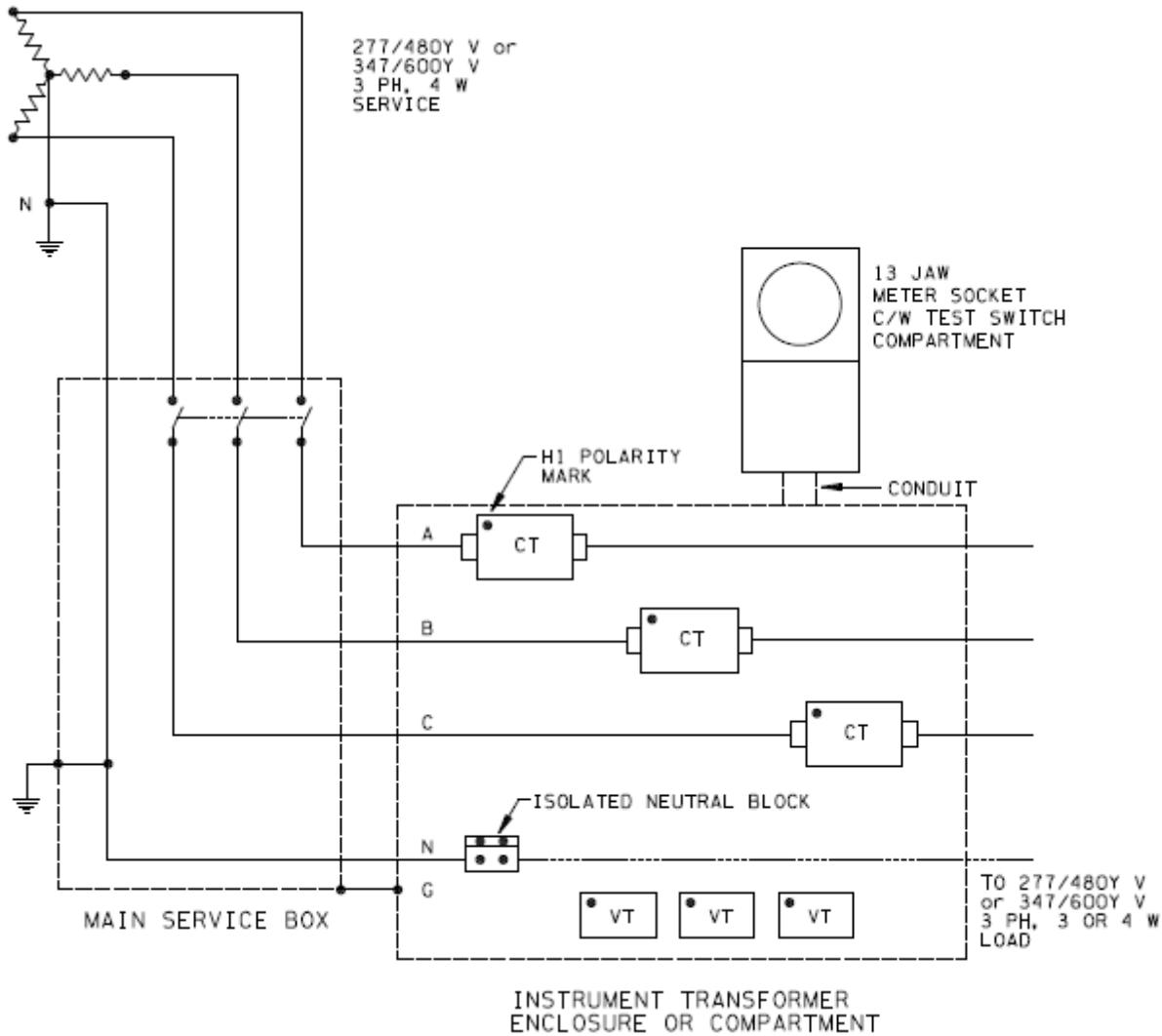
### 5.2.3 120/208Y V, 3 Phase, 4 Wire Service



#### Notes:

1. See section 5.3.1.2, 5.3.2.2, 5.4.1.2, or 5.4.2.2.
2. Approved sockets, CTS130PW-BC or CT113-L.

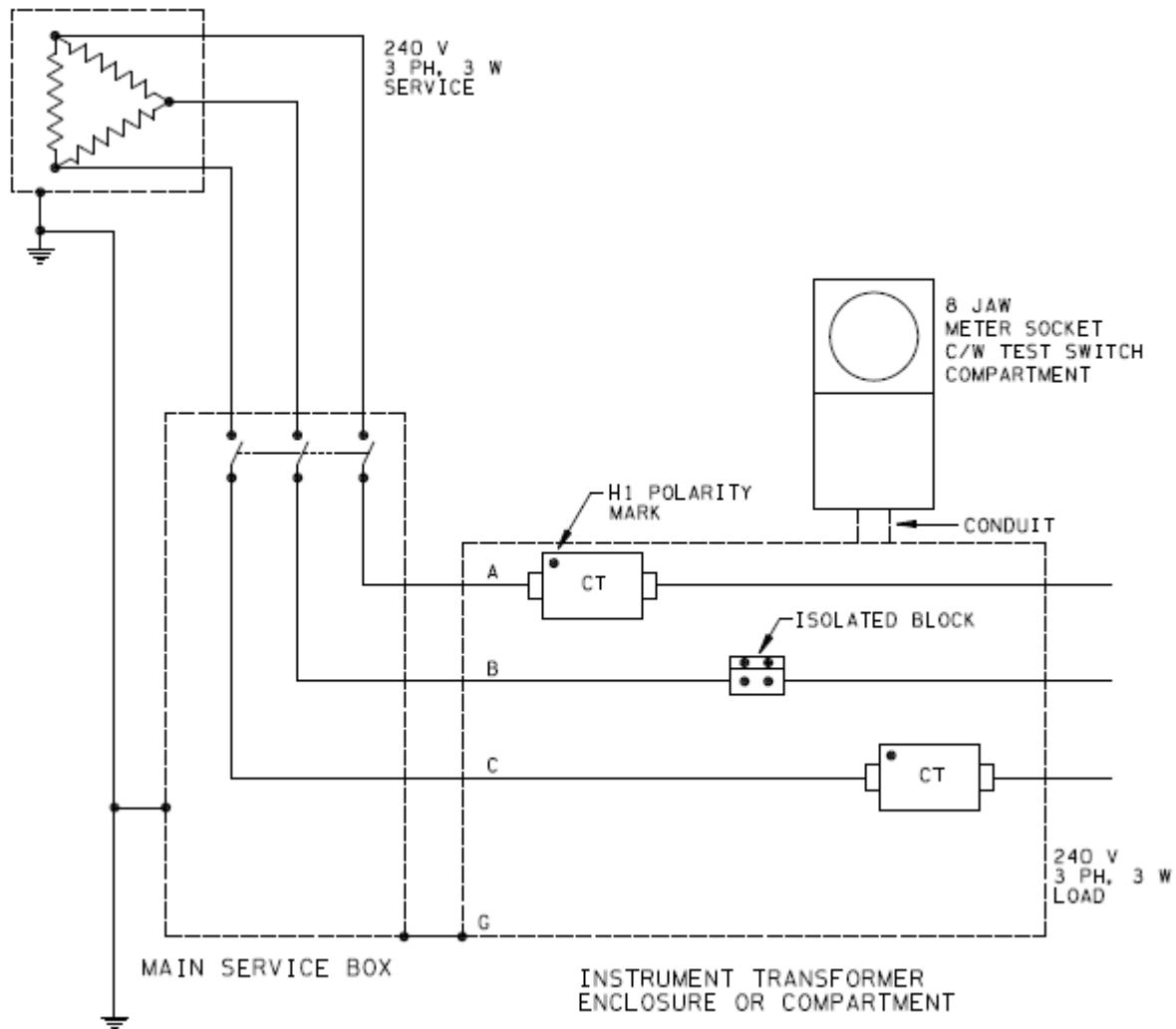
## 5.2.4 277/480Y V or 347/600Y V, 3 Phase, 4 Wire Service



### Notes:

1. See section [5.3.1.2](#), [5.3.2.2](#), [5.4.1.2](#), or [5.4.2.2](#).
2. Approved sockets, CTS130PW-BC or CT113-L.
3. BC Hydro will supply the VTs, CTs, and test switch for either a 277/480Y V or a 347/600Y V 3 phase, 4 wire service. However, BC Hydro does not supply the power transformer for a 277/480Y V, 3 phase, 4 wire service.

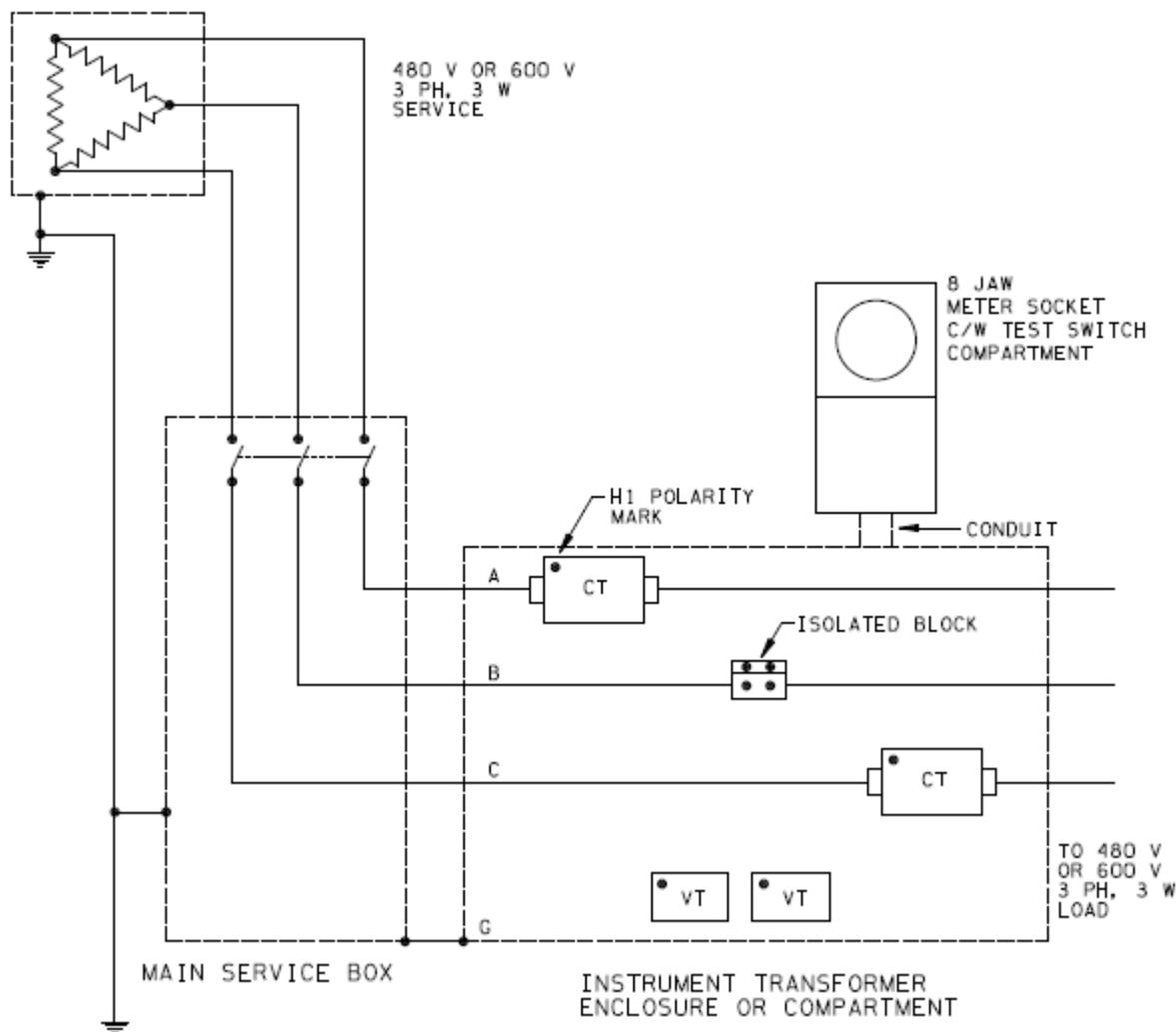
## 5.2.5 240 V, 3 Phase, 3 Wire Delta Service



### Notes:

1. See section [5.3.2.3](#), [5.3.2.4](#), [5.4.2.3](#), or [5.4.2.4](#).
2. Approved sockets, CTS800PW-BC or CT108-L.
3. BC Hydro does not supply the power transformers for this service. However, if the Customer provides the power transformers, BC Hydro will supply the CTs and meter.

## 5.2.6 480 V or 600 V, 3 Phase, 3 Wire Delta Service



### Notes:

1. See section [5.3.2.3](#), [5.3.2.4](#), [5.4.2.3](#), or [5.4.2.4](#).
2. Approved sockets, CTS800PW-BC or CT108-L.
3. BC Hydro does not supply the power transformers for either of these services. However, if the Customer provides the power transformers, BC Hydro will supply the VTs, CTs and meter.

**The above drawing applies to 200A and less services as well. Self-Contained metering is not provided regardless of size of service.**

## 5.3 Instrument Transformer Enclosure

### 5.3.1 Responsibility

#### 5.3.1.1 1 Phase

a) The **customer** shall:

- Supply an instrument transformer enclosure
- Instrument transformer enclosure shall be installed in horizontal position in accordance with section 5.1.1.1, 5.1.1.2, and 6.9; and
- Supply and install a Hydel model CTS405PW-BC or a Microelectric model CT105-L, 5 jaw Transformer-Type Meter Socket in accordance with section 5.7.1; and
- Supply and install a conduit between the instrument transformer enclosure and the meter socket in accordance with section 5.8; and
- Supply and install communication conduit and termination boxes as required in section 3.2; and
- Install the CT(s) in accordance with section 5.6; and
- Make the CT primary connections in accordance with section 5.6

b) The **BC Hydro** will:

- Supply the CT(s); and BC Hydro standard mechanical connectors; and
- Supply and install the test block, meter, and metering wiring.

#### 5.3.1.2 3 Phase

a) The **customer** shall:

- Supply an instrument transformer enclosure and an isolated neutral block
- Instrument transformer enclosure shall be installed in horizontal position in accordance with section 5.1.2.1, 5.1.2.2, and 6.10.
- Supply and install a Hydel model CTS800PW-BC (8 jaw), CTS130PW-BC (13 jaw) or a Microelectric model CT108-L (8 jaw), CT113-L (13 jaw), Transformer-Type Meter Socket in accordance with section 5.7.1; and
- Supply and install a conduit between the instrument transformer enclosure and the meter socket in accordance with section 5.8; and
- Supply and install communication conduit and termination boxes as required in section 3.2 and 6.17; and
- Install the CTs and VTs in accordance with section 5.6; and
- Make the CT primary connections in accordance with section 5.6

b) The **BC Hydro** will:

- Supply the CTs; and BC Hydro standard mechanical connectors; and
- Where the phase-to-phase voltage is over 300 V:
  - Supply the VTs; and
  - Make the VT primary connections; and
  - Supply and install the test switch, meter, and metering wiring.

### 5.3.2 Equipment

a) The instrument transformer enclosure shall:

- Not be used as a splitter; and
- Shall be installed in horizontal position in accordance with section 6.9 and 6.10 with line entering and load exiting from the opposite ends. Where the enclosure has to be installed in vertical position due to space constraint in an existing installation, written approval shall be obtained from BC Hydro prior to installation.
- Not contain devices or connections other than the BC Hydro metering equipment; and
- Be on the load side of the main service box or sub service disconnect device; and
- Be adjacent to the main service box or sub service disconnect device; and
- CTs and VTs are to be arranged and installed such that most efficient use of space inside the enclosure is accomplished; and
- Where located indoors, be in the same room as the main service box or sub service disconnect device; and
- Where located outdoors, be weatherproof, padlockable, adjacent to the meter socket, and at least 900 mm from finished grade; and
- Be as close as practicable to the meter socket/cabinet (*See section 5.8 for the maximum separation distance*); and
- Where located indoors, be in the same room as the meter socket/cabinet; and
- For 1 phase installations, be in accordance with the dimensional and other requirements of section 6.9; and
- For 3 phase installations, be in accordance with the dimensional and other requirements of section 6.10; and
- Have flanged sides or hinged cover with provision for installation of BC Hydro wire seals; and
- Be permanently labelled as “BC Hydro Metering”; and
- Have provision for terminating a bonding conductor, within the enclosure, with either:
  - A 10-32 bonding screw and washer; or
  - A mechanical connector suitable for a No.12 to No. 8 AWG conductor.

*The location of an instrument transformer enclosure for detached single family*

*residential services is restricted. See section 5.1.*

- b) The main service box or sub service disconnect device shall have provision for being locked open with 8 mm (5/16") shank padlock.
- c) For each point-of-metering, the same unique identifier shall be permanently and legibly marked on each of the following:
  - Main service box or sub service disconnect; and
  - Instrument transformer enclosure; and
  - Meter socket/cabinet.

*In accordance with WorkSafe BC regulations, it is essential that each instrument transformer enclosure point-of-isolation and meter socket/cabinet is explicitly and unambiguously identified to insure that it can be safely disconnected and locked out.*

- d) Where there is a potential for back energization from the load side of the instrument transformer enclosure:
  - Written approval shall be obtained from BC Hydro; and
  - A CSA approved lockable disconnect device supplied by the switchgear manufacturer shall be provided on the load side of the instrument transformer enclosure; and
  - The load side disconnect device shall meet the same requirements as the line side main service box or the line side sub service disconnect device; and
  - A warning notice shall be installed in a conspicuous place near the instrument transformer enclosure; and
  - A permanent, legible single-line diagram shall be installed in a conspicuous place near the instrument transformer enclosure.

*Examples of the potential for back energization include:*

- *Where, by special permission from BC Hydro, there are multiple services and/or points of metering and there is the potential for switching loads between them;*
- *Where, by special permission from BC Hydro, the Customer has power generation that may be synchronized and/or closed transition momentarily connected to BC Hydro.*

*However, where the Customer has generation connected via a CSA approved transfer switch, no potential for back energization is deemed to exist and only a line side disconnect device is required.*

### **5.3.2.1 120/240 V, 1 Phase, 3 Wire**

- a) For 120/240 V, 1 phase, 3 wire installations, the neutral is not part of the metering circuit.
- b) Where a single 3 wire bar type CT is supplied, it shall be installed in accordance with section 6.11. Where two 2 wire bar type CTs are supplied, they shall be installed in accordance with section 6.12.

*See also the table in section 5.6.*

### **5.3.2.2 3 Phase, 4 Wire Supply – 3 Phase 4 Wire Load**

- a) Where a 3 phase, 4 wire supply serves a 3 phase, 4 wire load, all neutral conductor(s) shall be routed through (i.e. in and out) the instrument transformer enclosure. A neutral tap is not acceptable.
- b) An isolated neutral block shall be supplied. Where multiple neutral cables are used, only one of the cables is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three No. 12 AWG conductors. See section 6.13.

### **5.3.2.3 3 Phase, 4 Wire Supply – 3 Phase 3 Wire Load**

- a) Where a 3 phase, 4 wire supply serves a 3 phase, 3 wire load, the neutral shall be extended to the instrument transformer enclosure. The minimum size of the neutral extension shall be No. 2/0 AWG copper.
- b) The neutral extension shall terminate at an isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three No. 12 AWG conductors. See section 6.13.

### **5.3.2.4 3 Phase, 3 Wire Supply and Load**

An isolated block shall be supplied for B phase. Where multiple cables are used, only one of the B phase cables is required to be connected to the isolated block. The isolated block shall have either a 10-32 screw and washer or a mechanical connector suitable for terminating two No. 12 AWG conductors.

## 5.4 Switchgear Instrument Transformer Compartment

### 5.4.1 Responsibility

#### 5.4.1.1 1 Phase

a) The **customer** shall:

- Supply and install an instrument transformer enclosure in accordance with section 5.1.1.1 and 5.1.1.2; and
- Supply and install a Hydel model CTS405PW-BC or a Microlectric model CT105-L, 5 jaw Transformer-Type Meter Socket in accordance with section 5.7.1; and
- Supply and install a conduit between the instrument transformer enclosure and the Transformer-Type Meter Socket in accordance with section 5.8; and
- Install the CT(s) in accordance with section 5.6; and
- Make the CT primary connections in accordance with section 5.6

b) The **BC Hydro** will:

- Supply the CTs; and
- Supply and install the test block, meter, and metering wiring.

#### 5.4.1.2 3 Phase

a) The **customer** shall:

- Supply and install an instrument transformer enclosure in accordance with section 5.1.2.1 and 5.1.2.2; and
- Supply and install a Hydel model CTS800PW-BC (8 jaw), CTS130PW-BC (13 jaw) or a Microlectric model CT108-L (8 jaw), CT113-L (13 jaw) Transformer-Type Meter Socket in accordance with section 5.7.1; and
- Supply and install a conduit between the instrument transformer enclosure and the Transformer-Type Meter Socket in accordance with section 5.8; and
- Install the CTs in accordance with section 5.6; and
- Make the CT primary connections in accordance with section 5.6

b) **BC Hydro** will:

- Supply the CTs; and
- Where the phase-to-phase voltage is over 300 V:
  - Supply the VTs; and
  - Make the VT primary connections; and
- Supply and install the test switch, meter, and metering wiring.

#### 5.4.2 Equipment

a) The switchgear instrument transformer compartment shall:

- Be barriered off from other compartments; and
- Not be used as a splitter; and
- Not contain devices or connections other than the BC Hydro metering equipment; and
- Be on the load side of the main service box or sub service disconnect device; and
- Be as close as practicable to the main service box or sub service disconnect device; and
- Where located indoors, be in the same room as the main service box or sub service disconnect device; and
- Be as close as practicable to the meter socket/cabinet (*See section 5.8 for the maximum separation distance*); and
- Where located indoors, be in the same room as the meter socket/cabinet; and
- Be of sufficient size to provide acceptable access for the installation, wiring, and removal of the instrument transformers; and
- | • Minimum height of VT shall be 250mm; and
- | • Provide a minimum of 155 mm clearance between the top of the VTs and any barrier or obstruction, and 50 mm from any side of VT to any part of the enclosure or live conductors; and
- | • Not have a depth greater than 610 mm; and
- | • Not required access through other compartments; and
- | • Have a hinged cover with provision for the installation of a BC Hydro wire seal; and
- | • Be permanently labelled as “BC Hydro Metering”; and
- | • Have a provision for terminating a bonding conductor, within the compartment, with either:
  - A 10-32 bonding screw and washer; or
  - A mechanical connector suitable for a No. 12 to No. 18 AWG conductor

*Where the BC Hydro service is at a primary voltage level (4kV – 35kV), the main service box or sub service disconnect device may be on the primary of the Customer power transformer.*

*The overall dimension of the instrument transformer compartment is not specified.*

*The use and location of an instrument transformer compartment for detached single family residential services is restricted, See section 5.1.*

- b) The CTs shall be 600 to 1800 mm above the floor level.

*This only applies to the mounting height of the CTs within the switchgear instrument transformer compartment. The bottom and top of the switchgear instrument transformer compartment may be lower or higher.*

- c) The main service box or sub service disconnect device shall have provision for being locked open with an 8 mm (5/16") shank padlock.
- d) For each point-of-metering, the same unique identifier shall be permanently and legibly marked on each of the following:
  - Main service box or sub service disconnect; and
  - Instrument transformer compartment; and
  - Meter socket.

*In accordance with WorkSafe BC regulations, it is essential that each instrument transformer compartment point-of-isolation and meter socket/cabinet is explicitly and unambiguously identified to insure that it can be safely disconnected and locked out.*

- e) Where there is a potential for back energization from the load side of the instrument transformer compartment:
  - Written approval shall be obtained from BC Hydro; and
  - A CSA approved lockable disconnect device supplied by the switchgear manufacturer shall be provided on the load side of the instrument transformer compartment; and
  - The load side disconnect device shall meet the same requirements as the line side main service box or the line side sub service disconnect device; and
  - A warning label shall be installed in a conspicuous place near the instrument transformer compartment; and
  - A permanent, legible single-line diagram shall be installed in a conspicuous place near the instrument transformer compartment; and

Examples of the potential for back energization include:

- *where, by special permission from BC Hydro, there are multiple services and/or points of metering and there is the potential for switching loads between them;*
- *Where, by special permission from BC Hydro, the Customer has power generation that may be synchronized and/or closed transition momentarily connected to BC Hydro.*

However, where the Customer has generation connected via a CSA approved transfer switch, no potential for back energization is deemed to exist and only a line side disconnect device is required.

#### **5.4.2.1 120/240 V, 1 Phase, 3 Wire**

- a) For 120/240 V, 1 phase, 3 wire installations, the neutral is not part of the metering circuit.
- b) Where a single 3 wire bar type CT is supplied, it shall be installed in accordance with section 6.11. Where two 2 wire bar type CTs are supplied, they shall be installed in accordance with section 6.12.

See also the table in section 5.6.

#### **5.4.2.2 3 Phase, 4 Wire Supply – 3 Phase 4 Wire Load**

- a) Where a 3 phase, 4 wire supply serves a 3 phase, 4 wire load;
  - The neutral bus shall be routed through (i.e. in and out) the instrument transformer compartment; or
  - A rigid neutral bus tap shall be provided from the neutral bus to the instrument transformer compartment. The rigid neutral bus tap shall not be less than 25 mm x 6 mm (1" x 1/4").
- b) A 10-32 screw and washer shall be supplied at the following points:
  - Line side of the A phase CT; and
  - Line side of the B phase CT; and
  - Line side of the C phase CT; and
  - Neutral bus or neutral tap.

#### **5.4.2.3 3 Phase, 4 Wire Supply – 3 Phase 3 Wire Load**

- a) Where a 3 phase, 4 wire supply serves a 3 phase, 3 wire load, the neutral bus shall be extended to the instrument transformer compartment. The rigid neutral bus extension shall not be less than 25 mm x 6 mm (1" x 1/4").
- b) A 10-32 screw and washer shall be supplied at the following points:
  - Line side of the A phase CT; and
  - Line side of the B phase CT; and
  - Line side of the C phase CT; and
  - Neutral bus extension.

#### **5.4.2.4 3 Phase, 3 Wire Supply and Load**

A 10-32 screw and washer shall be supplied at the following points:

- Line side of the A phase CT; and
- B phase (2 x 10-32 screws); and
- Line side of the C phase CT.

### **5.5 120/240 V, 1 Phase, 400 A Meter Socket Assembly with an Integral CT**

BC Hydro will allow the use of;

- 400A meter socket assembly with integral CT provided there is customer service equipment with the means of disconnect installed on the line side of metering; and
- 400A meter socket assembly with an integral CT c/w main disconnect.

#### **5.5.1 Responsibility**

- a) The **Customer** shall:

- Supply and install a 120/240V, 1 Phase, 5 jaw, outdoor meter socket assembly with an integral CT in a location acceptable to the BC Hydro's Designer and the local electrical inspection authority; or

*Model #s are; Hydel CT4-BC-INK and Microlectric JS4B-STW*

- Supply and install a 120/240V, 1 phase, 5 jaw outdoor rated meter socket assembly with an integral CT come with main min 22kA circuit breaker; and

*Model #s are: Hydel CT4-WSOH-BC and CT4-WS-BC*

- Install the CT and primary connections in accordance with section 5.6.

b) The **BC Hydro** will:

- Supply the CT; and
- Supply and install the meter, test block and metering wiring.

### 5.5.2 Equipment

a) The 400 A meter socket shall be installed outdoors for residential services as permitted on the load side of the service box with the neutral insulated.

- If the 400 A meter socket is wall mounted, it shall be one of the following approved models:

Hydel CT4-BC-INK (5 jaw) c/w lexan barrier; or  
T&B Microlectric JS4B-STW (5 jaw) c/w lexan barrier.

- If the 400 A meter socket is pole mounted, it shall be one of the following approved models complete with the manufacturer supplied pole mounting kit:

Hydel CT4-BC (5 jaw) c/w lexan barrier plus CT4PMK36 pole mounting kit;  
Hydel CT4-WSOH-BC or CT4-WS-BC (5 jaw) plus CT4PMK36 pole mounting kit or  
T&B Microlectric JS4B-STW (5 jaw) c/w lexan barrier plus PMB-JS4 pole mounting kit.

Any unused mounting holes shall be closed to prevent moisture or insect ingress.

*The manufacturer supplied pole mounting kit insures that the 400 A meter socket is securely attached to the pole. Attaching “wall mount” 400 A meter sockets directly to a pole with lag bolts or using a site fabricated bracket is prohibited.*

- b) The 400 A meter socket shall be mounted with the centre of the meter between 1500 mm and 1800 mm above finished grade.
- c) The 400 A meter socket bottom panel shall be secured with screws that require a tool for removal.

*Access to energized conductors, in the bottom panel, shall not rely only on the presence of the BC Hydro seal and/or padlock.*

*Contact BC Hydro local design to get information on Distribution Standards Equipment Advisory for more information.*

## 5.6 Instrument Transformers

- a) At 300 V phase-to-phase and less, current transformers (CTs) are only required. At greater than 300 V phase-to-phase, CTs and voltage transformers (VTs) are required.
- b) 600V and 480V 200A 3 phase 3 wire delta services will be metered using two VTs and two bar type CTs.

*BC Hydro typically supplies the following CTs for permanent installations.*

Location	Supply System	Min Current	Max Current	Qty	Type	Section
Indoor	120/240 V 1 Phase 3 Wire	300 A	600 A	1	3 Wire Bar	<u>6.11</u>
		800 A	1200 A	2	2 Wire Bar	<u>6.12</u>
	3 Phase 3 Wire	300 A	1200 A	2	2 Wire Bar	-
		1000 A	6000 A	2	Window	<u>6.14</u>
	3 Phase 4 Wire	300 A	1200 A	3	2 Wire Bar	<u>6.13</u>
		1000 A	6000 A	3	Window	<u>6.14</u>
Outdoor	120/240 V 1 Phase 3 Wire	300 A	800 A	2	Donut	<u>6.15</u> <u>6.16</u>
	3 Phase 3 Wire	300 A	800 A	2	Donut	<u>6.15</u> <u>6.16</u>
	3 Phase 4 Wire	300 A	800 A	3	Donut	<u>6.15</u> <u>6.16</u>

*Donut or Window CTs may be available for Temporary Construction indoor installations (see drawings 6.14 and 6.15)*

*Normally these Temporary Construction CTs are removed when permanent revenue meters are installed.*

*Window CTs are only allowed in switchgear instrument transformer compartment, with the exception of fire pump service.*

***However, the Customer should check with BC Hydro to determine exactly which CTs will be supplied for their installation.***

When BC Hydro supplies bar-type CTs for instrument transformer enclosures, they typically also supply the primary conductor connectors. However for multi-service line and load conductors where BC Hydro supplied mechanical connectors are not sufficient, a splitter box is required per BC Electrical Code.

*A 3 Wire Bar CT has 4 primary connections. (see section 6.11)*

- c) The CT H1 primary terminal polarity marks shall be on the line side (towards BC Hydro) in accordance with the schematic drawings in section 6.11.
- d) The CT shall be mounted against the rear panel of the instrument transformer enclosure/compartment using the provided CT base holes.

***“Hanging” window style CTs from the conductor, or using the primary terminals to support bar style CTs, is not permitted. Mounting CTs to the side, top or bottom walls of the instrument transformer enclosure/compartment is not permitted.***

- e) The conductors shall be shaped and supported in such a way to minimize the mechanical stress applied to the CTs.
- f) The VT and CT primary winding terminals and secondary winding terminals shall remain accessible and the nameplates shall remain visible. The installation shall facilitate the easy replacement of the VTs and CTs.

*While nameplates must remain visible, terminal accessibility and polarity orientation may position the nameplate upside-down or sideways. This is acceptable.*

### **5.6.1            Metered fire pump service Loads >67h.p. (50kW)**

Services for fire pumps over 67 h.p.(50 kW) shall be metered with transformer type metering using ‘donut’ or window style CTs only. (see sections 6.14 and 6.15)

(Fire pumps rated 66 h.p. (49 kW) or less will be unmetered and billed on a flat rated monthly consumption charge.)

## **5.7            Transformer-Type Meter Socket**

### **5.7.1            Indoor/Outdoor Installations**

- a) The customer supplied Transformer-Type Meter Socket and the sealing ring shall be certified in accordance with CSA Standard C22.2 No. 115, *Meter Mounting Devices* and they shall be approved by BC Hydro.

b) The Transformer-Type Meter Socket shall be installed, in a readily accessible location approved by BC Hydro, in accordance with sections 3 and 5.1.

The sealing ring shall be a screw type in accordance with section 6.2.

*The Transformer-Type Meter Socket shall be as close as practicable to the instrument transformer enclosure/compartment and in the same room as the instrument transformer enclosure/compartment, see section 5.8 for the maximum separation distance. For detached single family residential 1 phase services, section 5.1.1.1, requires that both the instrument transformer enclosure/compartment and the Transformer-Type Meter Socket be located outdoors.*

c) One Transformer-Type Meter Socket is required for each 3 phase instrument transformer point-of-metering.

d) The Transformer-Type Meter Socket tilt shall not exceed 3° from vertical.

e) All Transformer-Type Meter Socket in indoor location shall be mounted, using all four predrilled holes meeting CEC, Part 1, Rule 6-408, on a 19 mm ( $\frac{3}{4}$ ") plywood backing.

All Transformer-Type Meter Sockets in outdoor location shall be wall mounted on metal support channels.

*The plywood or metal support channels shall be securely fastened to the wall. Shooting, or otherwise mounting the meter socket, directly to the wall is not permitted. Plywood backing for outdoor application will not be accepted.*

f) The centre of the meter shall be mounted between 1,500 mm to 1,800 mm above the finished grade.

*A mounting height of 1,650 mm above finished grade is preferred.*

g) Grounding lug(s) to be provided inside the Transformer-Type meter socket.

h) For pole mounted applications:

- The Transformer-Type Meter Socket shall be secured to the pole using the manufacturer's purpose built pole mounting bracket (e.g. Microlectric PMB200) with lag screws; and
- The Transformer-Type Meter Socket shall be located on the side of the pole that is not subject to vehicle damage. If this is not practicable, protection posts shall be installed 600 mm in front of the Transformer-Type Meter Socket similar to those required under section 6.3.

- i) The conduit shall enter the Transformer-Type Meter Socket from the bottom or side where knockouts provided.
- j) The conduit shall not be entered from the back of the Transformer-Type Meter Socket.
- k) Transformer-Type Meter Socket shall not be installed within 1000 mm of gas meters or within 3000 mm of propane meters, tanks, regulators or relief devices.

### 5.7.2 Grounding

- a) In accordance with section 36 of the Canadian Electrical Code, an external ground conductor shall be provided for the Transformer-Type Meter Socket if:
  - The associated instrument transformer compartment is within a unit substation with a high voltage (greater than 750 V) section; or
  - The Transformer-Type Meter Socket is within the same room as high voltage equipment.
- b) Where required, the external Transformer-Type Meter Socket ground conductor shall not be less than No. 2/0 AWG copper and shall be connected to the station ground grid electrode.

*A No. 2/0 AWG copper conductor is required since, due to skin effect, its large surface area provides a low impedance path for high frequency electrical noise.*

### 5.7.3 Optional Meter Compartment

The optional meter compartment shall use the Transformer-Type Meter Socket in accordance with the following:

- a) Be completely separate from the instrument transformer enclosure;
- b) The meter socket is permitted to be installed within the exterior side of switchgear;
- c) The recessed depth is less than the depth of the Transformer-Type Meter Socket, i.e. the cover shall project beyond the finished exterior wall surface; and
- d) Recessing does not interfere with the installation, reading or removal of the meter; and
- e) Recessing does not interfere with the installation or removal of the Transformer-Type Meter Socket cover.
- f) The Transformer-Type Meter Socket may be installed on the exterior of the switchgear provided there are adequate measures taken to protect against damages.
- g) The Customer shall provide a continuous Metal or Rigid PVC conduit, without

access fittings, between the optional meter compartment and the instrument transformer compartment as per section 5.8.

h) The conduit shall enter from the bottom of the meter socket.

*Seek prior approval from BC Hydro designer prior to considering this option.*

## 5.8 Conduit

a) The Customer shall supply and install a conduit between the Transformer-Type meter socket and the instrument transformer enclosure/compartment.

*The Transformer-Type meter socket shall be as close as practicable to the instrument transformer enclosure/compartment and in the same room as the instrument transformer enclosure/compartment.*

*Where the instrument transformer enclosure is located outdoor, conduit shall exit from the bottom of the instrument transformer enclosure to the Transformer- Type meter socket.*

b) The conduit shall be either rigid metal, EMT or rigid PVC.

*ENT (electrical non-metallic tubing) is not permitted.*

c) The conduit shall have not more than the equivalent of three 90° bends.

d) For 1 phase installations, the conduit length shall not exceed 3 m (10') and the minimum trade size shall be 21 (3/4").

e) For 3 phase installations, the conduit length shall not exceed 10 m (33') and the minimum trade size shall be 35 (1 1/4"). Except that, where special written approval is first obtained from BC Hydro, a 41 (1 1/2") conduit with a length of between 10 m (33') and 25 m (82') may be installed.

f) The conduit shall be continuous and without access fittings. Except that, an "(LB, LL, and LR) style" fitting may be installed immediately adjacent to the meter socket providing the fitting's cover:

- Remains clearly visible; and
- Has provision for the installation of a BC Hydro wire seal.

Or as an alternative,

- Elbow 90 with minimum trade size 41 (1 1/2") shall be installed immediately adjacent to the meter socket.

- g) The conduit shall remain visible for its entire length except where it is embedded in a concrete floor or ceiling within the same room.

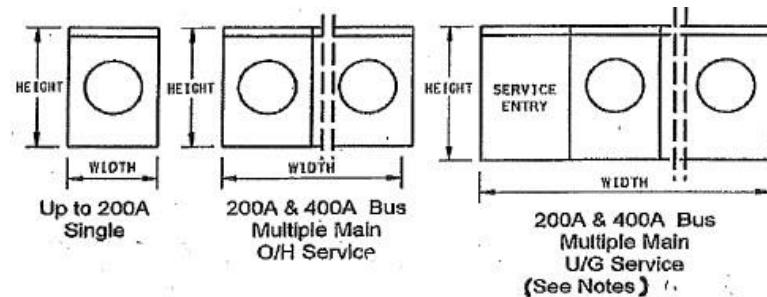
*Conduits shall not be installed through walls or underground.*

- h) For switchgear applications, where it is necessary to route the conduit through other switchgear compartments, Customer shall provide a continuous metal or rigid PVC conduit, without access fittings, within the switchgear. Given this, if it is necessary to route through the service entry (wireway) compartment, the conduit shall enter and exit from either sides all the way towards the back of the compartment in order not to obstruct any cable pulling and/or termination.
- i) The Customer shall leave a pull string in the conduit.

## 6. Reference Drawings

### 6.1 Underground Main Service Meter Sockets

Mandatory for new 200 & 400A multiple underground services.

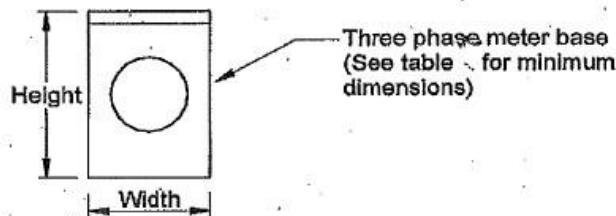


#### MINIMUM REQUIREMENT OF ENCLOSURES FOR METER SOCKETS

Enclosure	Sockets	Minimum Outside Dimensions			K.O. for Duct min.	Minimum Line Connector Range
		Height	Width	Depth		
Up to 200A Single	1	430	240	130	3"	#2 - 3/0 Cu #2 - 250 kcm Al
200A Main Bus	2	380	435	130	3"	#2 - 3/0 Cu #2 - 250 kcm Al
	3	380	650	130		
	4	380	870	130		
400A Main Bus (See Note 1)	2	508	665	140	3"	#1/0 - 500 kcm Cu / Al
	3	508	880	140		
	4	508	1110	140		

#### SIZES OF THREE PHASE METER BASES FOR SERVICES UP TO 200A

Type of Meter Enclosure	Minimum Outside Dimensions (mm)			Knockout Size	Minimum Line Connector Range
	Height (H)	Width (W)	Depth (D)		
Three Phase up to 200 Amps	480	295	135	To Accept 3" Conduit	#2-3/0 Cu #2-250 kcm Al



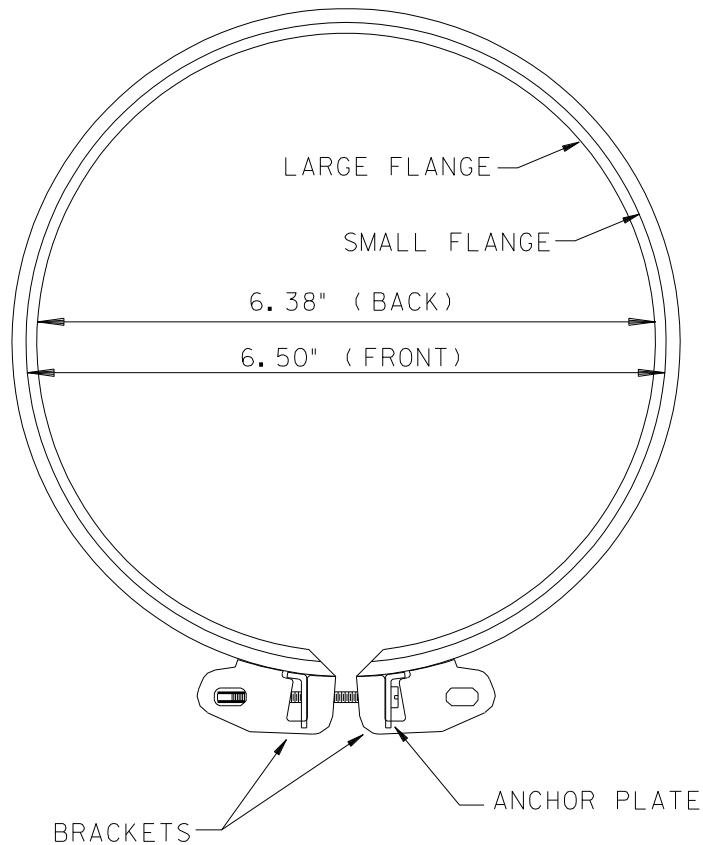
Notes:

For U/G services the following apply:

1. 200A & 400A, 1 phase, multiple main enclosures shall have one extra compartment for service entry supply conductors.
2. See section 3.8.
3. They are not applicable to single overhead, main service meter sockets or to sub service meter sockets.
4. Metered and unmetered conductors shall not be crossed per Distribution Standards.
5. Dimensions are in mm.

## 6.2

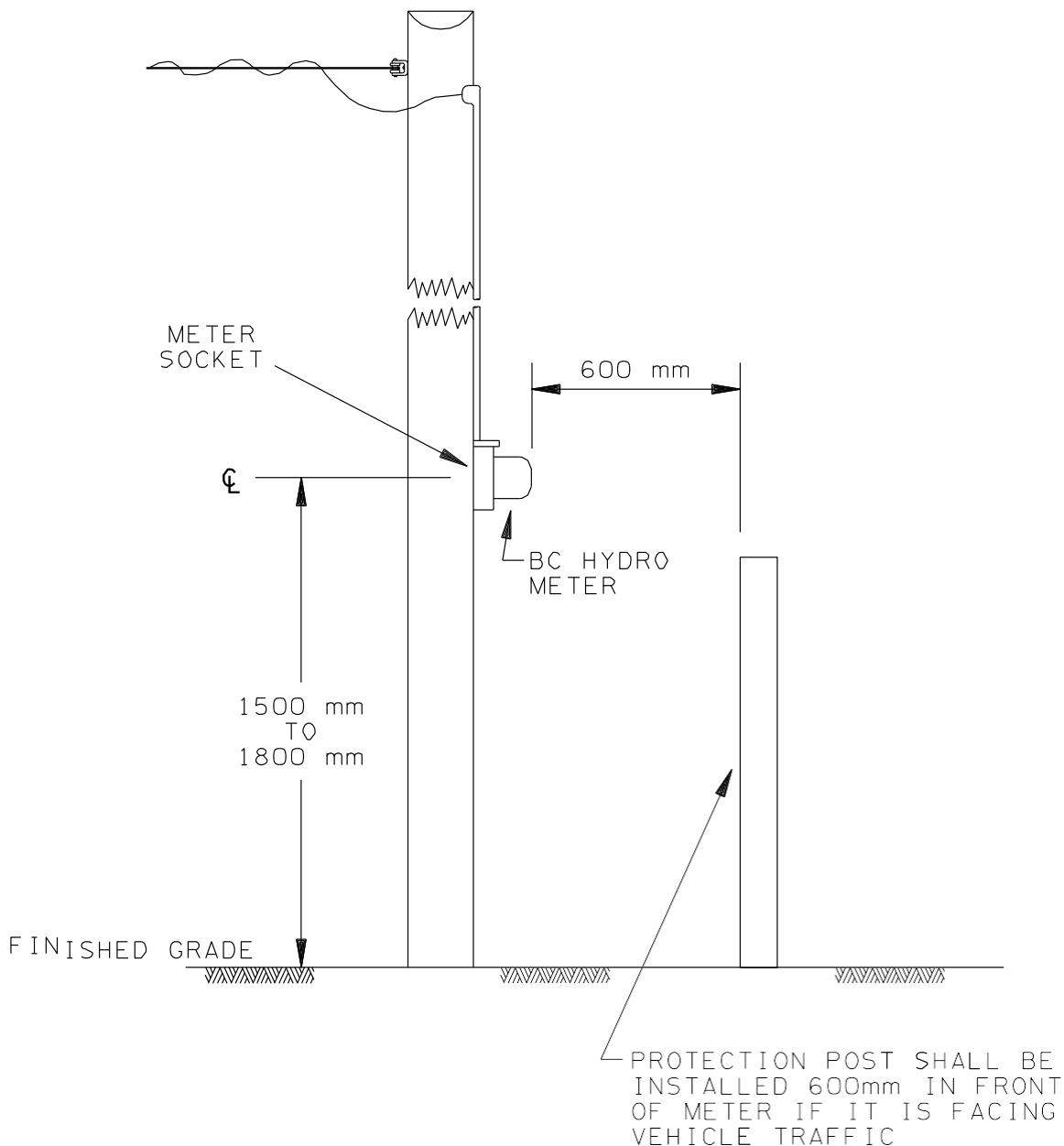
## Sealing Ring



Notes:

See section 4.1.

## 6.3 Individual Pole Mounted Meter Socket

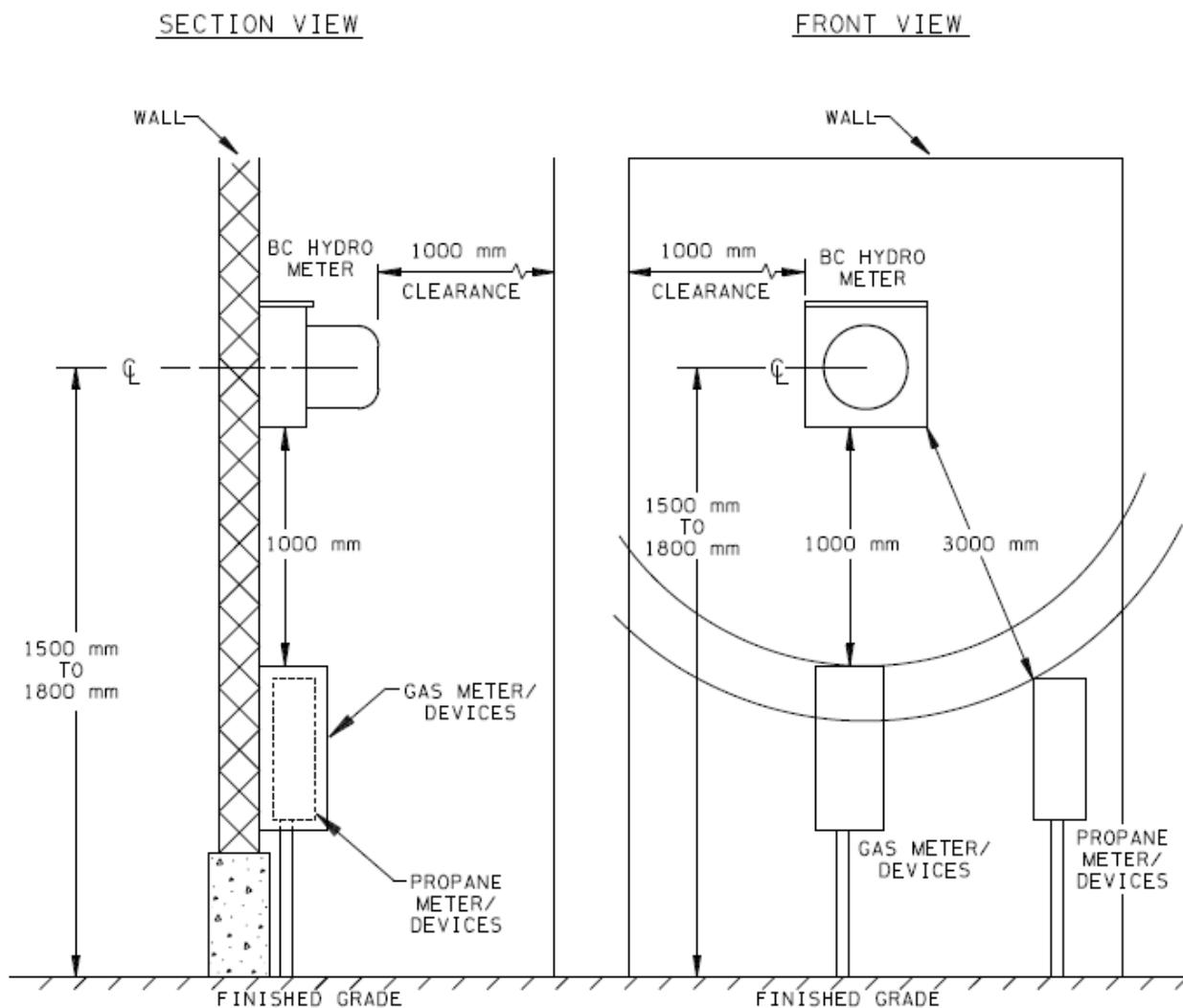


### Notes:

1. See section 4.2.6.
2. Mast shall remain visible throughout its entire length.

## 6.4

### Individual Wall Mounted Meter Socket Near a Gas or Propane Meter

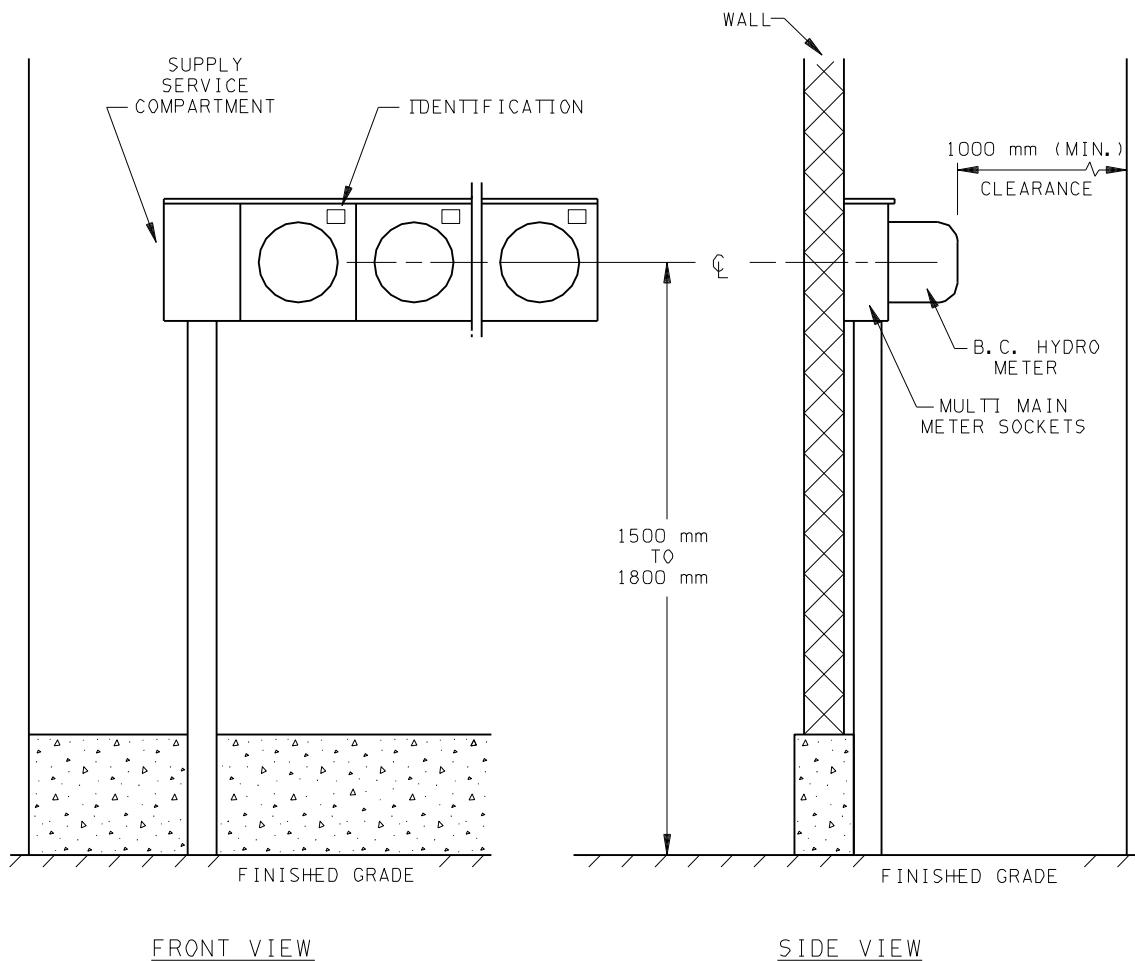


#### Notes:

1. See section 4.2.7.
2. Propane meter/devices includes any propane stationary tank.
3. Not to scale drawings.

## 6.5

## Multiple Main Meter Socket

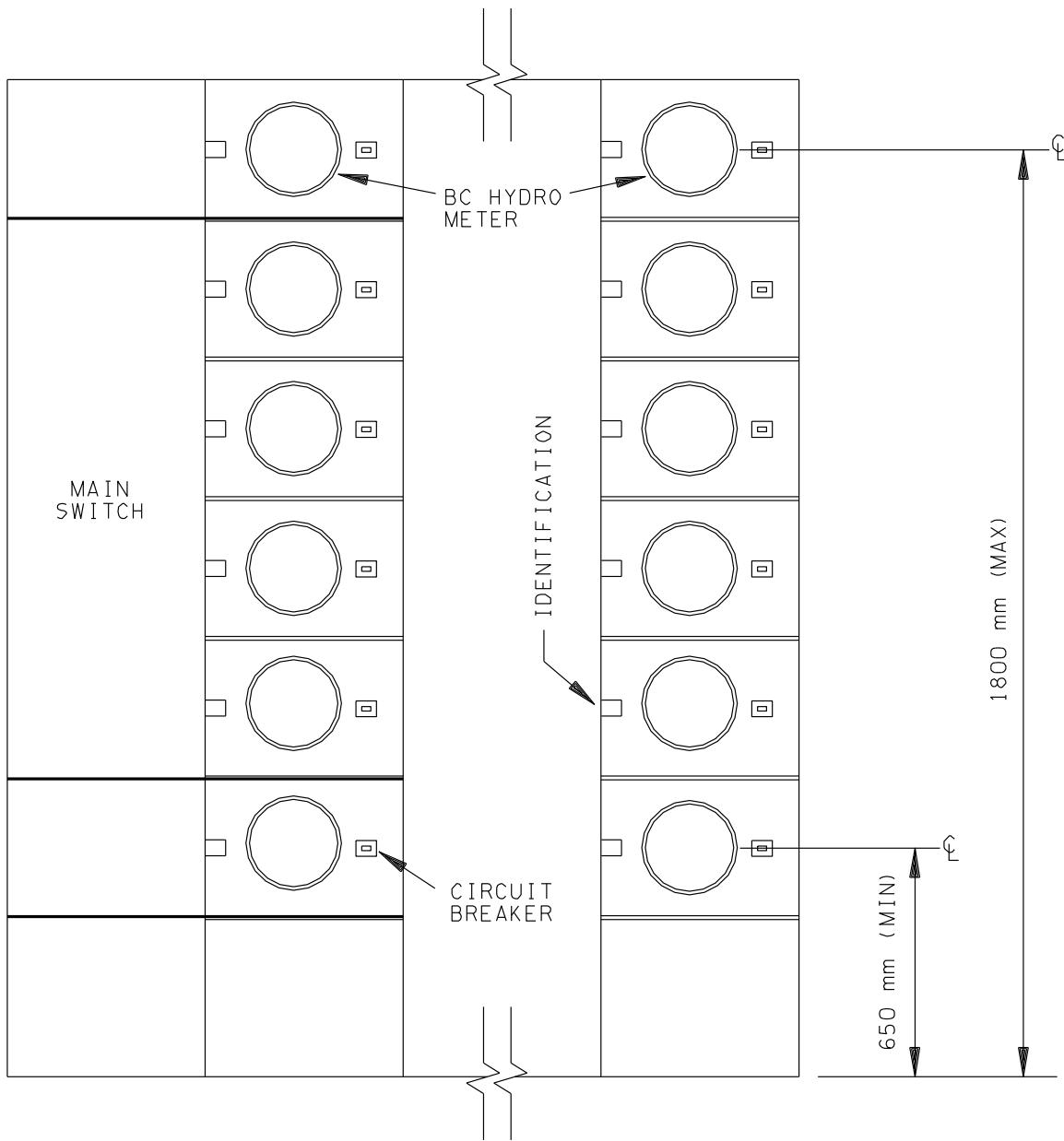


### Notes:

1. See section 4.3.
2. Underground service illustrated.

## 6.6

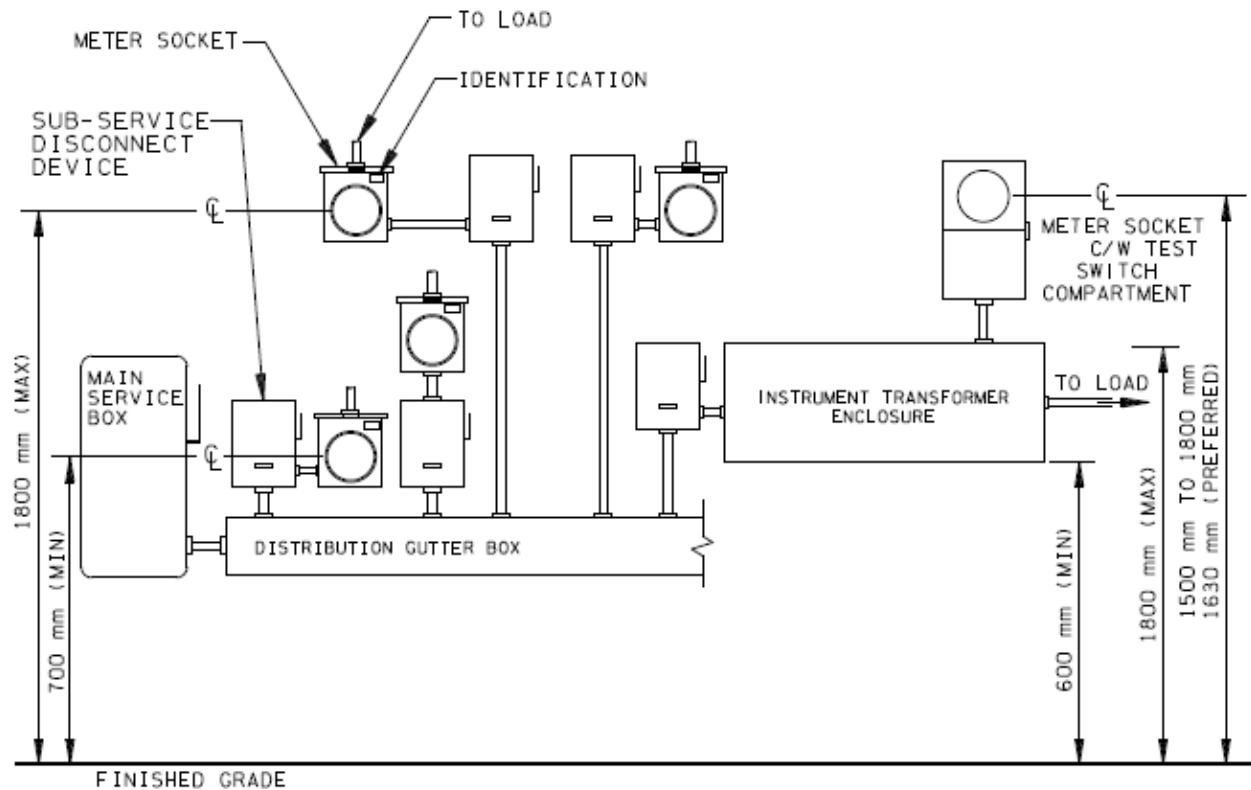
## Meter Centre



### Notes:

1. See section 4.4.

## 6.7 Grouped Sub Service Metering



### Notes:

1. See section 4.5.
2. Cold style metering with the meter socket on the load side of the sub service disconnect device and with the neutral isolated at the meter socket is required.
3. Each meter socket shall be adjacent to, and as close as practicable to, the controlling sub service disconnect device and in the same room as the controlling sub service disconnect device.
4. Contact BC Hydro and refer to the ES53 Series Underground Electrical standards and the ES54 Underground Civil standards for underground main service conduit, wireway and pull box requirements.
5. Multiple Self-Contained Metering and multiple Instrument Transformer Metering are allowed.

## 6.8 Service Pedestal

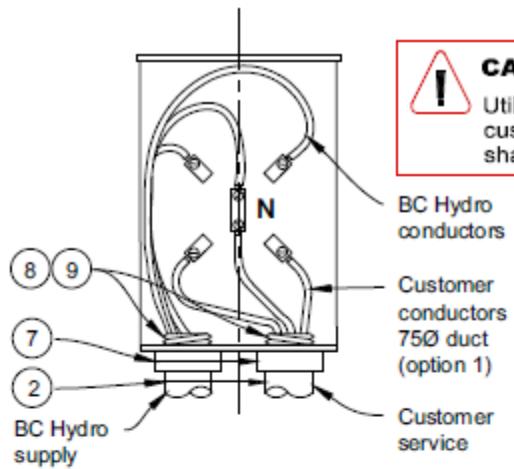


Figure 1 - 200 A Meter Socket - Hot Style Customer Bottom Exit

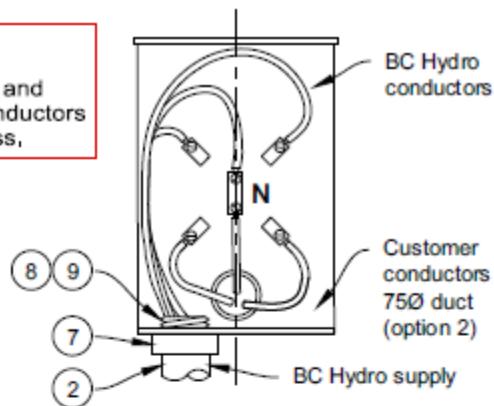


Figure 2 - 200 A Meter Socket - Hot Style Customer Back Exit

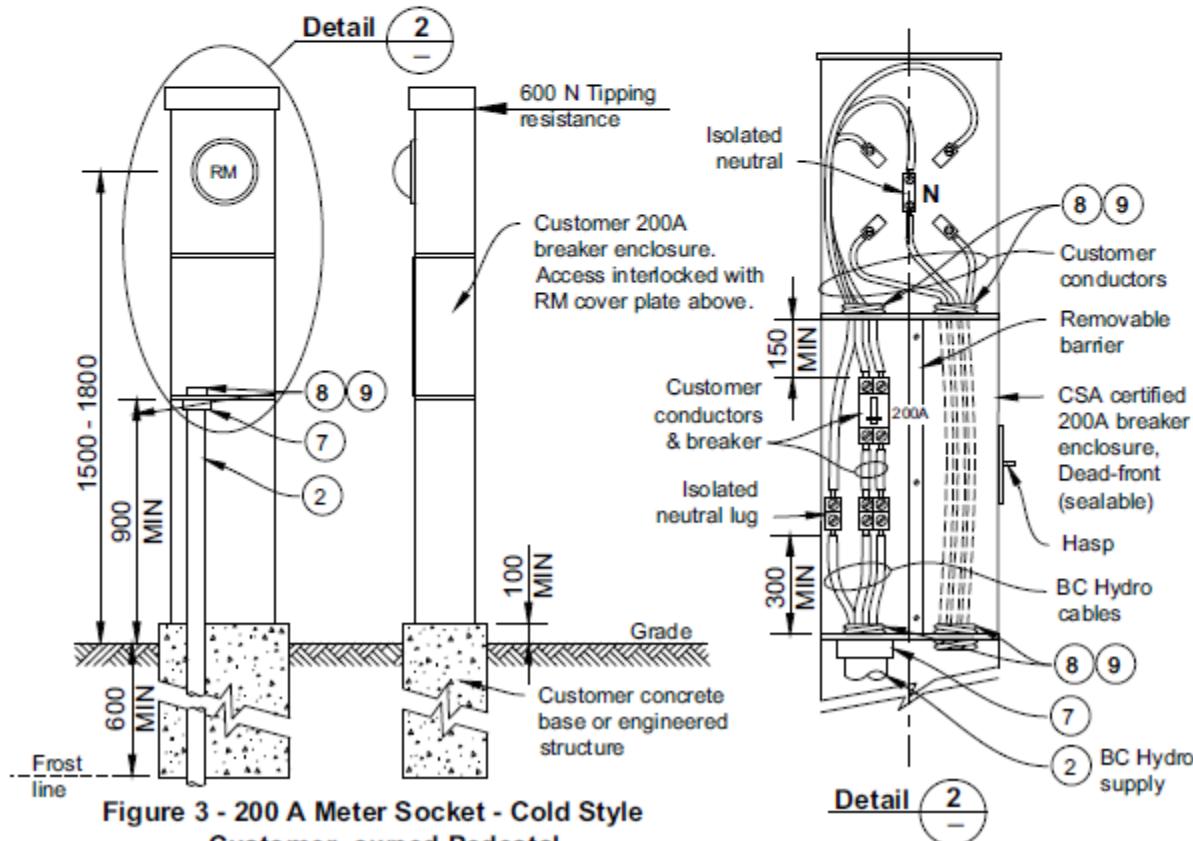
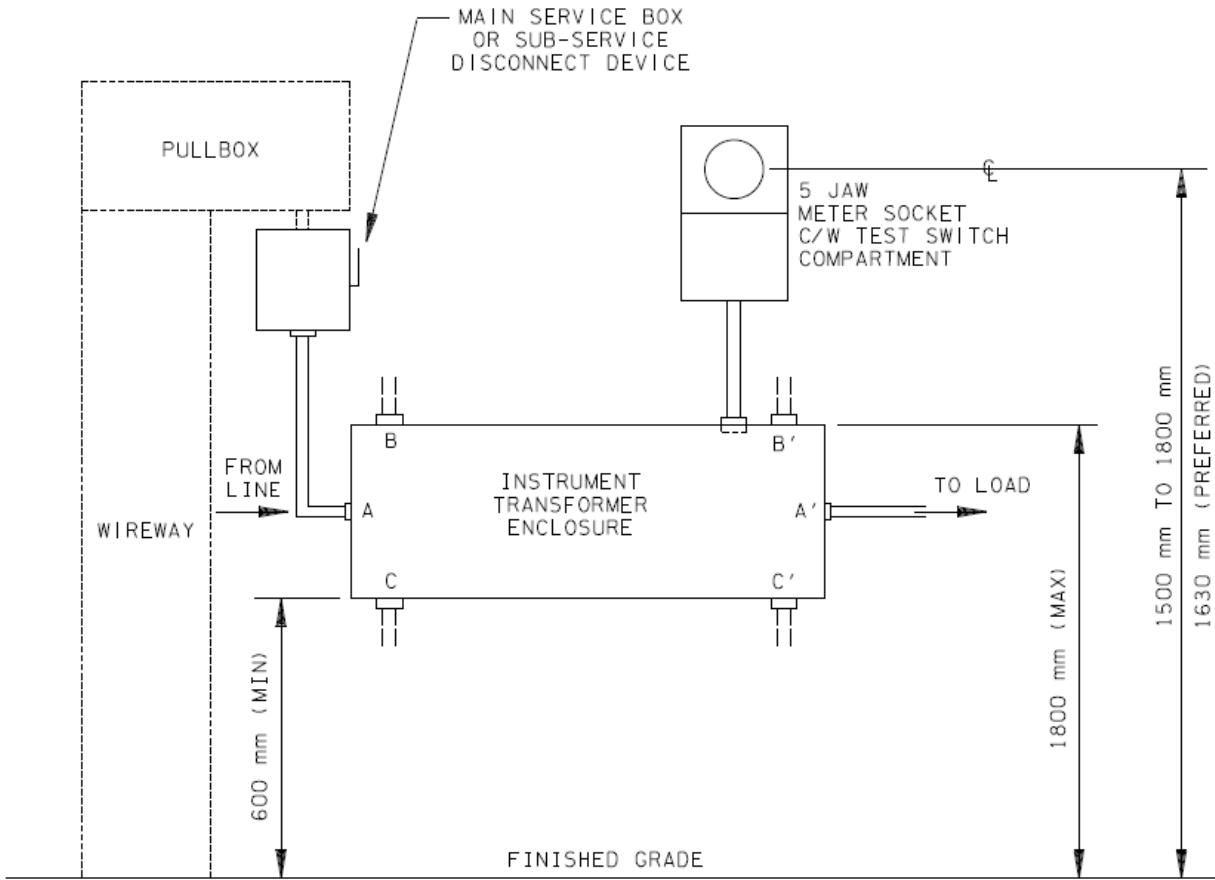


Figure 3 - 200 A Meter Socket - Cold Style Customer-owned Pedestal

Notes:

1. See section 4.6.

## 6.9 120/240 V, 1 Phase, Instrument Transformer Enclosure



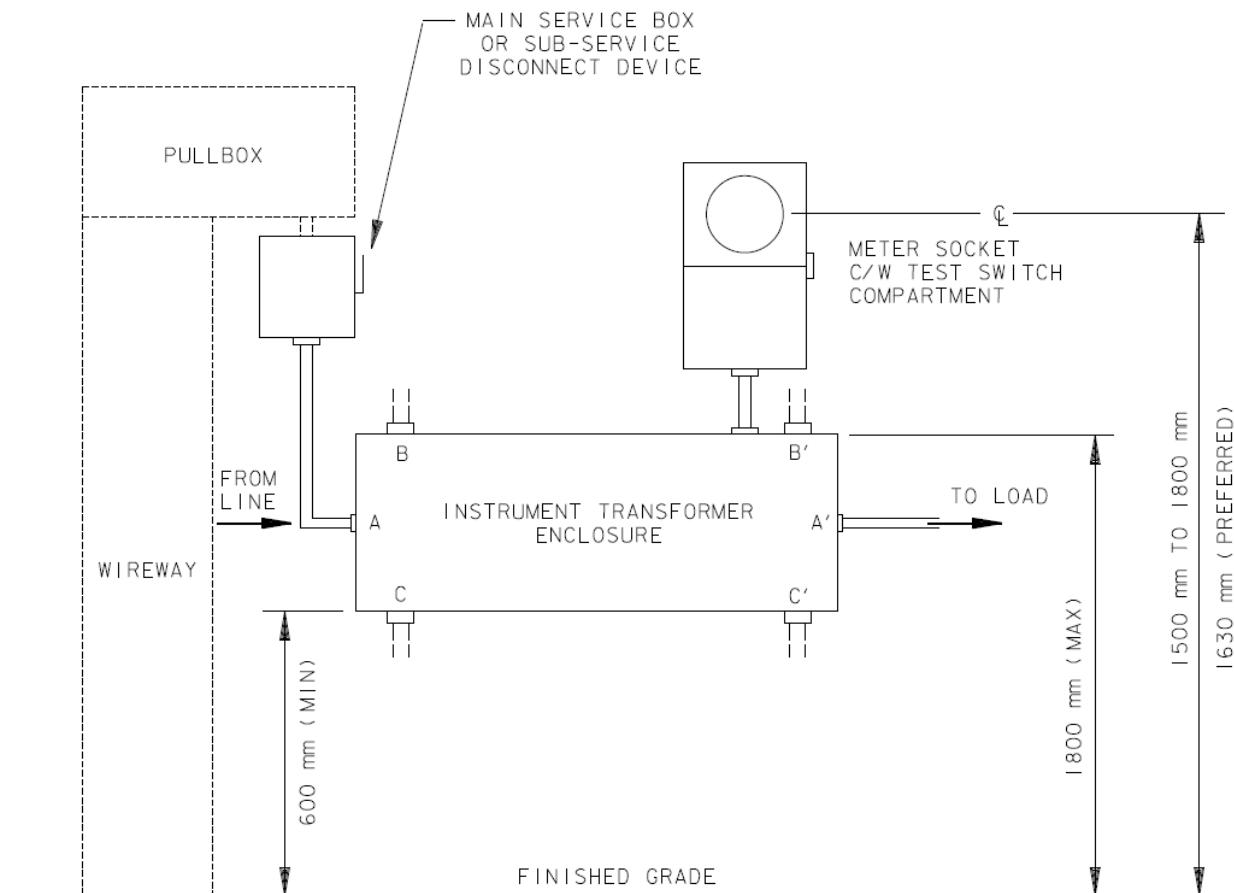
### Notes:

1. The following minimum 120/240 V, 1 phase instrument transformer enclosure dimensions shall be provided.

Main Switch Size	Enclosure Size (W x H x D)
400 A or Less	760 mm x 420 mm x 205 mm (30" x 16" x 8")
Over 400 A	1065 mm x 460 mm x 405 mm (42" x 18" x 16")

2. The customer shall supply and install a 5 jaw meter socket
3. Illustrated equipment locations may vary provided the specified dimensions are achieved.
4. The instrument transformer enclosure shall be in the same room, adjacent to, and as close as practicable to, the main service box or sub service disconnect device.
5. The meter socket shall be in the same room, adjacent to, and as close as practicable to the instrument transformer enclosure.
6. Contact BC Hydro and refer to the ES53 Series Underground Electrical standards and the ES54 Underground Civil standards for underground main service conduit, wireway and pull box requirements.
7. The instrument transformer enclosure shall be installed in horizontal position with line entering and load exiting from A to A' (preferred option), B to B', C to C', B to C', C to B', A to B', A to C', B to A', or C to A' as depicted in the diagram.

## 6.10 3 Phase Instrument Transformer Enclosure



Notes:

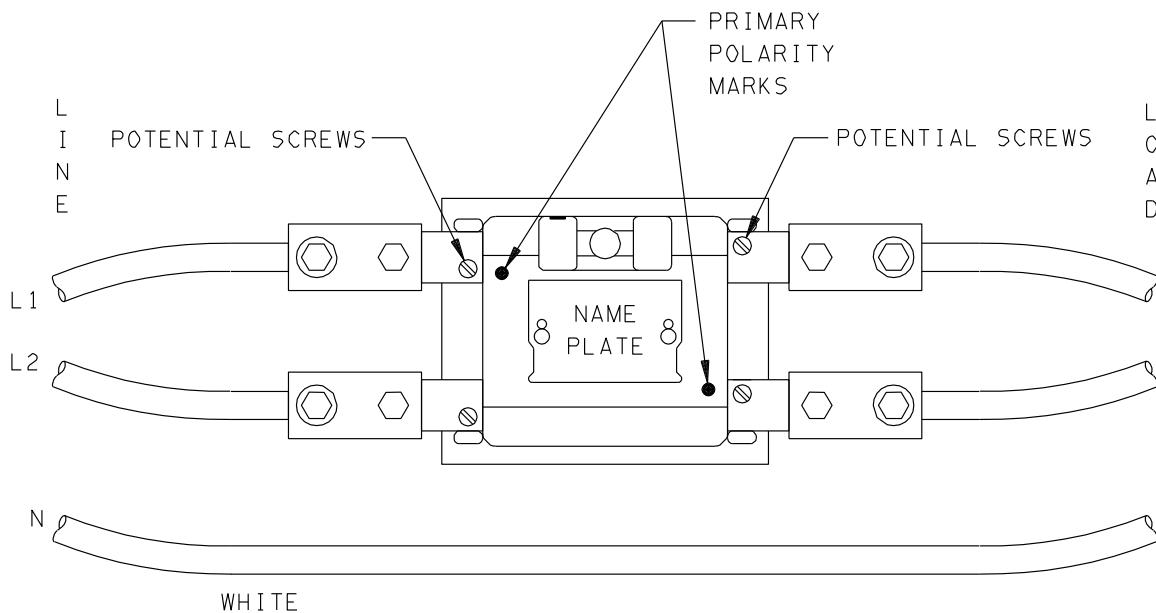
1. The following minimum 3 phase instrument transformer enclosure dimensions shall be provided.

Main Switch Size	Voltage	Enclosure Size (W x H x D)
400 A to 600 A	All	1065 mm x 460 mm x 405 mm (42" x 18" x 16")
601 A to 1,000 A	All	1065 mm x 915 mm x 610 mm (42" x 36" x 24")
Over 1,000 A	All	Use switchgear instrument transformer compartment or an approved engineered assembly complete with consultant's drawings

**BC Hydro is phasing out the 30" x 16" x 8" instrument transformer enclosure for 3 phase installation. Starting from April 15<sup>th</sup>, 2019, this enclosure will no longer be accepted.**

2. Illustrated equipment locations may vary provided the specified dimensions are achieved.
3. The Instrument transformer enclosure shall be in the same room, adjacent to, and as close as practicable to, the main service box or sub service disconnect device.
4. The customer supplied meter socket shall be in the same room, adjacent to, and as close as practicable to the instrument transformer enclosure.
5. Contact BC Hydro and refer to the ES53 Series Underground Electrical standards and the ES54 Underground Civil standards for underground main service conduit, wireway and pull box requirements.
6. The instrument transformer enclosure shall be installed in horizontal position with line entering and load exiting from A to A' (preferred option), B to B', C to C', B to C', C to B', A to B', A to C', B to A', or C to A' as depicted in the diagram.

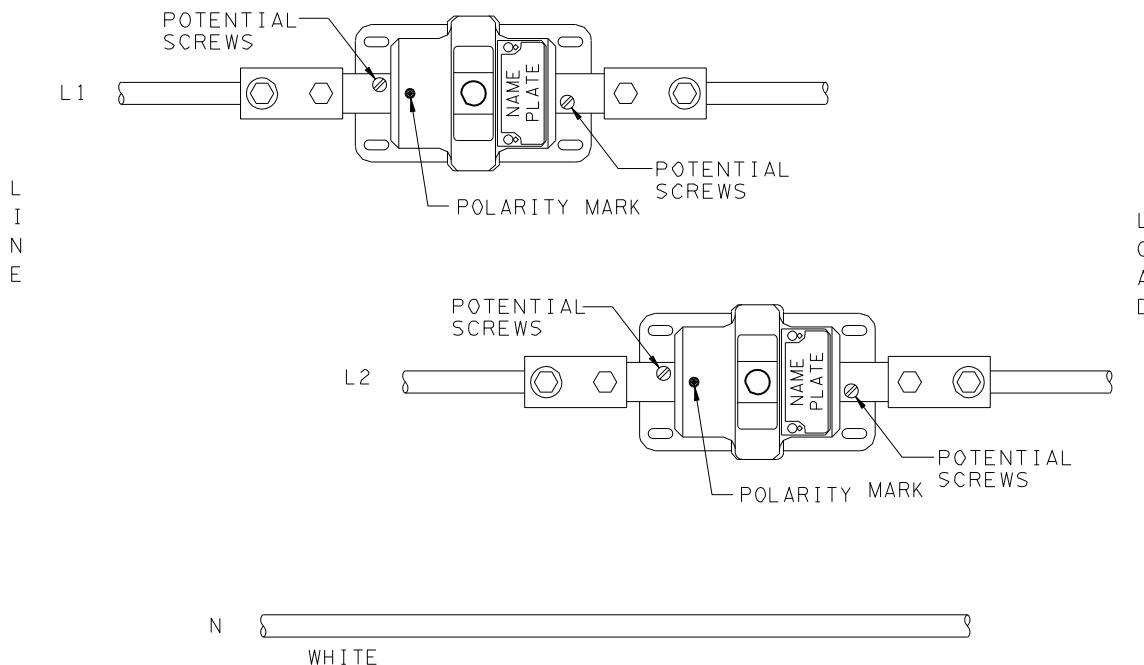
## 6.11 120/240 V, 1 Phase, Metering with a Single 3 Wire Bar Type CT



### Notes:

1. Contractors are required to use only BC Hydro supplied standard mechanical connectors.
2. See section 5.3.2.1.
3. The actual polarity markings may be different. Consult with the Local Design or Metering Technician should there be any question.
4. The mechanical connectors (lugs) shall be installed in-line with the CT bus bar per above diagram.

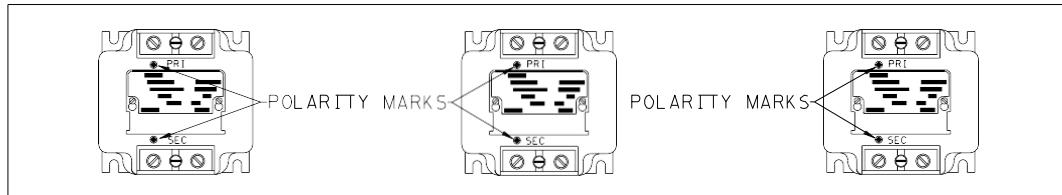
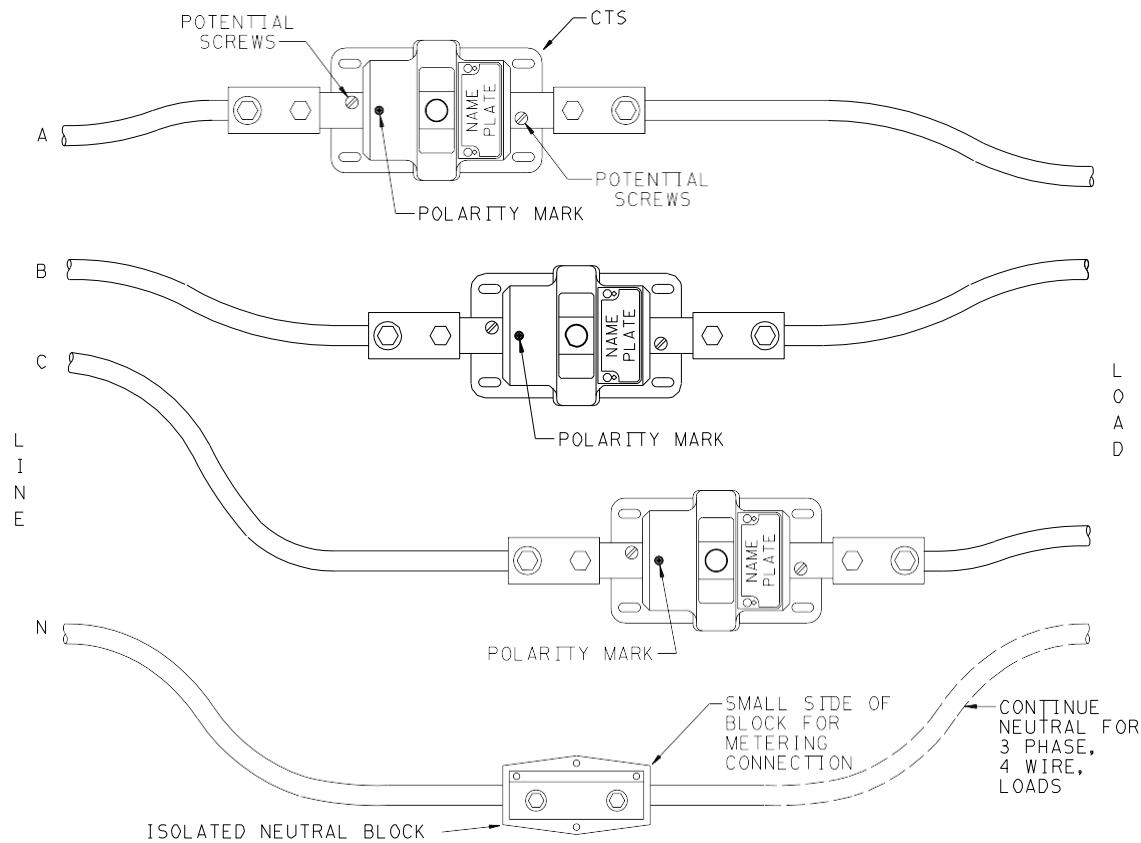
## 6.12 120/240 V, 1 Phase, Metering with Two 2 Wire Bar Type CTs



Notes:

1. Contractors are required to use only BC Hydro supplied standard mechanical connectors.
2. See section 5.3.2.1.
3. Polarity marks shall be towards the line side.
4. The mechanical connectors (lugs) shall be installed in-line with the CT bus bar per above diagram.

## 6.13 3 Phase, 4 Wire, Metering with Bar Type CTs

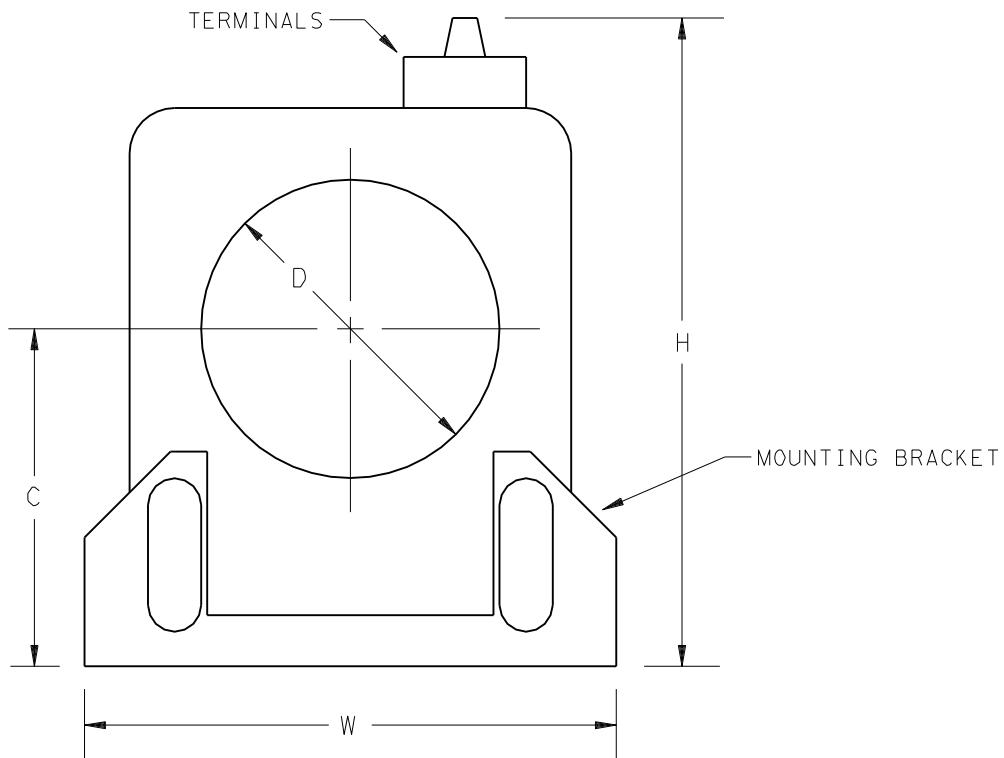


VTS NOT REQUIRED FOR 120/208Y V, 3 PHASE, 4 WIRE SUPPLY.

### Notes:

1. Contractors are required to use only BC Hydro supplied standard mechanical connectors.
2. See section 5.3.2.
3. Polarity marks shall be towards the line side.
4. It is a requirement that CTs are staggered for most efficient use of space, thereby reducing increased bending radius and ease of wiring of secondary terminals.
5. The mechanical connectors (lugs) shall be installed in-line with the CT bus bar per above diagram.

## 6.14 Typical Indoor Window CT



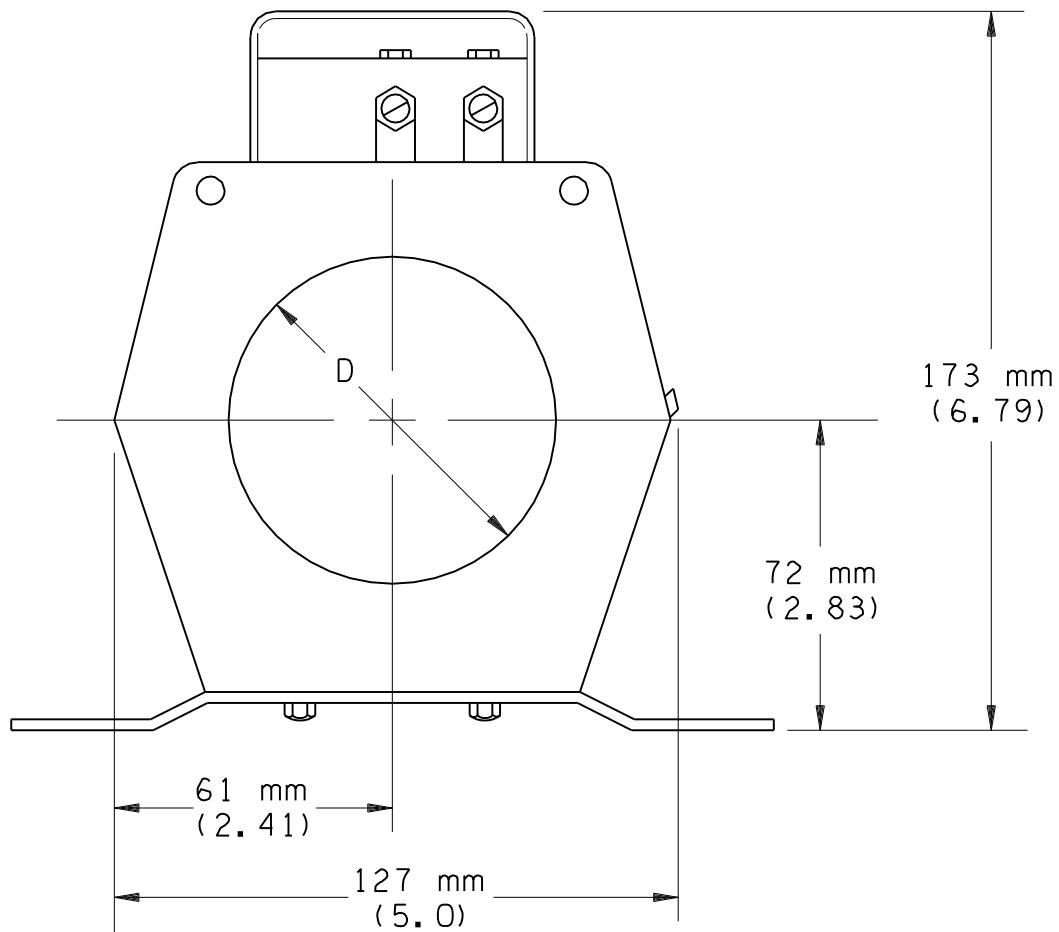
DIMENSION TABLE

Rated Current	"D" Minimum Window Diameter	"W" Maximum Body Width	"H" Maximum Overall Height	"C" Window Centre Height
1,500-5 A 2,000-5 A	146 mm (5.75")	229 mm (9.0")	292 mm (11.5")	Adjustable from 114 mm to 140 mm (4.5" to 5.5")
3,000-5 A 4,000-5 A	146 mm (5.75")	229 mm (9.0")	330 mm (13.0")	Adjustable from 146 mm to 178 mm (5.75" to 7.0")
5,000-5 A 6,000-5 A	206 mm (8.125")	292 mm (11.5")	330 mm (13.0")	145 mm $\pm$ 3 mm (5.69" $\pm$ 0.125")

Notes:

1. See section 5.6.

## 6.15 Typical Indoor/Outdoor Donut CT



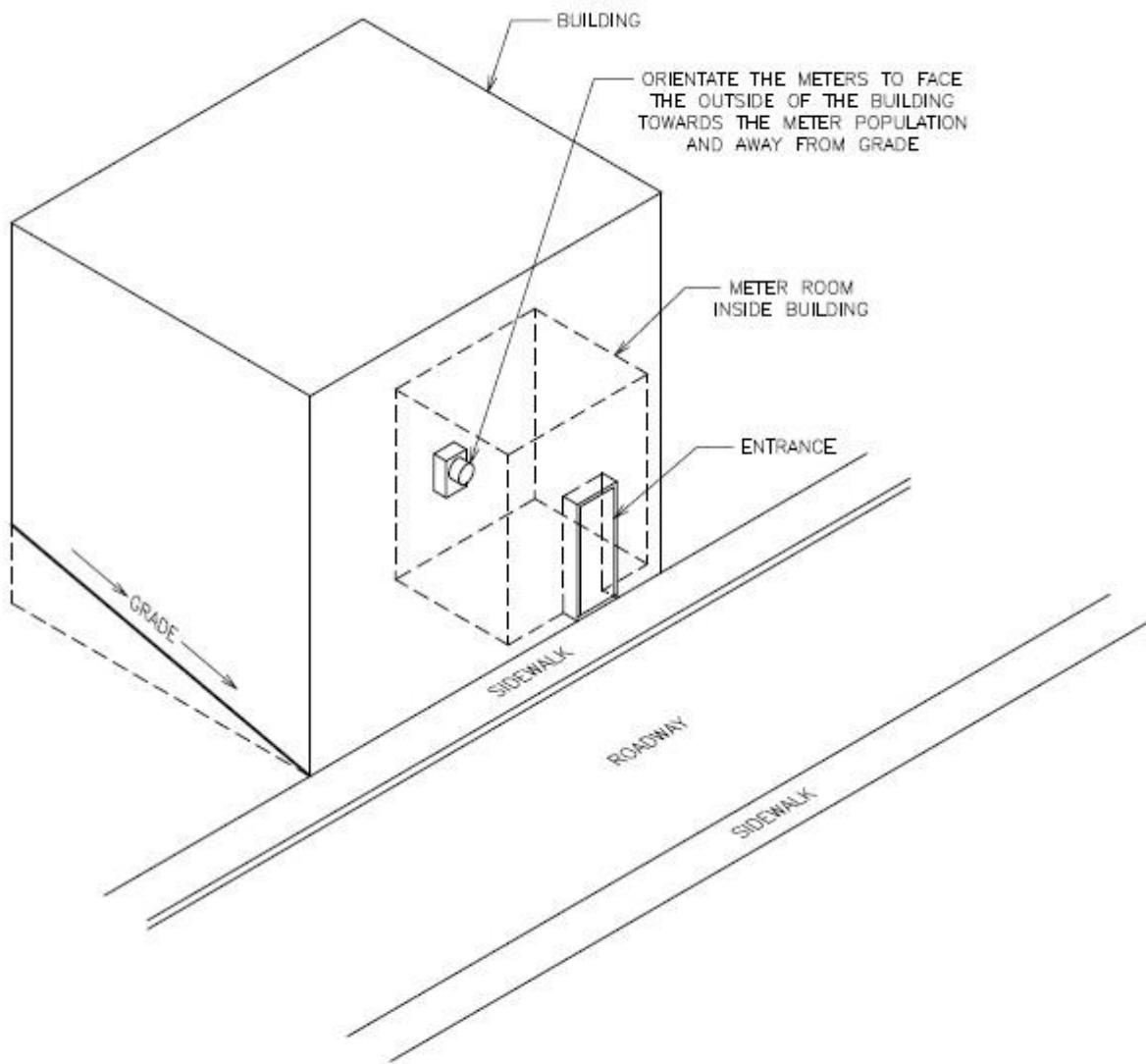
**DIMENSION TABLE**

Rated Current	"D" Minimum Window Diameter
200 A 300 A	63 mm (2.5")
400 A 600 A 800 A	79 mm (3.12")

Notes:

1. See section 5.6.

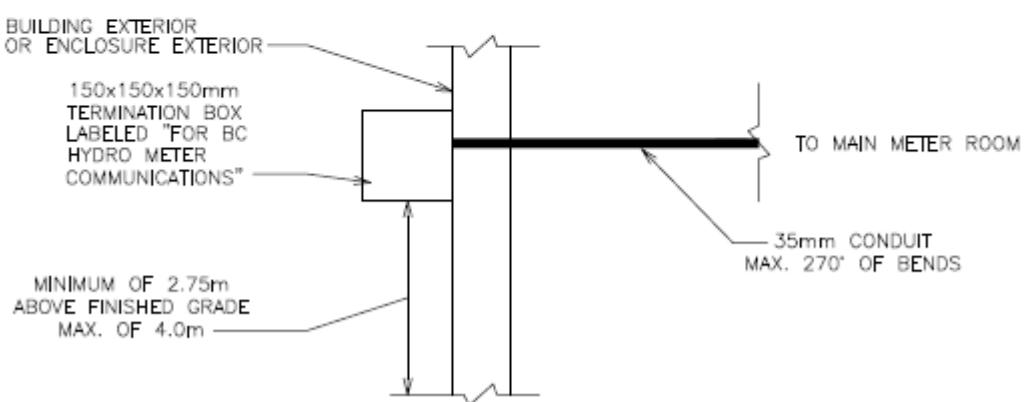
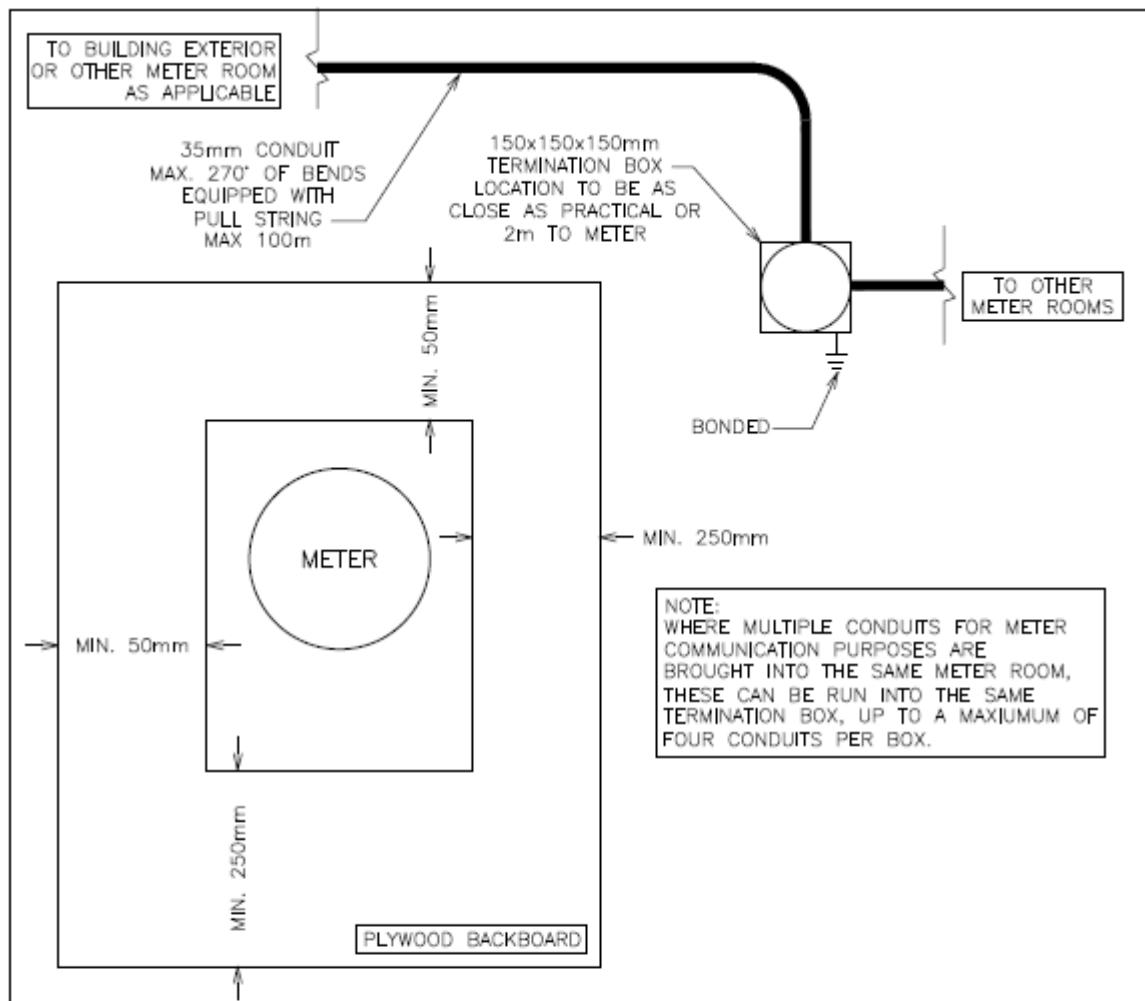
## 6.16 General Arrangement of Meter Inside Electrical/Meter Room



### Notes:

1. Grouped sub service meters shall be installed inside an electrical/meter room. See section 3.2.
2. At least one meter socket in the electrical room shall be mounted in such location as shown above, facing an exterior wall preferably without obstruction.

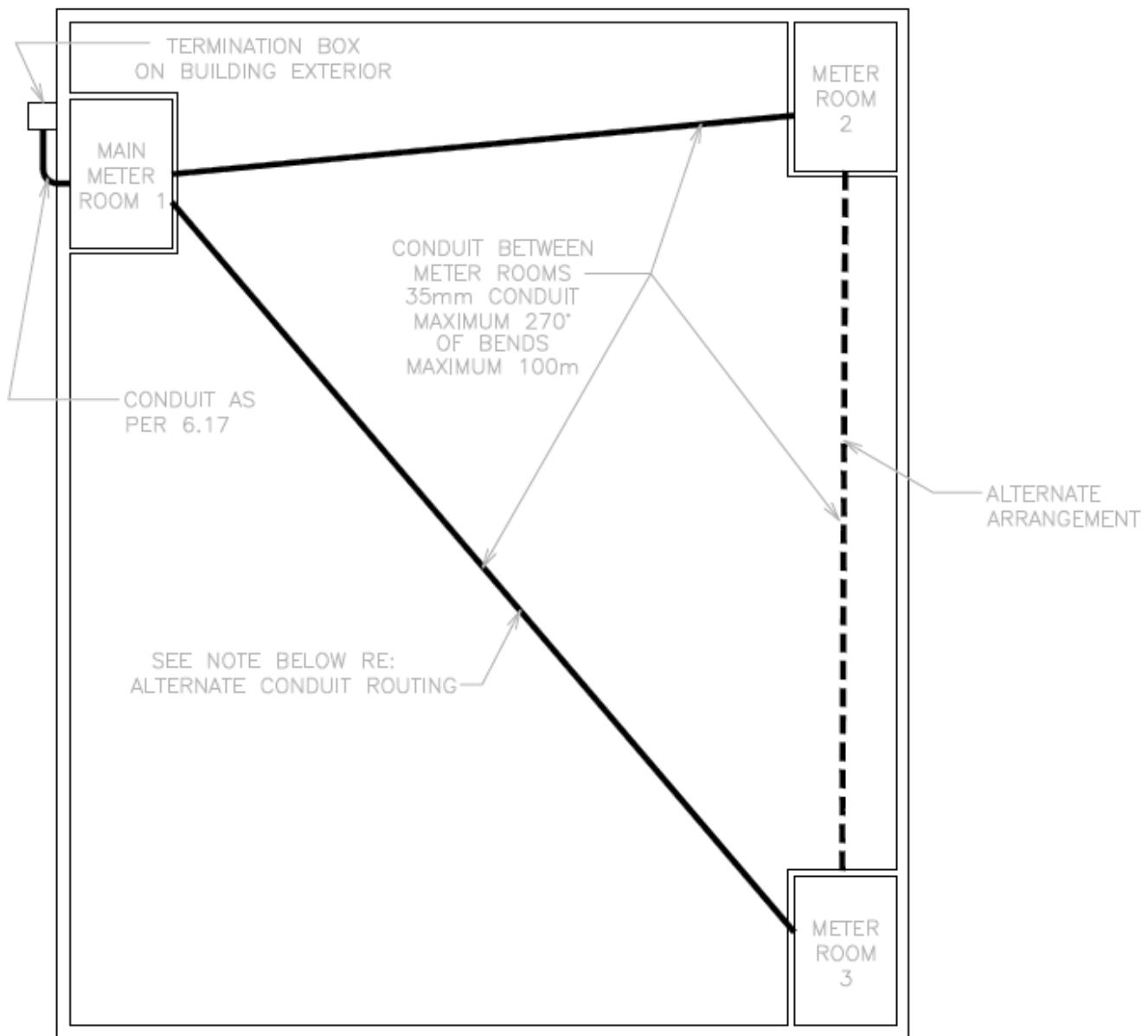
## 6.17 Meter Connection to RF Mesh Network



### Notes:

1. See section 3.2. The above is only required for one meter inside elec. room
2. All material/connections from Termination box to meter is BCH responsibility.

## 6.18 Multiple Meter Rooms Conduit Arrangement

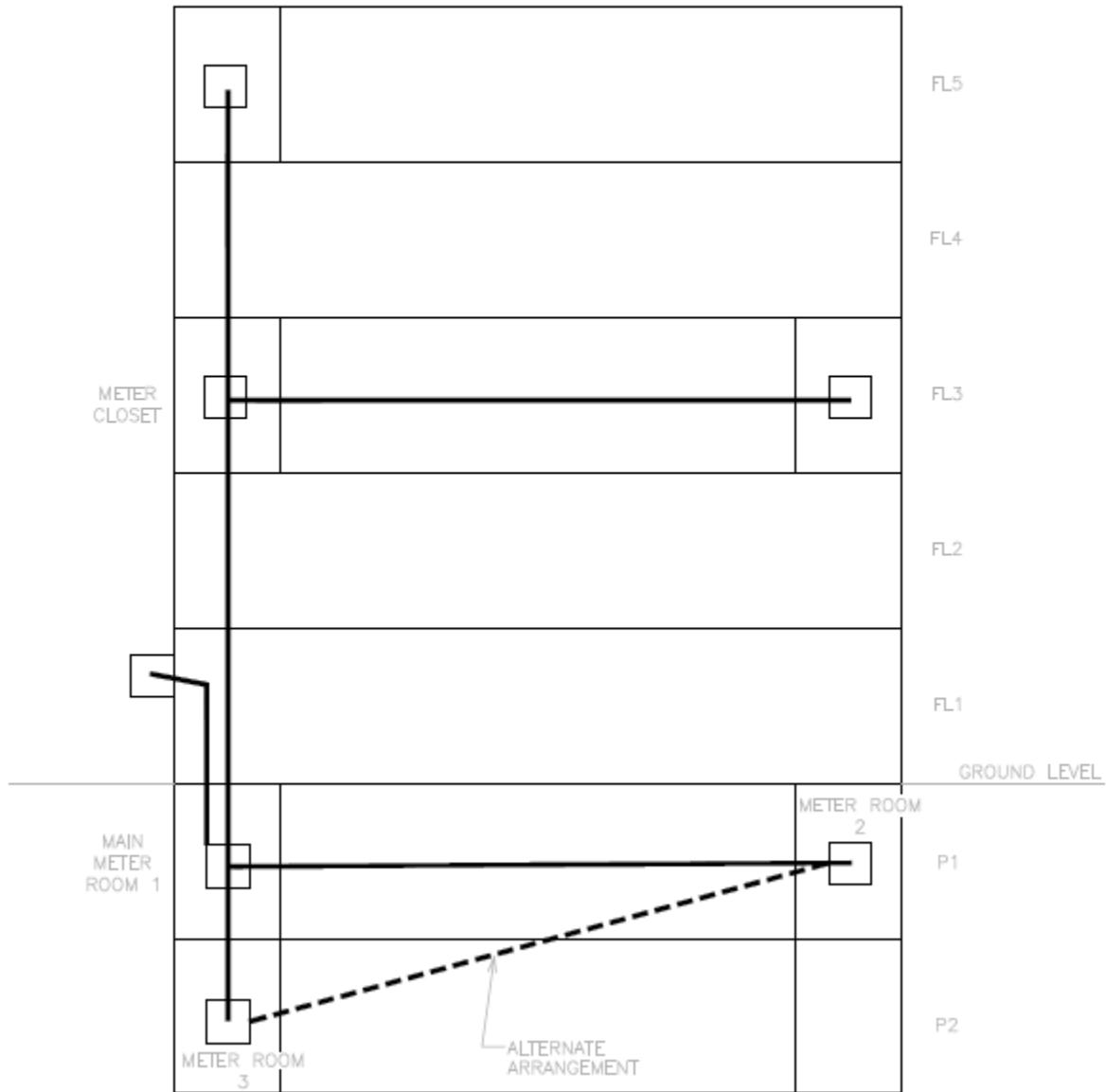


### Notes:

1. Alternate arrangement is to run conduit from Main Meter Room 1 to Meter Room 2, and from Meter Room 2 to Meter Room 3 in a daisy chain configuration, instead of Main Meter Room 1 to Meter Room 3.
2. See section 3.2.
3. Conduit run between meter rooms exceeding 100m requires installation of additional pull box similar to above termination box dimension and set up.

## 6.19 Multiple Meter Rooms on Multiple Levels Conduit Arrangement

KEY	
—	35mm CONDUIT MAX 270° OF BENDS EQUIPPED WITH PULL STRING, MAX 100m
□	TERMINATION BOX IN METER ROOM OR BUILDING EXTERIOR



### Notes:

1. Alternate arrangement is to run conduit from Main Meter Room 1 to Meter Room 2, and from Meter Room 2 to Meter Room 3 in a daisy chain configuration, instead of Main Meter Room 1 to Meter Room 3.

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