	TITLE: Engineering Specification	
RECOMMENDED: A. Diotte	NO: GCS0008	REV: 6
APPROVED: Bob Harrington		
REV. DATE: 2020-08-28		

Secondary Voltage Revenue Metering Specification

REVISION SHEET

Revision	Description of Change	Date	Initial
0	Original Document	2003-07-23	bp/csm
1	Section 10.3 indexing correction Section 14.3 except in specified areas	2004-01-12	bp/csm
2	Section 4.96 depth of cabinet Table 6 depth of cabinet to accommodate Smart metering	2006-12-20	jjp/csm
3	Modified overall formatting and layout. Added 5 jaw meter sockets. Added Sec 12.4 & 12.5 for Backup Generators	2008-01-10	kh/csm
4	General Content Revision, Indexing, & Reformatting	2014-06-09	smc/bp/csm
5	General Content Revision	2016-02-05	smc/csm
6	Removal of Primary Metering Section Addition of Gas Clearance Dwgs Addition of Labelling Requirements for MCMS/MCMU Updated to reflect changes in 26th Edition of OESC Update to allow Fire Pump Services $\leq 600A$ to be non-interval Update to allow 347V/600Y temporary services up to 400A to be non-interval as per updated ECS0037 Additional wording for Load Displacement and made FIT Metering legacy.	2020-08-28	ad/rh

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1. Introduction

The Hydro Ottawa Limited (HOL) document ECS0012, Conditions of Service, describes the customer classes served by HOL, and the types of services available to each customer class. This specification describes the metering installation requirements for secondary services supplying HOL customers. If there are any discrepancies between this document and the most current revision of HOL's *Conditions of Service*, the Conditions of Service shall take precedence.

The Customer is responsible for contacting HOL to ensure that the Customer have the current version of the Metering Specifications document. The latest Metering Specifications shall be provided through the HOL website – refer to HOL's Conditions of Service (ECS0012), under 'Contact Information' for more information.

2. References

This document refers to the following documents and specifications:

- American Society for Testing and Materials (ASTM) – ASTM D1535: Standard Practice for Specifying Color by the Munsell System
- Canadian Standards Association (CSA) – CSA C22.2, No. 94.1: Enclosures for Electrical Equipment. Non-environmental considerations.
- Canadian Standards Association (CSA) – CSA C22.2 No. 94.2: Enclosures for Electrical Equipment, Environmental Considerations
- Canadian Standards Association (CSA) – CSA C22.2 No. C22.2 211.2: Rigid PVC (Unplasticized) Conduit
- Canadian Standards Association (CSA) – CSAC22.3, No. 1-10: Canadian Electrical Code, Part III
- Canadian Standards Association (CSA) – CSA C282: Emergency Electrical Power Supplies for Buildings
- Electrical Safety Authority (ESA) – ESA Bulletin DB-04/17: Distributor Information Bulletin (Revision: Meter Base Mounted Transfer Devices)
- Hydro Ottawa – ECG0001 – Commercial Secondary Ownership
- Hydro Ottawa – ECG0002 – Technical Guideline For Customer Owned Standby Generation
- Hydro Ottawa – ECG0006 – Embedded Generation Technical Connection Guideline
- Hydro Ottawa – ECG0015 – ERF/Com 1PH or 3PH, Secondary Commercial Service ≤500kW 1PH or >10kW 3PH
- Hydro Ottawa – ECS0002 – Res UG 120V/240V, 1PH, 3W, ≤200A Secondary Service
- Hydro Ottawa – ECS0012 – Conditions of Service
- Hydro Ottawa – ECS0023 – Un-metered Service Conditions, Connections and Upgrades
- Hydro Ottawa – GCS0032 – Primary Revenue Metering Specification
- Hydro Ottawa – GCS0043 – HOL Monitoring And Control Box (MCB) Installation
- Hydro Ottawa – GCS0048 – HOL Monitoring And Control Box (MCB) Installation Box (MCB) Installation For < 500 kW ERF
- Hydro Ottawa – GDS0018 – Single Line Diagram General Secondary Service With Load Displacement ERF > 500 kW AND ≤10 MW
- Hydro Ottawa – MCS0003 – Res UG 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base
- Hydro Ottawa – MCS0004 – Agr OH 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base
- Hydro Ottawa – MCS0005 – Res 120V/208Y, 2PH, 3W, 100A to 200A Network Service Entrance and Meter Socket Wiring Detail
- Hydro Ottawa – MCS0007 – Com 120V/240V, 1PH, 3W, 400A Transformer Rated Service Using Meter Socket with Separate Instrument Transformer Cabinet
- Hydro Ottawa – MCS0008 – Agr/Com UG 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base

Hydro Ottawa	–	MCS0016	–	Com 600V, 3PH, 3W Delta or 347V/600Y, 3PH, 4W Wye, ≤200A 7–Jaw Meter Base Wiring Detail
Hydro Ottawa	–	MCS0017	–	Com 120V/208Y or 347V/600Y, 3PH, 4W, ≥200A to 600A Services
Hydro Ottawa	–	MCS0018	–	ERF/Agr/Com/Res 1PH and 3PH, 4–Jaw, 5–Jaw, and 7–Jaw Wiring Detail
Hydro Ottawa	–	MCS0019	–	Com/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Using Combination Meter Socket Base
Hydro Ottawa	–	MCS0020	–	Com/Res SLD Typical Secondary Metering for Multiple Unit Building
Hydro Ottawa	–	MCS0021	–	Res 120V/240V, 1PH, 3W, 400A Multiposition Ganged Meter Trough
Hydro Ottawa	–	MCS0022	–	Com 120V/208Y or 347V/600Y, 3PH, 4W, 400A Transformer Rated Service Installation with Instrument Transformer Cabinet
Hydro Ottawa	–	MCS0024	–	Com/Res 120V/208Y or 347V/600Y, 3PH, 4W, Non–Interval Metering Arrangement in a Switchboard with Peak Demand ≤233kW
Hydro Ottawa	–	MCS0025	–	Com/Res 120V/208Y or 347V/600Y, 3PH, 4W, Interval Metering Arrangement in a Switchboard with Peak Demand >233kW
Hydro Ottawa	–	MCS0026	–	Com/Res 120V/208Y ≥800A or 347V/600Y >200A, 3PH, 4W Parallel Metering Arrangement in a Switchboard with Peak Demand >233kW
Hydro Ottawa	–	MCS0035	–	ERF/Com Concrete Base Foundation for Weatherproof Metered Cabinet
Hydro Ottawa	–	MCS0036	–	Com/Res 120V/240V, 1PH, 3W, 400A Secondary Service with Meter Centre
Hydro Ottawa	–	MCS0037	–	Com/Res 120V/240V, 1PH, 3W, 100A to 400A Secondary Service with Multiple ≤200A Sub–Service Disconnects
Hydro Ottawa	–	MCS0041	–	Agr/Com 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Instrument Transformer Cabinet and Meter Base
Hydro Ottawa	–	MCS0042	–	Com UG 120V/240V, 1PH, 3W, 400A Service with Switchboard
Hydro Ottawa	–	MCS0043	–	ERF/Com 1PH or 3PH, ≤200A Service Pedestal Mounted Metering Cabinet
Hydro Ottawa	–	MCS0053	–	ERF 120V/240V, 1PH, 3W, ≤200A Overhead Service Entrance Parallel Metering <10kW Wiring Detail
Hydro Ottawa	–	MCS0055	–	Multiple Customer Metering System Installation Requirements By The Owner For A New Building
Hydro Ottawa	–	MCS0058	–	ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Secondary Parallel Construction Detail
Hydro Ottawa	–	MCS0061	–	Res MCMS Communication Wiring for Electrical Rooms without Communications Equipment
Hydro Ottawa	–	MCS0063	–	ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub–Service with Splitter Trough
Hydro Ottawa	–	MCS0064	–	ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub–Service with Metering Centre
Hydro Ottawa	–	MCS0066	–	Com 120V/208Y, 3PH, 4W, ≥800A, or 347V/600Y, 3PH 4W, >200A Interval Metering External Modem Enclosure with Telephone Line for Communications
Hydro Ottawa	–	MCS0073	–	Com UG 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Service Entrance Disconnect and Metering on Customer Owned Pole
Hydro Ottawa	–	MCS0077	–	Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade Using Combination Meter Socket Base
Hydro Ottawa	–	MCS0078	–	ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade to use Combination Meter Socket Base
Hydro Ottawa	–	MCS0080	–	Res 120V/240V, 1PH, 3W, ≤200A Residential Service Metering Using External Modem Enclosure with Telephone Line for Communications
Hydro Ottawa	–	MCS0081	–	Com 120V/240V, 1PH, 3W, ≤600A and 120V/208Y or 347V/600Y, 3PH, 4W, ≥200A Secondary Utility Tower Service using Splitter Trough
Hydro Ottawa	–	MCS0082	–	Com 120V/240V, 1PH, 3W, ≤600A Secondary Metered Utility Tower Service with 6–Position Ganged Meter Trough
Hydro Ottawa	–	MCS0091	–	Com 120V/240V, 1PH, 3W, ≤200A Secondary Service with Meter Socket Wiring Detail
Hydro Ottawa	–	MCS0099	–	Com 120V/208Y or 347V/600Y, 3PH, 4W, Customer Owned Outdoor Switchgear with Check Meter Installation

Hydro Ottawa – MCS0102 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Placement of Warning Lamacoid and Stickers

Hydro Ottawa – MCS0105 – Agr/Com/ERF/Res Minimum Clearance In Front Of Revenue Metering Equipment

Hydro Ottawa – MCS0106 – Agr/Com/ERF/Res Minimum Clearances Next To Revenue Metering Equipment

Hydro Ottawa – MCS0107 – ERF/Res 1PH, Load Displacement Minimum Clearance From Gas Related Equipment

Hydro Ottawa – MCS0108 – ERF Outdoor Mounted Disconnects Minimum Clearance From Gas Related Equipment

Hydro Ottawa – MCS0111 – COM OUTDOOR SECONDARY 1-PHASE OR 3-PHASE ≤ 200A METERED CABINET WALL MOUNTED

Hydro Ottawa – MCS0115 – General Secondary Service Electrical Closet Clearances For Meter Centre And MCMU Installations

Hydro Ottawa – MCS0129 – General Arrangement Interval Metering Wireless Modem Enclosure

Hydro Ottawa – UFS0001 – Bollards Protective

Hydro Ottawa – UGS0002 – Grounding Transformer or Switchgear Base

Measurement Canada – E-24 – Policy on Approval and Use of 2.5-Element Metering

Measurement Canada – Electricity and Gas Inspection Act

Measurement Canada – S-E-04 – Specifications for the Installation Requirements for Multiple Customer Metering Systems

Measurement Canada – S-E-10 – Specification For Installation And Use: Size Of Wires Used To Connect Meters To Conventional Instrument Transformers

National Electrical Manufacturers Association (NEMA) – NEMA 250–2003: Enclosures

Ontario – Current edition of the Ontario Building Code (OBC)

Ontario – Current edition of the Ontario Electrical Safety Code (OESC)

Ontario – Regulation 22/04 – Electrical Distribution Safety

Ontario – Regulation 541/05 – Net Metering

Ontario Energy Board (OEB) – Distribution System Code (DSC)

Ottawa Utility Co–Ordinating Committee – Utility Pedestal Guidelines

Society of Automotive Engineers (SAE) – SAE J429 – Mechanical and Material requirements for Externally Threaded Fasteners

Transportation Association of Canada (TAC) – Geometric Design Guide for Canadian Roads, Section 3.1.3, "The Clear Zone Concept"

Underwriters Laboratories Canada (ULC) – CAN/ULC-S102– Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

Underwriters Laboratories Canada (ULC) – CAN/ULC-S115– Standard Method of Fire Tests of Firestop Systems

3. Scope

This document contains requirements for HOL revenue metering installations.

The type of Low-Voltage HOL revenue metering equipment to be installed is determined by the application, voltage, and ampacity of the service to be metered: this document is organized accordingly. Note that when using this document to determine the requirements of metering a particular service, the entire document must be considered.

4. Definitions

Advanced Metering Infrastructure (AMI) as outlined in *Functional Specification for an Advanced Metering Infrastructure* Version 2, July 5, 2007, prepared by the Ontario Ministry of Energy.

Amalgamated Switch is a generic term that means a single enclosure that contains both a service entrance disconnect and fuse panel; manufacturers include Amalgamated Electric and Canadian Electrical Box.

AMI stands for Advanced Metering Infrastructure.

Back-Up Generator means Permanent or temporary generation that does not parallel with HOL's distributor's system, as per HOL document ECG0002.

Badge Number is the unique identifier, given by HOL, for an electric revenue meter. HOL badge numbers take the form of OTT#####, where ##### is a unique number within the HOL distribution system.

Bi-Directional Meter is a meter capable of recording net energy flow by registering the amount of energy delivered by HOL or received from the Customer.

Break-Before-Make Transfer Switch – also known as a “Open Transition Transfer Switch”.

Bulk Meter – defined in HOL's *Conditions of Service* (ECS0012).

Central Metering – Metering of less than four buildings owned by the Customer on a single property, usually agricultural customers.

Check Meter – defined in HOL's *Conditions of Service* (ECS0012).

Cold Metering – defined in HOL's *Conditions of Service* (ECS0012).

Commercial Class of Customer – defined in HOL's *Conditions of Service* (ECS0012).

Communications Tower – a mechanical structure, and related electronic supporting equipment, used in the broadcast or reception of wireless communications. This includes, but is not limited to, cell phone towers, microwave towers, television and radio transmission towers.

Conduit – any raceway defined as “conduit” in the OESC, as well as EMT.

‘Confined Space’ means – a space which conforms to the MOL definition of a confined space, or any space recognized as a fully or partially enclosed space space that:

- a) That is not both designed and constructed for continuous human occupancy, and

- b) In which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.”¹
- c) Has limited, or restricted, means of entry or exit

1 - Taken from Ministry of Labour *Confined Space Guideline*, July 2011.

Corrosive Environment means an area where:

- Equipment may be exposed to corrosive substances such as winter-time roadway and pathway treatments, or
- The atmosphere contains one or more corrosive substances, which includes but is not limited to:
 - Indoor or outdoor recreational pools
 - Potable or waste water storage, treatment, or dispensary facilities
 - Commercial car washes
 - Animal faeces processing, storage or dispensary facilities
 - Fertilizer manufacturing, processing, storage, or dispensary facilities
 - Cement manufacturing, processing, storage, or dispensary facilities
 - Fossil fuel manufacturing, processing, storage, or dispensary facilities
 - Any area exposed to spray from a roadway or highway
 - Any marine environment
 - Any environment with high humidity
 - Any environment that can encourage, accelerate, or cause adverse electro chemical or galvanic effects

Customer – defined in HOL's *Conditions of Service* (ECS0012).

Customer Side of a device – see “Load Side”.

Demand Billed Customer – a demand metered non-residential Customer with average monthly peak demand greater than 50kW over the most recent calendar year that is read monthly and billed on kW, kVAR, or kVA demand as well as kWh energy.

Demand Meter – a meter that measures a Customer's peak usage during a specified period of time.

Demarcation Point – defined in HOL's *Conditions of Service* (ECS0012).

DG Source Disconnect means all of the following:

- “Distributed Generation Source Disconnect”,
- “DG Source Fused Disconnect”, and
- “Distributed Generation Source Fused Disconnect”.

All of these refer to an Electrical Safety Authority (ESA) approved device with factory installed over-current protection rated at either 100% full-load amps (FLA) or 80% of the available fault amps of the customer's generation or energy storage equipment, whichever is greater; moulded case breakers are not acceptable. It shall provide an obvious visible open point. This device is used to isolate the customer's distribution generation (DG) equipment, or energy resource facility (ERF) equipment, from the equipment that it supplies.

DG System Fused Disconnect also known as “Distributed Generation Fused Disconnect”, an Electrical Safety Authority (ESA) approved device with factory installed over-current protection rated at either 100% full-load amps (FLA) or 80% of the available fault amps from the customer’s generation or energy storage equipment, whichever is greater; moulded case breakers are not acceptable. It shall provide an obvious visible open point. This device is used to isolate the customer’s distributed generation (DG) equipment, or energy resource facility (ERF) equipment, from the utility distribution system. Also referred to as “Utility Disconnect”..

Direct-Connect Meter – a meter that carries full load current and connects across full line voltage. Also called a self-contained meter.

Drip-Loop – a downward loop in the Customer’s service conductors, near where the Customer’s service conductors attach to the supply authority overhead conductors, to prevent water from entering the service mast at the weather-head.

Dry Core Transformer Losses – defined in HOL’s *Conditions of Service* (ECS0012).

Emergency Backup – defined in HOL’s *Conditions of Service* (ECS0012).

EMT stands for “Electrical Metallic Tubing” – which is defined in the Ontario Electrical Code as round metal raceway that has thinner walls than rigid metal conduit intended for conductors.

Energy Resource Facility – defined in HOL’s *Conditions of Service* (ECS0012).

ERF stands for Energy Resource Facility.

IHSA stands for “Infrastructure Health & Safety Association.

FIT – defined in HOL’s *Conditions of Service* (ECS0012).

Gas refers to a combustible substance, in gaseous form, typically Natural Gas.

HOL stands for “Hydro Ottawa Limited”.

Hot Metering refers to a specific configuration of HOL owned revenue metering equipment, typically used on residential services, when the Service Entrance disconnect is connected on the Load Side of the revenue meter.

IES stands for the “Illuminating Engineering Society”.

IESO stands for the “Independent Electrical System Operator”.

Interval Meter – defined in HOL’s *Conditions of Service* (ECS0012).

Lamacoid – “a generic term commonly used for specifying 2-ply or 3-ply, laminated engraving stocks and/or the nameplates, tags, or legend plates produced from [plastic] stock.”² Can be used interchangeably with the term ‘Lamicoid’.

Line Side of a device refers to the point at which utility supplied energy enters the device. Also referred to as either the “High Side”, “LDC Side”, “Grid Side”, “Upstream” side, or “Utility Side” of a device.

Load Side of a device refers to the point at which utility supplied energy exits the device. Also referred to as the “Customer Side”, “Downstream” side, or “Low Side” of a device.

Load Displacement – defined in HOL’s *Conditions of Service* (ECS0012).

LOP stands for “Loss of Phase”.

2 – Adapted from <http://www.cuttingedgeinc.com/ref/glm2.htm> as of 2015/03/30.

LOP Protection means Loss of Phase Protection; refers to a protective device capable of sensing a fault condition, loss of voltage, and/or adverse frequency condition on a single phase of a 3-Phase system, and reacts by operating an isolation device.

Marine Grade Plywood – sheet of plywood that has been manufactured to be specifically used in wet or humid environments. It is resistant against delamination, fungal attack, rot, and decay.

MCMS see definition of “Multiple Customer Metering System”.

MCMU see definition of “Multiple Customer Metering Unit”.

MDM/R stands for “Meter Data Management and Repository” which centrally stores and manages meter data from smart meters across the Province of Ontario.

Mesh Network is a network where any device within the network can act as a repeater for network communication. A mesh network shall be able to self-heal around non-communicating devices by hopping to an operational device.

Metal-Clad Switchgear is specific type of Metal-Enclosed Switchgear. It is a metal structure containing switching equipment and other associated equipment such as instrument transformers, buses, and connections. The circuit breakers, transformers, buses, and connections are placed in separate, grounded, metal compartments, which are either unfilled (dry type) or contain a liquid, semi-liquid, or other insulating medium.

Metal-Enclosed (or Cubicle) Switchgear is a switchgear assembly enclosed on all sides and top, which may have the control, meter, and protective equipment mounted at the front or back, and the fixed primary switching devices with related equipment, including buses where required, located inside.

MicroFIT Generator – defined in HOL’s *Conditions of Service* (ECS0012).

Mimic Bus – A primary Single Line Diagram affixed on the outside face of a Switchgear showing the principle connections and electrical components contained inside.

Mullion – a vertical element that forms a division between units of a window, door, or screen, or is used decoratively; also applies to a piece of hardware that divides the opening of a pair of doors.³

Multiple Customer Metering System (MCMS) – defined in HOL’s *Conditions of Service* (ECS0012).

Multiple Customer Metering Unit (MCMU) – an individual metering panel which, when combined with multiple MCMUs form a buildings’ MCMS excluding the communication infrastructure. The MCMU panels should have the same form, fit and function as each panel within the system with only programming required to differentiate each panel’s metering requirements.

Net Metering (see also **Bi-Directional Meter**) – Typically used in installations when the Customer is primarily interested in offsetting their consumption of utility supplied power with power generated by their own equipment. Potential exists to sell power not utilized within the premise to the provincial grid.

Network Service three wire service with three conductors plus a Neutral conductor supplied from a 3-Phase, 4-Wire, Grounded-WYE power system.

Open Transition Transfer Switch – a transfer switch that “breaks contact with one source of supply before it makes contact with another”⁴. The intent of this device is to prevent back feed into HOL’s distribution system or back feed through HOL’s revenue metering equipment from the Customer owned equipment.

Pedestals – a mounting device that includes a meter socket and in some cases a breaker that is self-

³ – Adapted from <http://wikipedia.org> as of 2015/03/30.

⁴ – Adapted from <http://en.wikipedia.org> as of 2015/09/15.

supporting.

Permanent – period of time greater than one calendar year.

Primary Metered Service – a connection whose meter point is located on the primary side of a distribution transformer, at a voltage greater than 750V. Refer to HOL's *Primary Revenue Metering Specification* (GCS0032) for further information.

Professional Engineer (P.Eng) – Holder of an Ontario Professional Engineering license from Professional Engineers Ontario..

Pyrotanex – manufacturer of mineral insulated cable. In this document, the term generically refers to fire-resistant mineral insulated cable, typically copper clad, used as part of a commercial electrical installation. Also known as Pyro.

Residential Customer is defined in HOL's *Conditions of Service* (ECS0012).

Residential Service is a Service supplying a Residential Customer, typically 120/240 V, 1-phase, 3-wire, up to 400 A, and may be subject to additional restrictions.

Riser refers to a Duct or raceway that begins at the service entrance and travels from there to each of the floors in the building and through which internal electrical distribution cabling is passed, or is to be passed.

SAE stands for the "Society of Automotive Engineers".

Sea Can (or Intermodal Container) – a Customer supplied Weatherproof reusable metal box, made of corrugated steel, intended to be used in transporting goods on a ship, rail, or truck. Structures of this type generally do not have either a NEMA or CSA rating. In the context of this document, it can be used as a temporary portable enclosure.

Secondary Service is defined in HOL's *Conditions of Service* (ECS0012).

Self-Contained Meter – a meter which carries full load current and connects directly across full line voltage. Also called a "Direct-Connect Meter".

Service Size or **Service Entrance Size** – defined in HOL's *Conditions of Service* (ECS0012).

SLD stands for "Single Line Diagram".

Smart Meter – defined in HOL's *Conditions of Service* (ECS0012).

Standard HOL Padlock is a padlock that uses a 9.5 mm [3/8"] shackle; its manufacturer, model, and style is determined by HOL.

Standby Generator (see definition of "Back-Up Generator") – see HOL document ECG0002.

Strut channel often referred to colloquially by one of several manufacturer trade names, (e.g. "G-STRUT", "Flexstrut", "Kindorf", "Unistrut", "SuperStrut", "UltraSTRUT", "Strut", "Metstrut", "JIK Astrut"), is a standardized formed structural system used in the construction and electrical industries for light structural support, often for supporting wiring, electrical, plumbing, or mechanical components.

Sub-Service – defined in HOL's *Conditions of Service* (ECS0012).

Switchgear – an indoor or outdoor enclosed assembly of devices such as

- a) switches;
- b) interrupting devices;
- c) air circuit breakers;
- d) power circuit breakers; and
- e) control, metering, protective, and regulating equipment with associated interconnections and supporting structures.

Temporary – any period of time up to one (1) calendar year.

Unit Metering – see definition of “Multiple Customer Metering Unit”.

5. Requirements for All Customer Classes

All installations referenced in this document shall comply with the requirements of the latest edition of HOL's *Conditions of Service* (ECS0012), the Ontario Electrical Safety Code (OESC), all other applicable federal, provincial, and municipal laws, by-laws, specifications, and codes.

It is the Customer's responsibility to ensure that all of the Customer supplied and installed equipment meet the requirements of this document and comply with all applicable laws and codes, including the most recent edition of the OESC.

Unless noted otherwise, all mechanical fasteners including bolts, nuts, washers, spacers, etc., used to fulfil the requirements of this document shall meet, or exceed, SAE Grade 5 specifications as per SAE J429.

All disconnection devices electrically connected upstream of any HOL revenue metering, or ancillary equipment, shall have provisions permitting it to be securely locked in the "open" position with a Standard HOL Padlock. This shall include, but be not limited to, switches, disconnects, and breakers.

Meter Socket positions shall not be equipped with automatic bypass or shorting devices.

The metering equipment shall be located immediately after, and on the Load Side of the Service Entrance or main, fused disconnect.

All utility revenue metering equipment shall remain in HOL's ownership, regardless of any and all charges levied by HOL to the Customer.

5.1 Metering Responsibilities

5.1.1 Hydro Ottawa

HOL, responsibilities are explained in Section 1.7 of HOL's *Conditions of Service* (ECS0012).

HOL shall provide revenue metering, and supporting ancillary, equipment consistent with current HOL standards, the current revision of this document, the current release of HOL's *Conditions of Service* (ECS0012) and shall be auditable to meet the requirements of Ontario Regulation 22/04.

5.1.2 Customer

The Customer shall provide safe and unobstructed access for HOL for the purposes of performing work on the revenue metering, and ancillary, equipment; see Section 1.7.1 of HOL's *Conditions of Service* (ECS0012) for more information.

The Customer must provide, in a timely manner, the size and type of service required to HOL to ensure prompt service.

In the absence of permission, or direction, from HOL, no person may remove, connect or otherwise interfere with HOL's revenue meters, wires, supporting ancillary equipment, or seals.

The Customer shall be responsible for the care and safekeeping of HOL's revenue meters, wire, and supporting ancillary equipment, on the Customer's premises. If any HOL equipment on the Customer's premises is lost, destroyed, or damaged by means other than ordinary wear and tear or act of nature (not including any of insect infestation, animals, or plant/tree growth) during any and all phases of construction in the area of a HOL Meter Installation, the Customer shall be held responsible at HOL's determination.

If the metering equipment can be subject to falling icicles, ice, and/or snow from the Customer's roof, the Customer shall install a suitable ice rack or ice guard above.

The Customer shall ensure that the meter is suitably protected while work is being done adjacent to the meter and shall be entirely responsible/liable for all costs incurred relating to materials and labour for repairing or replacing a damaged meter, metering equipment, or supporting ancillary equipment that has been damaged through the Customer's action, inaction, or neglect.

The Customer shall ensure that the Customer owned equipment is properly identified, marked, and connected for metering and operation purposes. The Customer shall take whatever steps necessary to correct any deficiencies, in particular cross wiring situations, in a timely fashion. If the Customer does not take such action within a reasonable time, HOL shall disconnect the supply of power to the Customer.

The Customer shall provide space acceptable to HOL, as outlined in this document, for the installation of revenue meters, metering equipment and communications.

The Customer/owner grants HOL permission to operate the Customer's Service Entrance main disconnect breaker/switch for the purpose of meter re-verification and maintenance. The Customer shall continue to be responsible for the integrity (and repair or replacement) of the disconnect breaker/switch, meter socket, and ancillary revenue metering equipment should it be discovered any have been damaged or became damaged as a result of HOL performing its work as described above. All safety equipment must be maintained and capable of being operated, as per HOL's *Conditions of Service* (ECS0012).

For Customer's served by an individual meter socket base or by ganged (including, but not limited to, work on the conductors inside the meter base or the installation of a ATS Collar, such as GenerLink), the Customer shall contact HOL to arrange for a disconnect at their transformer.

5.2 HOL Metering Equipment and Customer-Owned Equipment

No Customer owned equipment shall be connected to any internal part of HOL owned revenue metering circuitry, except where such connection is authorized by HOL in writing.

Except for those approved exceptions listed below, no Customer owned equipment shall be installed upstream of HOL revenue metering equipment. Approved exceptions include, transformers, disconnects for the purposes of Cold Metering, and services for fire pumps.

5.3 Point of Demarcation

The point of demarcation shall be as specified in HOL Ownership Guideline documents ECG0001 and ECG0003, or as specified in the connection agreement.

5.4 Metering Equipment Location

The location of the service entrance point (or main service entrance equipment) and all revenue metering, and ancillary, equipment shall be established through consultation with HOL..

Meters may be out of roadside visibility if the building that the meter is mounted on is considered a significant heritage building under the Ontario Heritage Act, as per HOL's *Conditions of Service* (ECS0012).

No HOL revenue metering equipment shall be installed in a location that would present a hazard to a meter technician while performing HOL required work.

All indoor rated revenue metering equipment shall be installed in an electrical room or inside a weatherproof cabinet or enclosure that meet the requirements of Section 5.5 and 5.6.

With the exception of weatherproof enclosure and cabinets, the meter equipment location shall not be covered or obstructed in any way – doing so would limit the serviceability, or replacement, of the meter or meter socket base, and would restrict the Customer's access to their own meter.

The area of the finished grade, or floor, in front of all revenue metering equipment and ancillary devices shall be level for the entire width of the equipment and the entire extent of the clearance specified in this document.

Instrument Transformer cabinets shall remain within easy and obvious sight of the meter socket base.

Where one (1) service entrance provides service to a number of units, as in row housing, the service entrance shall be installed in a public area.

All HOL revenue metering equipment shall be installed next to, or within easy and obvious sight of, the service entrance disconnect it takes supply from.

Clearances for metering equipment shall meet the requirements of MCS0105, MCS0106, MCS0115.

5.4.1 Metering Equipment near Combustible Gas Equipment

HOL supplied revenue metering, and HOL supplied ancillary, equipment, enclosure, or cabinet, shall meet the minimum separation specified in HOL specifications MCS0106, MCS0107, and MCS0108.

Existing revenue metering equipment installations that do not meet the minimum clearance requirements from Gas related equipment shall not have additional equipment installed that may produce a spark. This includes, but is not limited to, revenue meters that have an integrated or external remote disconnect capability, timers, or load-limiters.

5.5 Metering Enclosures and Cabinet Construction Requirements

5.5.1 General Requirements

All metering enclosures and cabinets shall be mounted on a plumb Permanent vertical surface.

The top of the enclosure shall not be higher than 1830 mm [6'] above the floor or finished grade.

All metering enclosures and cabinets shall be mounted such that access to the metering, or ancillary, equipment does not become impeded while the entrance door (to the room or area the enclosure is installed) is open. Further, it shall be mounted such that the entrance door cannot make contact with the metering equipment enclosure doors when they are operated.

All enclosures intended to be mounted outdoors, with the exception of meter socketbases and combination base metering enclosures, require a factory installed drip-cover to be installed over all operable doors.

All metering enclosures and cabinets shall be bonded to ground using a Customer supplied ground conductor connected to the service's main grounding point using an appropriately sized conductor. HOL Metering Technicians shall also use this conductor as a reference point when using a multi-meter to measure for voltage.

Enclosures that have been altered by the Customer may be deemed unacceptable by HOL at its determination. This includes any action that reduces the rating of the enclosure and includes installation of additional hardware that has been fastened, welded or soldered to the enclosure by the Customer.

5.5.2 Enclosure Rating Requirement

5.5.2.1 Outdoor Enclosure

All meter socket bases mounted in an outdoor location shall be Type 3R or better.

Enclosure requirements as per OESC and ESA apply to all customer owner switchgear and switchboards located outdoors, except those that are directly connected to the HOL distribution system without a disconnect switch and protective device. Regardless of the minimum type of enclosure specified in the

OESC, enclosure types shall always be appropriate for the environment they are installed in. Any future issues with the enclosure due to insufficient rating shall be resolved at the customers expense

All other enclosure types mounted in an outdoor location shall be Type 3 or better.

5.5.2.2. Indoor Enclosure

The following enclosures mounted in a location that not be subject to fire suppression system (including, but not limited to, sprinkler systems) shall be Type 1 or better:

- Meter Centres,
- Instrument Transformer enclosures,

All other enclosures mounted in an indoor location shall be Type 3 or better.

5.5.3 Enclosure Thickness Requirements

The enclosure shall be constructed as per CSA C22.2 No. 94.1 and CSA C22.2 No. 94.2.

With the exception of meter socket bases and disconnect switches, all enclosures shall come equipped with a factory installed back plate or mounting plate, composed of a minimum of 1.52 mm [16 MSG] to mount all equipment installed inside the enclosure. It shall be secured to the enclosure with either appropriately sized nuts with lock washers or "posi-lock" nuts with flat washers and:

- Using no less than four (4) factory installed posts (located at the corners of the back plate or mounting plate, as shown in Figure 4 or Figure) for enclosures (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] or smaller.
- Using no less than six (6) factory installed posts (located along the edge of the back plate or mounting plate, as shown in Figure 5 or Figure) for enclosures larger than (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"].

5.5.4 Enclosure Lock Requirement

Metering enclosures and cabinets shall come with factory installed hardware allowing the cabinet to be locked against unauthorized access. It shall be such that it allows for at least one of the following,

- A single Standard HOL Padlock.
- A dual locking system including a 60 mm or 75 mm [2-3/8" or 3"] long polished steel bar that can accommodate two (2) padlocks: a standard HOL padlock and the Customer padlock.
- A Lock Box can be used for cabinets.

All locks and operating mechanics must be heavy-duty type and capable of securing the doors to make unauthorized entry as difficult as possible. The use of plastic latches or plastic locking mechanisms shall not be permitted.

5.5.5 Enclosure Doors

All hinged doors shall be factory installed, with welded hinges, and be capable of opening outward at least 90 degrees with respect to the enclosure. Doors shall constructed so as not be openable when sealed or padlocked.

All hinged doors shall be electrically bonded to the enclosure with either a #10 gauge or #12 gauge stranded cooper conductor that is either bare or has a green insulation, using factory installed posts or studs. This shall be done in such a way that it does not interfere with the operation of the hinged door.

If an individual space within enclosure is covered by two (2), or more, doors, then one (1) of them shall have a factory formed, or welded, tongue in which the other door(s) rest in when all of the doors have been closed and locked. This shall be manufactured in such a way that an object cannot be inserted into the enclosure between any two (2) closed doors.

If a double door is used, the inactive door must be equipped with two 19 mm x 250 mm [3/4" x 10"] bolts located on the inside at the top and bottom in addition to any internal locking mechanism.

Enclosures shall also be equipped with a doorstop capable of holding the door in the open position preventing it from being accidentally closed.

The enclosure shall be installed in the orientation it was designed for. Hinged enclosure doors that operate from top-to-bottom or bottom-to-top shall not be permitted.

5.5.6 Enclosure Mullions Restrictions

When the enclosure uses Mullions as part of its construction, the Mullions shall not limit the accessibility, visibility, or operability of the equipment installed in the enclosure while the Mullions are installed in the enclosure.

None of the Mullions are to restrict the operation of any of the disconnects installed in the enclosure or impede verifying the state of any of the disconnects.

None of the Mullions shall obstruct the face of the meter installed in the enclosure or impede the use of any controls present on the face of the meter.

If the Mullions can be temporarily removed, it shall be such that a single HOL meter technician can remove it using only tools they are equipped with.

5.5.7 Additional Enclosures inside an Enclosure

Unless otherwise noted, all additional enclosures to be mounted inside an existing approved enclosure, shall be subject to all of the following:

- All additional enclosures shall meet, or exceed, the requirements of Section 5.5 of this document.
- The exterior wall of all additional enclosures shall be mounted no closer than 100 mm [4"] to the interior wall of the larger enclosure.
- The serviceability of the smaller enclosure, including the operation and accessibility of all doors and access panels shall not be hindered by any part (including, but not limited to, the larger enclosure's location, doors, or Mullion) of the larger enclosure it resides within.

5.5.8 Damage to Enclosures

If any of the doors, locking hardware, or exterior of an enclosure containing revenue metering equipment has been damaged, the enclosure shall be considered de-rated from its original specification.

The Customer shall undertake one of the following:

- Replace the damaged enclosure with an undamaged enclosure.
- Repair the enclosure to its original CSA type, and have the repaired enclosure approved per ESA rule 2-024. The repairs shall be to the satisfaction of HOL.

5.5.9 Service Equipment Mounted on Poles

5.5.9.1. HOL Owned Pole

The installation of service entrance equipment, meter sockets, or enclosures used to house revenue HOL owned metering equipment on to a HOL owned pole shall not be permitted.

5.5.9.2. Customer Owned Pole

The installation of HOL revenue metering on a Customer owned pole shall be permitted only for:

- A single 120V/240V, 1-Phase, 3-Wire service entrance with a nominal ampacity of 200 A or less.
- A single 120V/208 or 347V/600, 3-Phase, 4-Wire service entrance with a nominal ampacity of 200 A or less.

The installation of a ganged metering trough, splitter trough, or metering centre on a Customer owned pole, for use by HOL revenue metering, shall not be permitted.

5.5.10 Instrument Transformer Cabinet Requirements

The size of Instrument Transformer cabinets shall be dependent on the secondary conductor size, and the type of metering installation. Refer to Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrument Transformer cabinets used in residential and/or commercial services.

The Instrument Transformer cabinet is for the exclusive use of HOL revenue metering and ancillary equipment; it shall not be used to house Customer owned equipment. The Instrument Transformer cabinet shall not be used as a splitter trough or raceway.

All Instrument Transformer cabinets shall be equipped with removable 1.52 mm [#16 Gauge] minimum sheet metal interior mounting plates or back plates. The mounting plate or back plate shall be 75 mm [3"] narrower and 75 mm [3"] shorter than the Instrument Transformer cabinet and mounted with a minimum clearance of 15 mm [9/16"] behind it.

Service conductors shall enter and leave the Instrument Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet.

If this cannot be arranged, then a cabinet with minimum dimensions of (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] shall be used. This is to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs as detailed in Table 6, and Schedule 1, , Schedule 3, Schedule 4, Schedule 5, Schedule 6, Schedule 7, and Schedule 8 located at the back of this document.

Note: Combination meter socket bases and enclosures that contain only the revenue meter (with Instrument Transformer(s)) shall be exempt from Section 5.5.10 requirements.

5.5.11 Walk-In Enclosure

All walk-in enclosures shall meet, or exceed, the requirements of Section 5.5 of this document, or a Permanent Customer constructed Weatherproof structure that meets OBC requirements, that is separate and apart from the building being served.

Customer constructed weatherproof structures shall consist of permanent walls covered in brick, siding, or stucco, and shall be covered by a permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of both the OBC and Section 5.6 of this document.

The bottom of the doorway shall be a minimum of 460 mm [1' 6"] above grade to a maximum that permits the top of the walk-in to be less than 2130 mm [7'] above finished grade.

The walk-in enclosure shall not obstruct any sidewalk, walkway, or pedestrian or vehicular traffic while its doors are in the open position.

HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-throughs” and driveways.

The Customer shall provide mechanical protection for the enclosure in the form of bollards, if required, as per Section 5.14 of this document.

An outdoor public light shall be installed on the exterior of the structure as close as practicable to the main entrance for the purpose of illuminating the structure’s entrance.

The Customer shall remove any graffiti on a regular basis or when requested.

If a landing has been constructed outside the exterior door, then both the landing and staircase shall have handrails which comply with the OBC.

The entrance to the structure shall be kept free of snow, and debris, at all times to permit easy and safe access.

The entrance to the structure shall be both obvious and visible from the road allowance nearest to it, and labelled to indicate that it contains HOL revenue metering equipment.

5.6 Electrical Room Requirements

5.6.1 Location and Construction

All indoor rated revenue metering equipment, that is not mounted inside a weatherproof cabinet or enclosure, shall be installed in an electrical room.

Electrical rooms shall be located indoors, inside a Permanent Customer built structure that meets the requirements of the OBC. All electrical rooms shall be physically part of the building being served. The use of “Sea Can” shipping containers as an electrical room for a Permanent service shall not be permitted.

The Customer shall submit to HOL for their review, a detailed proposed layout, with dimensions including width and height, prior to the start of construction, renovation, or modification of their electrical room.

The room shall have a minimum ceiling height of not less than 2130 mm [7'] above the finished grade or floor.

The room shall be large enough to accommodate the full height and width of the metering installation including a minimum of 1500 mm [5'] of horizontal clearance in front of all revenue metering equipment as per HOL specification MCS0105.

It is recommended that all electrical rooms shall be designed to include 30% spare vertical and horizontal wall capacity for future growth.

The electrical room shall provide a clear, safe and adequate working space, and shall not be a confined space as defined by HOL.

5.6.2 Access Requirements

Customers shall provide access to their electrical rooms to HOL personnel as per HOL’s *Conditions of Service* (ECS0012).

An outside fire-rated door shall provide secure access from the outdoors or a fire-rated doorway shall provide secure access from a public area and must not connect to an adjoining room.

Outside doors providing access to electrical rooms must have at least 150 mm [6"] clearance between final grade and the bottom of the door.

While the permanent structure is under construction and if the electrical room is not located on the ground floor, the Customer shall provide a stairway leading directly to the electrical room's entrance. The Permanent stairway shall meet the OBC's requirements. This staircase shall be made available to HOL personnel prior to the installation of metering equipment.

5.6.3 Access Control

The entrance door for electrical rooms that contain multi-position metered services shall be kept locked at all times, to prevent access by unauthorized personnel. The locking system shall conform to one of the following:

- A key for the electrical room shall be installed in a secure key box adjacent to the electrical room's entrance, adjacent to the proposed "public" building entrance door, or that is accessible via a Customer provided combination, installed elsewhere on the Customer's premise.
- A polished steel bar, 60 mm or 75 mm [2-3/8" or 3"] in length, that permits two padlocks to be used to secure the cabinet: a Standard HOL Padlock and the Customer's padlock.

5.6.4 Maintenance

Electrical rooms shall be maintained by the Customer and reserved for the sole purpose of the electrical equipment that it contains, and shall not contain equipment foreign to the electrical installation. The electrical room shall also be kept as clean and tidy as practicable, providing a clear, unobstructed, and safe working space in accordance with the OESC. Observed obstruction of this working space shall be remedied by HOL notifying the Fire Department and the ESA.

5.7 Heating, Drainage and Electrical Requirements for Enclosures and Electrical Rooms

The Customer, at their expense, shall install a metered "public" service in the electrical room, or enclosure(s), for the purposes including, but not limited to, running a heater, a convenience outlet, and lighting. Combination meter socket bases and enclosures that contain only the revenue meter (with instrument transformer(s)) shall be exempt from this requirement.

The ambient temperature of the location housing revenue metering equipment shall be maintained between 10 °C [50 °F] and 30 °C [86 °F].

The location housing revenue metering equipment shall be equipped with a 120 VAC, 15 A, grounded convenience outlet located within 1000 mm [3' 4"] of the metering equipment itself. It shall be protected by a dedicated single-pole, double-throw breaker.

5.7.1 Enclosures and Cabinets

The enclosure shall be equipped with adequate lighting that provides at least 500 lm/m² at the working level, in accordance with IES standards.

5.7.2 Electrical Rooms

Electrical rooms 'on' or 'below' grade must have a drain including a "P" trap complete with a non-mechanical priming device and a backwater valve connected to the sanitary sewer. The electrical room floor must slope 6 mm / 300 mm [1/4" / 12"] or 2% towards the drain.

Electrical rooms shall be equipped with adequate lighting that provides at least 200 lm/m² at the working level, in accordance with IES standards. The lighting within the electrical room shall have mechanical protection (such as a metal or wire cage) and controlled via a wall switch located adjacent to the electrical room's outer door.

5.8 Ganged Metering Equipment

The ganged meter socket trough enclosure, and any enclosures it could be mounted inside, shall meet requirements set out in Section 5.5.

The ganged meter socket trough shall be installed such that it meets the metering equipment location specifications as per Section 5.4.

Conductors from the utility supply shall enter the ganged meter socket trough through the space specifically provided for that purpose, typically found on the end of the ganged meter socket trough. The ganged meter socket trough shall not be used as a raceway.

The trough shall be equipped with 12.7 mm [1/2"] studs on the Line Side of the trough that allows for the connection of compression type lugs in the metering enclosure.

If the ganged meter socket trough is to be installed inside a weatherproof enclosure of the Customer's construction, the weatherproof enclosure shall have a Permanent roof and Permanent walls, as per the OBC, covered with brick, siding, or stucco. It shall also provide secure access to the metering equipment. The weatherproof enclosure shall be subject to approval by HOL

HOL shall supply and install compression lugs for the Line Side conductors and the ganged meter socket trough shall come with factory installed mechanical lugs for the load side conductors.

Unused positions within a ganged meter socket trough shall be covered with a Customer supplied UV rated Lexan or UV rated strong plastic cover and a steel Sealing Ring if service will eventually be re-instated. Unused metering position(s) shall not have Load Side conductors installed.

If a meter position is permanently removed, the load side conductors shall be removed and a factory supplied blank cover shall be installed over top that meter position.

The Customer shall use only the factory installed meter sockets the ganged meter trough was manufactured with. The Customer shall not modify the ganged meter socket trough so it can accommodate more meter sockets than it was manufactured for.

The Customer shall be responsible for the installation, access, and ongoing maintenance of the ganged meter base. Where there are multiple Customers supplied from the ganged meter base, each supplied Customer shall proportionally share the responsibility, based on the number of meters used for their service, of the ongoing access and maintenance of the ganged meter bases.

5.9 Disconnect Switch

Disconnect switches required by this specification shall have over-current protection on the line or load side of the revenue meter. The nominal rating of the switch's overcurrent protection shall be equivalent to the service's ampacity.

The top of a disconnect switch shall be at a minimum 1200 mm [4'] to a maximum of 1830 mm [6'] above the floor or finished grade.

The bottom of the service entrance disconnect, meter socket base, or combination socket base and disconnect shall be not less than 1050 mm [3' 6"] above finished grade.

All disconnect switches shall be labelled as per the requirements of Section 5.9.

All disconnect switches shall each be equipped with at least:

- Cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.
- Pad-locking provisions for the switch handle in the “OFF” position.
- Pad-locking provision for the cover useable by HOL to place a tamper prevention seal.

5.9.1 Service Entrance Disconnect

The service entrance disconnect shall be approved use as service equipment per the OESC.

The service entrance disconnect shall permit padlocking with a Standard HOL Padlock.

All metering sockets shall be installed within view of the service entrance disconnect.

5.9.2 Load Side Disconnect

The load side disconnect switch shall be located in the building’s primary electrical room.

The load side disconnect switch shall be capable of opening all phases simultaneously, while leaving the neutral conductor closed, and come with the obvious means to visibly verify its state.

The load side disconnect switch shall be such that it can be locked, with a Standard HOL Padlock, in the “open” position.

The load side disconnect shall be incapable of remote operation and shall not contain any equipment that gives it any remote operation capability.

5.10 ESA Inspection Requirements

Inspection must be completed before connection per Hydro Ottawa Conditions of service ECS0012.

5.11 Metering Seals

All Customer supplied and installed meter sockets shall be compatible with sealing rings in use by HOL as a means of sealing the meter to the meter socket base. Refer to Tables, Table 1A, Table 2, Table 3, Table 4, Table 5, Table 5A, Table 5B, Table 7, Table 8, Table 9, Table 10, and Table 11 at the end of this document for requirements, specifications, and lists of HOL approved meter socket bases.

Only a HOL employee, agent, or another person lawfully entitled to do so on HOL’s behalf, may conduct work on HOL revenue metering equipment. No Customer shall remove, connect, alter, repair, or tamper with HOL’s revenue metering equipment.

Customers conducting maintenance on their electrical systems and require the seals to be cut shall contact Hydro Ottawa to arrange for a Service Isolation.

In the event that the Customer does any of the following HOL shall dispatch a Meter Technician to re-inspect the service and, if found satisfactory, install new seals as needed:

- Removes one (1), or more, HOL installed seals to gain access to replace blown or damaged fuses in the service entrance main disconnect or to access the interior of a splitter trough that contains conductors on the Line Side of the meter.
- Notices that one (1), or more, HOL installed seals on their equipment have been removed or have become damaged such that they no longer effectively seal the equipment they are attached to.

5.12 Metering Conduit Requirements

Metered conductors shall be housed in a separate dedicated conduit for HOL exclusive use. Conduits that connect to an enclosure shall not de-rate the enclosure's CSA rating.

Conduits shall have properly installed fire stop.

All revenue metering conduits shall incorporate no more than three (3) 90° bends or 90° fittings per run. Metering conduit size shall conform to the following table.

Conduit Size	No. of Phases	Min Conduit Run Length	Max Conduit Run Length
27 mm [1"]	1	N/A	20 m [65']
35 mm [1 1/4"]	3	N/A	20 m [65']
35 mm [1 1/4"]	1	20 m [65']	30 m [100']
41 mm [1 1/2"]	3	20 m [65']	30 m [100']

All conduit shall be continuous in length (i.e. it shall not use any unnecessary splice fittings along its run).

All empty metering conduits longer than 5800 mm [20'] shall have a rope 6 mm [1/4"] or more in diameter fished through them. The rope shall be of sufficient strength to pull conductors through the conduit prior to the installation of metering equipment.

All conduit connected to a 13-Jaw meter socket base shall do so using the factory manufactured knock-outs located on the bottom-half of the meter socket base.

5.13 Transformer Rated Meter and Instrument Transformer Installation

5.13.1 Instrument Transformer Requirements

Instrument Transformers may be required as part of a metering installation depending on the voltage and amperage of the service being metered.

The Instrument Transformer enclosure shall be located immediately after, and on the load side of, the main fused disconnect or breaker, inside the building and in the same electrical room, and within sight, of the service entrance main disconnect or breaker.

The Instrument Transformers shall be supplied and installed on site by HOL Metering Services. Refer to Table 10 located at the end of this document, to determine the type and quantity of Instrument Transformers required.

Instrument Transformer placement within the enclosure shall be such that it shall maximize primary and secondary terminal accessibility. Proper polarity orientation shall be required with the CT's polarity marks pointing towards the utility supply. The nameplate may be oriented upside-down or sideways, allowing for ease of serviceability of the terminations.

All Instrument Transformers used as part of the revenue metering installation shall be subject to the following:

- All CTs used in services with an Ampacity up to, and including, 1200 A shall be of the Bar Type CTs.
- All CTs used in services with an Ampacity exceeding 1200 A shall be of the Doughnut Type CT.

All secondary conductors that enter or exit an Instrument Transformer cabinet shall be housed in conduit that meets the requirements for conduit already contained in this document; see Section 5.12 of this document for more information.

5.13.2 Conductor Requirements

Services over 200A, with the exception of services described in Section 6.4.2.1 of this document, require the secondary conductors to enter and leave the Instrument Transformer cabinet at opposite lower sides or the bottom of the Instrument Transformer cabinet housed in conduit that meets the requirements already contained in this document; see Section 5.12 of this document for more information.

Conductors terminating at the main service entrance disconnect, at HOL owned revenue metering equipment, or at any operable device that may be operated by HOL personnel (under the direction of the device's control authority) including, but not limited to, DG / ERF Disconnects, shall be subject to the following:

- Conductors installed for the purposes of bonding surfaces to ground shall be comprised of copper.
- The use of Pyrotanex (sometimes referred to as 'Pyro') conductor as service conductors is acceptable in limited instances. Contact HOL Metering Systems Section for more information.
- When using copper conductors, both mechanical and compression lugs are acceptable means of termination.
- When using aluminum conductors:
 - For services up to and including 200 A, both mechanical and compression lugs are acceptable means of termination.
 - For services greater than 200 A, the conductor shall be terminated with a compression lug.
- Conductors terminating at an Instrument Transformer, regardless of service Ampacity, shall be terminated with compression lugs.

Continuous runs of conductor shall be used between the service entrance disconnect and the first device on the customer side of the metering equipment.

A minimum length of each conductor for both line and load side of the bar type (in-line) CTs will be 1200 mm [4'] shall be provided within the Instrument Transformer cabinet.

All secondary conductors shall be obviously marked at their terminations using electrical phasing tape as follows:

- For 1-Phase Services: White phasing tape shall be used to identify the Neutral conductor.
- For 3-Phase Services: Red tape shall identify the A-Phase of supply, Black tape shall identify the B-Phase, Blue tape shall identify the C-Phase, and White phasing tape shall identify the Neutral conductor.

All conductors on the line side and the load side of a device shall be identical in type, quantity, and size.

Mineral insulated, solid, or hard drawn wire conductors are not acceptable for meter loops. Any variation from the above must be approved by HOL prior to the installation.

The termination of two (2), or more, conductors within the same mechanical lug barrel shall not be permitted. Double barrel mechanical lugs shall be used instead.

Conductors shall be secured onto a device, such as an Instrument Transformers, terminal blocks, etc., with fasteners that meet SAE Grade 5 specifications.

All HOL installed metrology revenue metering conductors (used to connect an Instrument Transformer) shall be copper only sized as per Measurement Canada document S-E-10.

For three phase services, a full sized Neutral conductor shall connect the Neutral bus in the main service entrance disconnect or switchgear, to the instrument cabinet. The Neutral conductor shall be terminated by the customer on an isolated neutral block provided and installed by the Customer in the instrument cabinet prior to the installation of metering equipment.

If the Customer does not require the use of the full-sized neutral conductor, the full size neutral conductor shall be extended from the meter enclosure and terminated at the next device where practicable. This shall be done so that if the Customer requires it in the future it will be available to them.

If a Customer's requests a reduced sized neutral conductor, and their service meets the requirements of the OESC, the Customer shall provide sufficient information to HOL to be used for considering a technical deviation approval.

Where parallel neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block.

5.13.3 Isolated Neutral Terminal Block Requirements

On all 3-Phase services, using Instrument Transformers, the customer shall supply and install an isolated neutral terminal block in the Instrument Transformer cabinet. The isolated neutral terminal block shall be mounted as follows:

- If mounted within a CSA Type 3, or better enclosure, the neutral block shall be mounted centred at the bottom of the back plate or mounting plate in the CT cabinet. Refer to Schedule 7 and Schedule 8 located at the back of this document for more details.
- For all other enclosure types, the neutral block shall be mounted such that it is centred in the bottom of the enclosure. Refer to Schedule 5 and Schedule 6 for more details.

The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the type of material of the conductors.

The isolated neutral terminal block shall be required even if the Customer does not require the use of the full-sized neutral conductor.

5.13.4 Conductor Termination of Bar Type Transformers.

The Customer shall provide mechanical lugs or compression lugs to connect the service conductors to bar type CTs. HOL's metering personnel shall train the conductors, cut the length of the conductors, and complete the termination to the bar type CTs.

Where parallel conductors are used, the Customer shall train, cut the length, and complete the termination of the conductors to the bar type CTs as per Section 5.13.2 of this document.

5.14 Bollards

The Customer shall supply, install, and maintain protective bollards around the outdoor metering enclosure, cabinet, walk-in, or pedestal for the purposes of providing mechanical protection and act as a mechanical barrier for HOL personnel against passing traffic.

Note: Third Party Utility Owned Metered Pedestal services described in Section 7.4.4 of this document are exempt from this requirement.

Bollards shall be required if any of the following conditions exist or if HOL deems it required.

- The metering equipment installation location is inside an area that can be accessed by a motor vehicle (including automobiles, sport-utility vehicles, and trucks), or within 2000 mm [6' 6-3/4"] of

an area that can be accessed by a motor vehicle (including automobiles, sport-utility vehicles, and trucks), where they easily achieve speeds in excess of 20 km/h.

- The metering equipment installation location is in an area that will be subject to grounds maintenance equipment operating within 1000 mm [3' 4"] of the metering equipment, capable of causing significant mechanical damage to the metering equipment. This includes snow clearing equipment and large riding lawn mowers.

The bollards shall be installed in sufficient quantity to provide adequate protection to the satisfaction of HOL.

The bollard shall consist of a steel jacket filled with concrete, and meet the requirements of HOL Specification UFS0001.

Bollards shall be positioned around the enclosure, cabinet, walk-in, or pedestal, as per UGS0002.

Bollards shall be positioned in such a way that they do not interfere with the accessibility, or maintainability, of the enclosure, cabinet, walk-in, or pedestal nor shall it interfere with the accessibility or maintainability of the equipment it contains.

It is recommended that the bollards be painted in a highly visible colour. If painted, the paint itself shall be such that:

- It is intended, by the paint's manufacturer, to be used outdoors.
- It is intended, by the paint's manufacturer, to cover the material(s) the bollard is comprised of.
- It shall act as a mechanical barrier, helping to protect the bollard against corrosion and water damage.

5.15 Plywood Mounting Board

All revenue metering equipment installations require a minimum 15.5 mm [5/8"] thick plywood mounting board.

The Customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 15.5 mm [36" x 36" x 5/8"] for the exclusive use of HOL's metering equipment.

The customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 1200 mm x 1200 mm x 15.5 mm [48" x 48" x 5/8"] for the transformer rated combination base metering enclosure, and metering equipment communications enclosure for Interval Metering of Standard Commercial 3-Phase Services.

The following equipment are the excepted from this requirement:

- revenue metering equipment typically installed for a single residence (including individual 4-jaw meter socket bases and 5-jaw combination base metering enclosure);
- revenue metering equipment installed inside of an enclosure, and;
- revenue metering equipment installed inside a Customer constructed Weatherproof enclosure

The surface of the plywood mounting board is for the exclusive use of HOL revenue metering equipment. Customer-owned equipment onto the plywood mounting board shall not be permitted.

The plywood shall be:

- Fire resistant treated plywood, and bear a stamp indicating it to the effect of, or
- Covered on all sides with a fire retardant paint prior to its installation. The fire retardant coating shall provide a maximum flame spread rating of 25 (Class A) in accordance with ULC document CAN/ULC-S102.

Marine Grade Plywood shall be used for outdoor installations.

The plywood shall be mounted plumb and level with its long dimension parallel to the finished floor.

If mounted directly on a permanent wall, the plywood shall be mounted flush; it shall not be recessed into the wall.

If the plywood is fastened directly to a wall, it shall be done such that the plywood is secure, and not permitted to buckle, bow, peel, or be lifted off the wall.

If more than one (1) sheet is required, the plywood shall be mounted such that each sheet is butted up against the next one, leaving no gaps between the sheets.

If the wall is not suitable to mount the plywood, due to excess condensation or other considerations, appropriately sized strut channel members shall be mounted vertically on the wall and the plywood mounted overtop the strut channel members. They shall be long enough to span the entire width of the plywood sheet. The members shall be installed such that each end of the plywood sheet is supported and there is no more than a 1200 mm [4'] span of unsupported plywood. This is to provide an air-gap to help prevent, or slow, the excess moisture from damaging the plywood.

If there is insufficient room on the electrical room walls for the plywood mounting board, the plywood sheet may be mounted on an open-air frame comprised of appropriately sized strut channel members. The members shall run floor to ceiling, and secured to the floor with an appropriately sized foot that permits the installation of four (4) fasteners; the same shall be used to secure the member to the ceiling. The members shall be installed such that each end of the plywood sheet is supported and there is no more than a 1200 mm [4'] span of unsupported plywood.

If fastened to Strut channel members, it shall be secured to it by using one of the listed fasteners:

- Appropriately sized "Channel Nut", with or without spring.
- [3/8"] bolt with [1"] washer, secured with [3/8"] posi-lock nut with [1"] flat washer, or [3/8"] nut, lock-washer, and [1"] flat washer, to be placed through both the plywood and Strut channel member. Flat washers to be placed against the plywood and intended to prevent the bolt from being pulled through the plywood in the event the nut is over tightened. All bolts shall meet, or exceed, SAE Grade 5 specifications as per SAE J429.
- Fasteners shall be used to secure the corners of the sheet and every linear 600 mm [2'] after along the Strut channel member.

5.16 Utilization of Permanent Labels and Tags

Customer shall provide nomenclature used to identify primary disconnects, and multiple meters used in buildings with multiple services, including apartment buildings, condominiums, strip malls, and shopping malls.

The Customer shall mark, or provide permanent, and legible nomenclature, to identify each Meter Socket base, and secondary sub-service disconnect if present with the civic address and the number of the unit being served.

The Customer shall provide Permanent, and legible nomenclature to identify the unit number either on, or adjacent to, the door of each unit being served, the unit number shall match the one on the ESA permit.

The Customer shall mark, or provide permanent and legible nomenclature to identify the main disconnect or breaker, and the individual disconnects or breakers for each service being metered on the permanent non-removable portion of the meter socket enclosure (it shall not be put on a removable cover). The medium used to display the nomenclature shall be fastened by a method that is both resistant to moisture and mechanical wear (i.e. cannot be accidentally removed or rubbed off). Nomenclature shall be resistant to fading due to age, mechanical wear, and UV light.

The Customer's electrician shall verify the accuracy of the Customer's nomenclature prior to the request for energization.

All nomenclature fonts shall be at least 50 mm [2"] in height. This includes, but is not limited to, services for strip malls, shopping malls, individual store fronts, and buildings with multiple residential units.

Newly constructed multi-unit buildings shall not be energized until clear and Permanent nomenclature, identifying the unit being served, has been applied to the metering enclosure associated with each unit.

The Customer, owners, and property managers of the buildings shall inform HOL if changes are made to the unit numbering in a timely manner to ensure proper association of revenue meters, and electricity bills, to Customers.

5.17 Termination of a Customer's Metered Secondary Service

If a metered service is no longer required, the Customer shall contact HOL and follow the process outlined in HOL's *Conditions of Service* (ECS0012).

For individually supplied services (such as those used for a detached residence), HOL shall remove both the Line Side conductors and revenue metering equipment.

The customer can leave load side conductors from the meter socket base in place if they choose to do so. it is recommended that the exposed meter socket base be covered with a customer supplied uv rated lexan or uv rated strong plastic cover secured using the existing sealing ring.

For 1-Phase services that are supplied from a ganged-meter trough, metering centre, or from a splitter trough:

- HOL shall remove the revenue metering equipment in conjunction with the removal of the meter-socket Load Side conductors.

Note: the ganged-meter trough, metering centre, or splitter trough, shall remained energized after the Customer service to be terminated has been de-energized to continue supplying the remaining Customers.

- The Customer shall remove the load side conductors in the meter socket base to ensure internal electrical safety and also to ensure that there is no inadvertent energy usage.
- If the Customer intends to re-energize the service within the next calendar year, the exposed Meter Socket base is to be covered by a Customer supplied UV rated Lexan or UV rated strong plastic cover, steel Sealing Ring, and a HOL supplied and installed meter Seal.
- If the Customer does not intend to re-energize the service within the next calendar year:
 - If the newly vacated Meter Socket is part of a ganged meter trough or metering centre, the Customer shall provide and install a factory supplied metal cover to cover the vacated Meter Socket position.

- Services that take supply from a splitter trough are to have the Meter Socket covered by a Customer supplied UV rated Lexan or UV rated strong plastic cover, steel Sealing Ring, and a HOL supplied and installed meter Seal.

For 3-Phase services that are supplied from a splitter trough, the Customer shall remove the Line Side conductors from the splitter trough to the service main disconnect, to ensure internal electrical safety and also to ensure that there is no inadvertent energy usage. HOL shall remove the revenue metering equipment after it has been verified that the meter-socket Load Side conductors have been removed and lock the disconnect switch in the “open” position. Note that the splitter trough shall remain energized after the Customer service has been removed to continue supplying the remaining Customers.

5.18 Check Metering Equipment

A check meter may be installed for verification purposes: potential losses generated by Customer owned devices, Multi Customer Metering systems, and unauthorized power diversion.

The check meter shall not be used for revenue billing purposes during construction of the project. The intent behind this requirement is based on the check meter installation not meeting all of the requirements of a revenue meter.

The check meter shall be installed within view of the Service Entrance main disconnect or breaker inside an electrical room, or if outdoors inside an approved Weatherproof enclosure.

The check meter shall be installed such that it is connected immediately after the building's Service Entrance main disconnect or breaker and before the dry-core transformers.

The check meter type shall be selected as per the services amperage rating and installed as per Sections 5.4 or 5.13 of this document, to account for the losses created by the Customer owned dry-core transformer and the conductors that deliver the energy to the residential units.

5.19 Meter Centres

Meter centres may be used for applications less than 750V.

All meter centres enclosures shall meet the requirements of Section 5.5 of this document.

Metering centres that are not outdoor rated shall be mounted in an indoor location. Indoor locations may include, but are not limited to, electrical rooms, Customer built Weatherproof enclosures, and outdoor rated enclosures and walk-ins that meets the requirements of Section 5.5 & 5.6 of this document.

Metering centres installed in corrosive environments shall be installed inside an enclosure that meets the requirements of Section 5.5.2 of this document.

An approved, suitably rated socket base meter centre located on the Load Side, and immediately adjacent to, the Service Entrance main disconnect for the building is required. Each meter position within the meter centre shall be “Cold Metering” protected by an appropriately rated Circuit Breaker for each distinct unit it supplies.

Refer to HOL Specification MCS0036 for construction details.

The centre of the bottom row of meter positions shall be not less than 600 mm [2'] above the finished floor. The centre of the top row of meter positions shall be not more than 1830 mm [6'] above the finished floor.

The distance between adjacent Meter Socket rims along the horizontal shall not be less than 150 mm [6"].

The distance between adjacent Meter Socket rims along the vertical shall be:

- For 100A, 4-Jaw or 5-Jaw Meter Sockets, not less than 75 mm [3"].

- For 100A, 7-Jaw Meter Sockets, not less than 150 mm [6"].
- For 200A, 4-Jaw, 5-Jaw, or 7-Jaw Meter Sockets, not less than 150 mm [6"].

Side-hinged doors, or panels, shall be installed over all sections of the Switchgear where HOL may be required to work including un-metered sections and those sections containing breakers or switch and meter mounting devices.

Breakers or switch handles shall have provisions for positive sealing and permit them to be padlocked, with a Standard HOL Padlock, in the "open" position.

Meter jaw arrangements shall be factory installed and not retrofitted to meet service requirements.

Each individual Meter Socket position, associated breaker, and breaker cover plate shall have adequate space for Permanent Customer identification, and each shall be identified as per Section 5.16.

The meter mounting socket and metal Sealing Ring shall be such that it can be sealed by HOL.

When a Neutral conductor is required for metering, the meter-mounting device shall have a pre-wired, ungrounded Neutral connection to the 5th terminal in the 5-Jaw socket, or 6th terminal in the 7-Jaw socket. The connection, if not made directly to the Neutral bus, shall not be less than a white #10 AWG conductor, or equivalent.

Refer to HOL Specification MCS0018 for wiring detail connection configuration.

5.20 Splitter Trough Applications

When a Splitter Trough is required as part of the metering installation, the Customer shall provide and install a CSA or ULC approved trough that is suitably rated for the application.

The splitter trough shall be installed such level and plumb.

The splitter trough shall be mounted horizontally; if space does not permit, and after obtaining HOL's approval, the splitter trough may be mounted vertically.

The Customer shall supply and install an isolated neutral block to be installed at a location within the splitter trough. A full-sized Neutral conductor shall run from the Neutral bus in the Service Entrance disconnect to the isolated neutral block. The full-sized Neutral conductor for each metered service shall be supplied from the isolated neutral terminal block inside the splitter trough.

Each service coming out of the splitter trough must go directly into a lockable disconnect with an isolated neutral block before proceeding to the individual socket type meter base.

The splitter trough shall come with factory installed hardware that permits its door to be locked with a Standard HOL Padlock and HOL installed Seal.

The splitter trough's door shall be either:

- Attached to the trough via a factory installed hinge such that it permits the door to be opened downwards.
- Normally secured to the trough by multiple bolts, or studs, such that it permits the door to be removed completely.

Refer to HOL Specification MCS0037 for construction details.

6. Residential Customer Class

This section of the document refers to the supply of electrical energy to residential Customers residing in detached, semi-detached, duplex, triplex, or townhouse dwelling units in urban and rural areas, as well as those residing in units that are part of multi-story apartment or condominiums. These requirements are in addition to those set out in Section 5. HOL owned revenue metering for residential services shall use Hot Metering.

Residential services are typically 120V/240V, 1-Phase, 3-Wire, 200A or less, self-contained services; services greater than 200A will require provisions for external Instrument Transformers to be installed.

6.1 Meter Location

6.1.1 Meter Socket Base Location

The meter sockets shall be located outdoors, in a location approved by HOL, normally on the side or front of the residence closest to the point of supply and in front of any existing, or proposed fence.

The location and installation of the meter socket base shall meet the requirements of Section 5.4.

Refer to HOL specifications MCS0105 for more information.

6.1.2 Ancillary Equipment

All HOL supplied supporting ancillary, equipment shall be installed on the same wall of the residence as the meter.

When installed directly onto the exterior surface of the residence's wall the disconnect switch, HOL supplied revenue metering equipment, and supporting ancillary equipment, shall be installed on the same surface and within 1000 mm [3' 4"] of each other. It shall meet the requirements of Section 5.4 of this document.

When installed inside an enclosure that either meets, or exceeds, the requirements of Section 5.5 of this document, or within a Customer constructed waterproof enclosure it shall be such that it can be secured using a polished steel bar as per Section 5.5.4. This shall be done to permit access by both the Customer and HOL personnel to the revenue metering equipment.

If an enclosure is used, it shall be large enough to house the disconnect switch the revenue meter, meter socket, and communications enclosure and shall meet all the requirements of Section 5.5.

HOL recommends that an appropriately rated view port be installed in the door of the enclosure that would allow the customer to have easy access to the revenue meter's display. If installed, it shall be centred over the revenue meter and be large enough to see the entire face of the meter.

HOL recommends installing the revenue metering, and supporting ancillary, equipment inside an outdoor rated enclosure as it can protect the equipment it contains from mechanical damage and can prevent access by unauthorized personnel.

6.1.3 Equipment near Driveways

Should metering be requested to be installed on the side of a residence that faces a driveway separating the residence from its neighbour, the request shall be subject to all of the following:

- If the driveway is not shared and is consistently a minimum of 3000 mm [10'] wide along its entire length (as shown in Schedule 9 of this document), the meter may be mounted on the side of the residence that faces the driveway of the Customer who owns the driveway.

- If the driveway is shared by the Customers of both residences, and is consistently a minimum of 3000 mm [10'] wide but less than 3600 mm [12'] wide along its entire length (as shown in Schedule 10 of this document), the meter may be mounted on the side of the residence of the Customer who makes the request first.
- If the driveway is shared by the Customers of both residences, and is consistently a minimum of 3600 mm [12'] wide along its entire length (as shown in Schedule 11 of this document), the meter may be mounted on the side of both residences that faces the shared driveway.

6.2 'Wired' Smart Meters

The standard residential revenue meter used by HOL contains a small wireless radio used to relay metering data back to HOL for billing purposes.

As an alternative, HOL offers revenue metering equipment that uses a dedicated telephone line to communicate with HOL, in lieu of the wireless radio, available for additional cost to the Customer. An installation of this type shall be subject to HOL specification MCS0080 and the conditions described in this section.

Residential revenue metering equipment that uses a telephone line to communicate is not a standard item that HOL keeps in stock as a result HOL requires a minimum of 16 weeks of lead-time to procure, configure, and install the residential revenue metering equipment that uses a telephone line to communicate.

The Customer shall be responsible for the cost of procuring the residential revenue metering equipment that uses a telephone line to communicate, a spare revenue meter (as applicable), communications equipment used by the revenue meter, and any additional ancillary equipment that may be needed.

HOL shall retain ownership of all revenue metering, communications, and ancillary equipment.

The Customer shall supply and install a disconnect switch, with over-current protection, on the Line Side of the revenue meter. The nominal rating of the switch's over-current protection shall be equivalent to the Service Entrance Ampacity.

6.2.1 Communications

Reliable communications between HOL and the revenue meter equipment is essential. It enables HOL to provide the Customer with accurate billing and the best customer service experience.

The Customer shall make provisions to install a dedicated telephone line for the exclusive use of HOL to communicate with the revenue metering, and supporting ancillary, equipment connected to their service.

The cost of installing and maintaining the telephone line shall be at the Customer's expense.

The telephone line shall be separate and apart from the telephone line used to provide service for the residence.

The telephone line shall be available for use by both HOL and revenue metering equipment at all times of the day.

The telephone line shall be such that it can be dialled directly by HOL.

A single telephone line shall not be shared among different Customers.

In the event that an individual Customer has more than one revenue meter, then a single dedicated telephone line may be used by HOL to communicate with all of the Customer's revenue meters.

A RJ-11 (4 pin) telephone jack receptacle is to be provided and terminated on the telephone cable within the meter's communications enclosure with 300 mm [12"] to 460 mm [1' 6"] telephone cable to allow for mounting the telephone jack inside the enclosure.

6.2.2 Enclosure

The Customer shall supply and install an enclosure to house the communications equipment. The enclosure shall meet the requirements for metering enclosures already contained in this document; see HOL document MCS0080 and Section 5.5 of this document for more information.

The enclosure shall have minimum dimensions of (H x W x D) 400 mm x 400 mm x 150 mm [16" x 16" x 6"].

The enclosure shall be installed within 75 mm [3"] to 130 mm [5"] of horizontal distance to the Meter Socket.

The Customer shall supply and install a 120VAC receptacle within the enclosure for the exclusive use of the revenue meter's communications equipment. The outlet shall take supply from the customer's panel, downstream of the customer's service entrance disconnect.

- The grounded duplex outlet shall have factory installed GFCI capability as per OESC.
- The grounded duplex outlet shall take supply from, and be protected by, a dedicated breaker that can be locked in the "closed" position with a Standard HOL Padlock while still able to maintain trip-free operation in the event of a Fault.
- If the Customer uses a fuse panel, in lieu of a breaker panel, for their residence then the Customer shall supply and install a "pony" panel, or electrical "sub-panel", for the purposes of housing the breaker.

In the event that multiple residential Customers that reside in a duplex, row house, or condominium request that their conventional revenue metering equipment be substituted with revenue metering equipment that uses a telephone line to communicate, each of the requesting Customer shall supply and install a separate communications enclosure to enclose additional communications equipment.

Each of the additional communications equipment installed shall take supply from the Appropriate Customer's panel.

6.2.3 Upgrades

HOL shall upgrade the equipment used by the revenue meter to communicate when HOL deems it obsolete, end-of-life, or is no longer commercially available; this shall be done at the Customer's cost.

HOL, at its determination, may replace the revenue metering equipment that uses a telephone line to communicate with conventional revenue metering equipment that instead uses a wireless radio if any of the following occurs:

- HOL loses communications with the revenue metering equipment for a period of more than five (5) business days.
- HOL deems the telephone line capacity, availability, reliability, or quality to be insufficient to properly support communications between HOL and the revenue metering equipment.
- HOL deems the 120VAC grounded duplex plug providing supply to the communications equipment to have insufficient capacity, availability, or reliability to support the revenue metering equipment.

HOL may re-install the revenue metering equipment that uses a telephone line to communicate, as soon as Practicable, only after the issue causing the lost communications has been remedied to HOL's satisfaction.

6.2.4 Ineligibility

Residential revenue metering equipment, that uses a dedicated telephone line, is intended for residential customers that are both individually supplied and individually metered. Residential customers that have one of the following are ineligible:

- ERF equipment (as described Section 12 of this document) installed on their premise.
- Automatic Open Transition Supply Transfer systems, such as GenerLink.
- Emergency Power Supply (as described in the OESC) installed on their premise.
- Revenue meter for their service mounted on a Customer owned pole shall not be eligible.
- Are supplied from a ganged meter trough, metering centre, or take supply from a splitter trough. Consult with an HOL Service Layout Agent to determine feasibility and eligibility.

6.3 120V or 240V, 1-Phase, 2 Wire Services

HOL does not provide 120V or 240V, 1-Phase, 2-Wire services as a standard offering on new services, as per HOL's *Conditions of Service* (ECS0012).

6.4 120V/240V, 1-Phase, 3-Wire, Individual Services

The Customer is required to supply and install an approved Meter Socket with a screw type Sealing Ring for service up to 200A.

The meter socket base shall be equipped with 12.7 mm [1/2"] studs on the Line Side of the metering enclosure that allows for the primary connections of compression type lugs in the metering enclosure.

HOL shall supply and install compression lugs for the Line Side conductors in the Meter Socket enclosure.

Meter sockets bases shall meet all the requirements relevant to its configuration set out in Section 5.

6.4.1 Overhead Services

The customer shall refer to Table 1, located at the end of this document, for a list of HOL acceptance criteria for the meter base socket and HOL Specification MCS0018 for wiring details.

6.4.1.1. Ganged Meters

If a ganged meter trough is used in conjunction with a 200A overhead service, it shall consist of no more than an individual ganged meter trough that has no more than six (6) metering positions.

The ganged meter trough shall not be altered as per Section 5.8 of this document.

6.4.1.2. Splitter Trough

If a splitter trough, in conjunction with individual Meter Socket bases, is used in conjunction with a 200A overhead service, the overhead service shall be used to supply no more than six (6) individual Meter Socket bases.

6.4.2 Underground Services

A 1-Phase service served from an underground supply system by HOL requires a minimum 200A Meter Socket, designed for connection to an underground supply system.

The customer shall refer to Table 1A, located at the end of this document, for a list of HOL acceptance criteria for the Meter Socket base and HOL Specifications ECS0002 and MCS0018 for construction details.

6.4.2.1. Services 225A to 400A (Underground Services)

The Customer is required to supply and install an approved 120V/240V, 400A, transformer rated combination base metering enclosure that meets, or exceeds, the requirements of Section 5.5 of this document, with screw type Sealing Ring.

The Residential services that use an Instrument Transformer mounted inside an indoor location, with the meter base installed at an outdoor location, shall upgrade the Meter Socket to one described above. The empty Instrument Transformer cabinet shall be removed as it will no longer be required. See HOL specification MCS0077 for details.

Metering equipment shall be installed as per Section 5 of this document.

Refer to Table 3, located at the end of this document, for a list of HOL approved Weatherproof combination base metering enclosure and HOL Specifications MCS0003 for construction details.

The standard residential revenue meter used by HOL on transformer rated residential services contains a small wireless radio used to relay metering data back to HOL for billing purposes.

6.4.2.2. Services Greater Than 400A, Underground Services

Refer to HOL Conditions of Service ECS0012 for standard offerings.

6.4.3 Instrument Transformer Replacement

If an Instrument Transformer on a 120V/240V, 1-Phase, 3-Wire, up to 200A, transformer rated service requires replacement as a result of ordinary wear and tear or has reached the end of its service life, HOL, at its determination, shall require the Customer to replace the existing metering equipment with an equivalent Self-Contained Meter.

As part of replacing the metering equipment, HOL at its determination shall:

- Remove the existing transformer-rated meter, Instrument Transformers, fusing blocks (if present), and test-switch blocks (if present).
- Require the customer replace the existing Meter Socket base, if required, in situ, with an approved Meter Socket base of equivalent Ampacity.
- Install a self-contained meter of adequate ampacity.

Refer to HOL specification MCS0077 for more information.

6.5 Residential Townhouses & Condominiums

When metering is required for continuous row of townhouses or condominiums, the Customer shall provide and install metering enclosure(s) that meet the requirements of Section 5 of this document.

6.5.1 Aggregated Services Less than 400 A

When metering is required for a residential townhouse or condominium development, with up to a 400A aggregated service, the Customer shall meet the following requirements.

An approved 120V/240V, 1-Phase, 400A, multi-position ganged Meter Socket trough, with approved Meter Socket bases which meet Section 5.8 specifications.

Meter gang socket trough shall be installed on the exterior wall of the building, or unit, as per Section 6.1.

Refer to Table 2, located at the end of this document, for a list of HOL approved multi-position meter gang socket trough and to HOL Specification MCS0021 for construction details.

6.5.2 Aggregated Services Greater than 400 A

When metering is required for a residential townhouse or condominium development, with a greater than 400A aggregated service, metering shall be on the Load Side of the disconnect/breaker supplying each individual unit, and be located either inside or outside of the building.

6.5.2.1. Meter Requirements

The Customer shall supply and install an approved metering centre, with appropriately rated Service Entrance disconnect switch / breaker with a sufficient number of approved Meter Socket positions for each unit being served as illustrated in HOL specification MCS0036.

Or:

The Customer shall supply and install a Service Entrance disconnect switch, lockable and sealable splitter trough, and an individual disconnect switch and individual approved Meter Socket base for each service to be metered as illustrated in HOL specification MCS0037.

The Service Entrance disconnect shall be installed at a height that meets the requirements of Section 5.9 of this document.

If individual Meter Socket bases with splitter trough are used, they shall be installed at a height that satisfies the requirements of Section 5.8 of this document.

If a meter centre is used, it shall be installed such that the top of the meter centre enclosure is no more than 1830 mm [6'] above the finished floor.

All 120V/240V, 1-Phase meter centres shall use only 4-Jaw Meter Sockets. If the socket is supplied with a 5-Jaw installed, it shall be removed prior to the installation of the metering equipment.

Each Meter Socket shall have clear and unambiguous nomenclature indicating which unit the meter base is connected to as per Section 5.16.

6.5.2.2. Outside Meter Enclosure and Cabinet Requirements

Metering enclosures shall meet the requirements of Section 5.5.

The bottom of the access doors shall be no less than 460 mm [1' 6"] above the finished grade and such that the top of the cabinet is no higher than 2130 mm [7'] above the finished grade.

6.5.2.3. Inside Metering Requirements

Metering equipment shall be installed in the building's electrical room. The electrical room shall be subject to all of the requirements of Section 5.6 of this document.

The metering equipment shall be installed on an approved plywood mounting surface described in Section 5.15.

All revenue metering equipment shall be grouped and installed in the same electrical room as the building's Service Entrance disconnect that service the meters. Multiple electrical rooms may exist in the same building, yet the Service Entrance main disconnect switch shall be in the same room for the meters it feeds.

Existing installations that use a splitter trough and individual Meter Socket bases, but do not have a Service Entrance disconnect, shall be "grandfathered" refer to HOL Conditions of Service ECS0012 for upgrade requirements.

6.5.3 Services at Apartment Buildings with Residential Units

A residential apartment building may contain Customer owned dry-core transformers that transform the building's service voltage to be suitable for residential use. The energy from these transformers is then distributed to electrical rooms located throughout building that contain the metering used to monitor each apartment unit's consumption.

The metering bases for each individual apartment unit shall be located in an electrical room either on the same, or adjacent, floor as the apartment unit itself. Metering equipment supplied and installed by the Customer shall be in accordance with one of the following methods:

- A meter centre located on the Load Side of a disconnect switch or circuit breaker shall be provided. Each meter position shall be "Cold Metering," the disconnect switch or circuit breaker shall be installed as close as practicable to, and within easy and obvious sight of, the meter centre taking supply from it.
- Refer to HOL Specification MCS0036 for service with meter centre and construction details.
- A lockable splitter trough located immediately adjacent to, and on the Load Side of disconnect switch. The splitter trough shall supply individual meter bases to each unit. A disconnect/breaker must be provided between the splitter trough and each of the individual Meter Socket bases.
 - Refer to HOL Specification MCS0037 for service with multiple Sub-Service points for construction details and Tables, located at the end of this document, for a list of HOL acceptance criteria for meter base socket.
- An MCMS as per Section 7.11 of this document. Consult with HOL to determine eligibility.

6.6 Network Services - 120V/208, 2-Phase, 3-Wire, Up To 200A

Network Services are only available in apartment buildings and multi-storey condominiums for use with residential services.

Network Services up to and including 200A shall have a 7-Jaw socket meter base connected on the Load Side of each Customer's fused disconnect or breaker.

5-Jaw socket meters shall only be permitted if the Customer installs a meter centre. The 5-Jaw assembly shall be full capacity, not a substitute, factory installed in the nine (9) o'clock position in the Meter Socket base.

Refer to Table 5, located at the end of this document, for a list of HOL approved commercial 7-Jaw Meter Socket bases. Refer to HOL Specifications MCS0005 and MCS0018 for construction details.

7. Commercial Customer Classes

This section discusses the general requirements for the location of revenue metering for Commercial service customers. HOL owned revenue metering for commercial services shall use "Cold Metering".

Commercial services are typically offered as either 120V/240V 1-Phase 3-Wire, 120V/208Y 3-Phase 4-Wire, or 347V/600Y 3-Phase 4-Wire services, each of which is available with a limited variety of Ampacity.

Service availability, orientation (either overhead or underground), voltage, and Ampacity subject to availability as per HOL's *Conditions of Service* (ECS0012).

The Customer is responsible to supply and install metering enclosures that meet the requirements of Section 5.5 of this document.

When metering equipment is to be placed in an electrical room, the electrical room itself shall meet the requirements already discussed in this document; see Section **Error! Reference source not found.** of his document for more information.

Any compartments, Instrument Transformer cabinets, boxes, sockets, or other workspace provided for the installation of HOL's metering equipment shall be for the exclusive use of HOL. No equipment, other than what is provided and installed by HOL may be installed in any part of the HOL metering workspace.

Alternate provisions must be made in the case of the following arrangements:

- In Switchgear, as specified in Section 7.11 of this document.
- In Meter and Metal Instrument Transformer Cabinet(s) as described in Section 5.13 of this document.

Refer to HOL document MCS0091 and MCS0111 for more information.

7.1 Meter Location

The Service Entrance main disconnect and the metering equipment shall be installed inside the building. It shall be installed inside a dedicated electrical room that meets the requirements of Section **Error! Reference source not found.** of this document; refer to HOL document MCS0091 for more information.

For 120V/240V, 1-Phase, up to and including 200A services, the Customer may supply and install the metering equipment in an outdoor location with the prior approval of HOL's Metering systems section.

If mounted outdoors, both the Service Entrance main disconnect and meter socket bases(s) shall be housed within a single lockable Weatherproof cabinet, or customer constructed Weatherproof enclosure, that is supplied and installed by the customer. The cabinet or enclosure can be used to house one or many meters and shall meet the requirements of Section 5.5 of this document. Refer to HOL Specification MCS0111 for construction details.

Where supplies exceed 200A but are less than 400A, the Customer shall provide and install an approved underground 120V/240V, 400A, transformer rated combination base metering enclosure, with isolated neutral block and 4-pole metering Test Switch. Refer to Table 3, located at the end of this document, for a list of HOL approved Meter Socket base and HOL Specification MCS0008 for construction details.

Where supplies exceed 400A, the Customer shall supply and install an approved Instrument Transformer cabinet and approved transformer rated combination base metering enclosure in an indoor electrical room approved by HOL.

All enclosures shall meet the requirements set out in Section 5.5 of this document.

All enclosure shall be mounted on a Customer provided plywood mounting surface that meets the requirements of Section 5.15 of this document.

7.2 Standard 1-Phase Metering Configuration

7.2.1 120V/240V, 1-Phase, Up To 200A

The Service Entrance main disconnect and the Meter Socket bases shall be installed inside the building.

The Customer is required to supply and install an approved meter socket base with a screw type Sealing Ring for each service up to 200A.

Socket bases with current bypass switches shall not be permitted.

Refer to Table 1A, located at the end of this document, for a list of HOL acceptance criteria for the meter socket base and HOL Specifications ECS0002 and MCS0018 for construction details.

7.2.2 Underground 120V/240V, 1-Phase, 3-Wire, 225A to 400A

The Customer shall provide and install an approved 120V/240V, 400A, transformer rated combination base metering enclosure, with isolated neutral block and 4-pole metering Test Switch.

The combination base metering enclosure shall be it shall be located immediately after, and on the Load Side of, the main fused disconnect or breaker, inside the building and in the same electrical room, and within sight, of the Service Entrance main disconnect or breaker.

A continuous 27 mm [1"] piece of EMT shall be used to house the metering secondary conductors from the instrument cabinet to an approved 5-Jaw transformer rated combination base metering enclosure. Conduit used shall meet the requirements as per Section 5.12 of this document.

Refer to Table 3, located at the end of this document, for a list of HOL approved transformer rated combination base metering enclosure and Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrument Transformer cabinets and HOL Specifications MCS0041 and MCS0007 for wiring details. Refer to Schedule 3, and Schedule 4 located at the back of this document for more information.

7.2.3 Underground 120/240V, 1-Phase, 3 Wire, Greater than 400A

The Customer shall supply and install an approved Instrument Transformer cabinet and approved transformer rated combination base metering enclosure in an indoor electrical room approved by HOL. The instrument cabinet shall meet the requirements already contained in this document; see Section 5.13.1 of this document for more information.

Refer to Table 4, located at the end of this document, for a list of HOL approved transformer rated combination base metering enclosure and Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrumentation Transformer cabinets and HOL Specifications MCS0041 and MCS0007 for wiring details. Refer to Schedule 3, and Schedule 4 located at the back of this document for more information.

7.3 Standard 3-Phase Metering Configuration

All new 3-Phase services shall be 4-Wire, Grounded-WYE (sometimes called Grounded-Star) systems, 3-Element metered with the Neutral conductor (grounded conductor) forming part of the metering circuit. The Neutral conductor must be connected between the transformer or point of supply and the metering point of all 3-Phase, 4-Wire, Grounded-WYE systems. The Neutral conductor must be grounded at the main service disconnect. The use of an isolated neutral block is necessary when the metering point is on the Load Side of the main service disconnect.

The 3-Phase commercial revenue metering installation shall consist of one of the following configurations.

All revenue metering, and supporting ancillary, equipment shall be installed immediately downstream of the service entrance and up stream of all customer devices. In this instance, a check meter and a metered public service shall not be required.

Note: In this instance no HOL commercial revenue metering, or HOL supplied supporting ancillary equipment, shall be installed after a customer owned dry-core transformer except for metering an individual residential service, as per Section 6.5 of this document.

Or:

All commercial metering installed down-stream, or on the “secondary” (low voltage) side, of Customer owned dry-core transformers shall:

Have a “public” metered service installed.

Have all metered Customer owned dry-core transformer and line losses shall be applied to the “public” service account.

7.3.1 Meter Requirements

In the case of single metered services, up to 200A, a Self-Contained Meter shall be installed to meter the service.

Install an approved commercial 7-Jaw Meter Socket base after, and on the Load Side of the Service Entrance main fused disconnect or breaker.

Install the Service Entrance main fused disconnect or breaker at a height that meets the requirements of Section 5.9 of this document.

Install an approved commercial 7-Jaw Meter Socket base at a height that satisfies the requirements of Section 5.4 of this document. Further, it shall be installed such that it is parallel with finished floor.

Supply and install an approved commercial 7-Jaw Meter Socket base with full-sized Neutral conductor. The socket base shall be installed such that it shall be as level and plumb as Practicable.

Install the Neutral conductor terminated in the Meter Socket base on an isolated neutral terminal block. A white #10 AWG Neutral tap shall be supplied to the 6th jaw, of the 7-Jaw Meter Socket base, as a voltage reference.

HOL shall install a self-contained socket meter of sufficient capacity to cover the Service Entrance main disconnect nameplate ratings and supply voltage. The meter shall be located on the Load Side of the Service Entrance main disconnect/breaker in all circumstances.

Refer to Table 5, located at the end of this document, for a list of HOL approved 7-Jaw Meter Socket bases and HOL Specification MCS0016 and MCS0018 for meter base wiring details.

7.3.2 120V/208, 3 Phase, 4-Wire Grounded-WYE, Up To 200A

Metering equipment shall be mounted indoors, either inside the building's electrical room, inside a Weatherproof enclosure of the Customer's own construction.

Note that the Service Entrance disconnect and any Bulk Meter revenue equipment must be installed in the same electrical room or enclosure.

7.3.3 347V/600Y, 3-Phase, 4-Wire Grounded-WYE, Up To 200A

Metering equipment shall be mounted indoors, either inside the building's electrical room, inside a Weatherproof enclosure of the Customer's own construction, or on a Customer owned pole mounted inside a CSA Type 4 or better enclosure as per HOL document MCS0073.

Note that the Service Entrance disconnect and any revenue equipment must be installed in the same electrical room or enclosure or on the same customer owned pole.

7.3.4 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, Greater Than 200A and Up To 600A Services

The Customer shall provide and install a properly sized Instrument Transformer cabinet and appropriate meter base in a location that meets the requirements of Section 5.13 of this document.

The instrument cabinet shall meet the requirements in Section 5.13 of this document.

All Instrument Transformers for services over 200A shall be installed in one of the following locations.

In the main electrical room of the building being serviced. The electrical room shall be Weatherproof and subject to Section **Error! Reference source not found.** of this document.

Or:

In a walk-in enclosure, or a Permanent Customer constructed Weatherproof structure that meets OBC requirements, that is separate and that meets, or exceeds, the requirements of Section **Error! Reference source not found.** of this document.

Or:

Shall be mounted in an enclosure or pedestal that meets, or exceeds, the requirements in Section 5.5 and Section 7.2 of this document (or equivalent) specifications.

The Customer shall provide a plywood mounting surface, that meets the requirements of Section 5.15 of this document.

The Customer shall provide and install an Instrument Transformer cabinet that shall meet requirements in Section 5.13.

The Customer shall provide and install an approved 13-Jaw transformer rated combination base such that it satisfies the requirements of Section 5.13 of this document.

The secondary metering conductors from the instrument cabinet to the combination base metering enclosure shall be enclosed in continuous EMT. The conduit used shall meet the requirements of this document; see Section 5.12 of this document for more information. The conduits diameter shall be based on the conduit's run as seen below. A single run of conduit shall not be longer than 30 m [100'] in length.

Conduit Size	Minimum Conduit Run Length	Maximum Conduit Run Length
35 mm [1-1/4"]	N/A	20 m [65']
41 mm [1-1/2"]	20 m [65']	30 m [100']

If switchgear is used in lieu of a metering cabinet, it shall be subject to the same requirements as mentioned above.

Refer to Table 5A, located at the end of this document, for a list of HOL approved commercial 13-Jaw Transformer Rated Meter socket base and Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrument Transformer cabinets and HOL Specification MCS0022 for construction details and HOL Specification MCS0017 for wiring detail.

7.4 Pedestals

Metered service pedestals are to be used when a suitable building, or electrical room, is not available to house the electrical service equipment.

Only one (1) metered service shall be permitted per pedestal and one (1) metered service per third party utility within a 50 m [164'] horizontal radius.

A pedestal shall have only one (1) service from HOL. A pedestal shall not take supply from both metered and unmetered services simultaneously.

The pedestal shall be supplied from an underground conductors from HOL's designated Supply Point

The pedestal shall be weatherproof. It shall be kept free and clear of snow, and debris, to allow access to the metering equipment at all times.

An outdoor public light shall be installed on the exterior of the enclosure, close to the main entrance for the purpose of illuminating the structure's entrance.

The pedestal shall be subject to the most current version of the City of Ottawa Utility Pedestal Guidelines.

The top of the pedestal is to be less than 1830 mm [6'] above finished grade.

Refer to HOL Specification MCS0043 for construction details.

7.4.1 Location Requirements

The pedestal being metered shall be located and oriented such that:

- It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.
- It shall not obstruct any vehicular traffic while its doors are in the open position.
- HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both "drive-throughs" and driveways.

The location of the pedestal shall be subject to all of the following:

- Shall meet the location requirements for metering cabinets already included in this document; see Section 5.5 of this document for more information.
- The service owner shall supply the GPS coordinates with ± 2 m [$\pm 6'$ 6-3/4"] accuracy and the associated civic address (if available) of the pedestal's location.
- The pedestal location shall be clear of the travelled portion of the roadway by meeting the Transportation Association of Canada offset guidelines as found in the Geometric Design Guide for Canadian Roads, Section 3.1.3.

If located in, or near, the vicinity of a road the pedestal shall be set back:

- A minimum of 1000 mm [3' 4"] from the travelled portion of the road if the road has a curb, with or without a sidewalk.
- A minimum of 4000 mm [13' 1-1/2"] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

7.4.2 Personnel Access

Access to the pedestal, by HOL's personnel, agents, or contractors shall meet the requirements already included in this document and shall also be subject to the following:

- Personnel to have a clear access in front of cabinet with no obstructions.
- Accessible via a flat surface area.
- The access door swing shall be un-impeded.
- Safe access to the enclosure shall not be impeded.
- Joint access to the pedestal shall be maintained through a key or lock sharing agreement.

7.4.3 Installation and Ongoing Responsibilities of the Service Owner

The pedestal's owner shall be subject to all of the following when the pedestal is installed within the public road allowance:

- Meet the technical requirements within the public road allowance, and have a Public Road Authority Access Agreement.
- Perform on-going Maintenance of the enclosure and the electrical conductor and equipment to designated Supply Point.

7.4.4 Third Party Utility Owned Metered Pedestal Services

A third party utility owned pedestal's metered service shall be used inside of, or within, 5000 mm [16' 4-7/8"] of the closest public road allowance. This includes metering for any enclosure, or structure, with a height less than 1830 mm [6'] above finished grade, excluding pedestals under the control of the Public Road Authority.

The service shall consist of a single 120V/240V, 1-Phase, 3-Wire, metered service with a maximum Ampacity of 200A.

All access panels shall be secured against unauthorized access as much as Practicable.

The Neutral conductor shall be extended past the Service Entrance disconnect and Meter Socket to be terminated at the first Customer owned device.

The pedestal shall meet all the requirements of the above Sections.

A pedestal's metered service can be shared amongst multiple pedestals for that third party utility company provided that all pedestals taking supply from the metered service are:

- The property of the same Customer as the pedestal that has the Service Entrance disconnect mounted on it.
- Within immediate and obvious view from both the pedestal that has the Service Entrance disconnect mounted on it and HOL's designated Supply Point.

The Service Entrance equipment shall meet the requirements of Section 0 of this document. The Service Entrance disconnect, approved meter base, or combination meter base and disconnect shall be mounted on the pedestal such that it does not extend past the side or top of the pedestal.

The Service Entrance disconnect shall consist of double pole breaker(s) or a mechanical bladed switch with over-current protection with over-current protection with nominal ampacity defined below. It shall be installed upstream from the Meter Socket.

PVC conduit, meeting the requirements of Section 5.12 of this document, shall be used to house all conductors connecting Service Entrance disconnect with an Ampacity greater than 30A, the Meter Socket base, and the next Customer owned device.

If the nominal Service Entrance Ampacity is less than or equal to 30A, the Service Entrance equipment and Meter Socket shall be subject to all of the following:

- Be chosen from Table 11 (located at the end of this document) shall be used to house both the Meter Socket and Service Entrance disconnect.
- Conductors used to provide supply to the Service Entrance shall be no smaller than #6 AWG as per approved combination Meter Socket and disconnect enclosure manufacturer limits.
- The disconnecting means shall be suitable for use within the combination Meter Socket and disconnect enclosure. The breaker shall have a nominal Ampacity of no more than 30A.
- The Meter Socket shall be rated 100A, 600V.

If the nominal Service Entrance Ampacity is greater than 30A but less than or equal to 200A, then the Service Entrance disconnect and Meter Socket shall be subject to all of the following:

- Conductors used to provide supply to the Service Entrance shall meet the requirements of ESA and OESC.
- The disconnecting means shall have a nominal Ampacity of no more than the rating of its meter socket.
- The approved individual socket base shall be chosen to meet requirements from Table 1 (located at the end of this document) and an outdoor rated and appropriately sized Service Entrance disconnect and enclosure.

7.5 3-Phase, 3-Wire, “Delta” Connected Service

All 3-Phase, 3-Wire, Delta connected secondary services represent a legacy standard HOL service voltage. HOL does not provide 3-Phase, 3-Wire, Delta connected meters for new, added, or upgraded secondary services.

Existing 3-Phase, 3-Wire Delta-connected services shall be “grandfathered”.

For existing Delta connected secondary services that have been “grandfathered”, the Customer shall supply and install, on the Load Side of the revenue meter, equipment capable of detecting and indicating the presence of a ground fault (normally in the form of fault-indicator lights), as per HOL’s Conditions of Service (ECS0012).

The Customer, in consultation with HOL, shall upgrade their existing Delta connected service to a Grounded-WYE connected service, of comparable Ampacity, in the event that any of the following occurs:

- The Customer undertakes work on their service, in close proximity to the service’s Demarcation Point (see HOL’s *Conditions of Service* (ECS0012)), that requires an ESA permit.
- The service has been de-energized for a period of more than six (6) months.
- The existing metering equipment has been damaged such that it requires replacement, regardless of the cause of the damage.
- The existing metering equipment will shortly reach or has already reached the end of its service life and requires replacement.

At its determination, HOL may deem the upgrade from Delta to Grounded-WYE necessary. Reasons may include, but are not limited to, the following:

- HOL is no longer able to procure Delta-connected meters.
- The accuracy of the existing metering installation has been proven suspect and would not be corrected through the replacement of the existing metering equipment.
- To provide continued reliable service to the Customer.

The upgraded service shall be subject to all of the following:

- It shall meet all the requirements of the most current version of this document.
- HOL shall provide a Grounded-WYE connected service. This may include the installation of a full-sized Neutral conductor from the supplying transformer(s) to the location where the revenue metering equipment is installed. The full-sized Neutral conductor shall be extended from the metering equipment to be terminated at the first Customer owned device where Practicable.
- The full-sized Neutral conductor shall be brought to an isolated neutral block, inside the Instrument Transformer enclosure, before being extended and terminated at the first Customer owned device where Practicable.
- The service shall be metered as a 3-Phase, 4-Wire, Grounded-WYE connected service.
 - If the Service Entrance Ampacity is less than 200A, the Customer shall supply and install an approved commercial 7-Jaw Meter Socket base.

Note: Refer to Table 5, located at the end of this document, for a list of HOL approved 7-Jaw Meter Socket bases and HOL Specifications MCS0016 and MCS0018 for meter base wiring details.
 - If the service entrance ampacity is greater than 200A, the Customer shall supply and install an approved commercial 13-Jaw meter socket base.

Note: Refer to Table 5A, located at the end of this document, for a list of HOL approved 13-Jaw Meter Socket bases and HOL Specification MCS0017, for meter base wiring details.

The Customer should consult with HOL to determine where they may require a high impedance grounding system for specialized applications and the correct specification and operation of the metering equipment.

7.6 Emergency Power Supply

The customer is to follow all requirements set out in Section 11 of this document.

7.7 Metered Utility Tower Services

A metered utility tower service includes metering for any tower or mast (including, but not limited to, cell-phone towers, communication towers, and communication masts) shall be subject to all of the following statements.

The Customer shall make provisions to prevent access by unauthorized personnel to the Service Entrance equipment and any HOL provided revenue metering, or HOL provided ancillary, equipment.

Provisions may include, but is not limited to, enclosing the area containing the Service Entrance, HOL provided revenue metering, and HOL provided ancillary, equipment with a fence of sufficient height to

both discourage and prevent unauthorized access. The fence shall also include a locked gate such that it permits both the Customer and HOL access the fenced off area.

At HOL's determination, the metering equipment shall not be visible from highways, arterial, or collector roads. Further, they shall not be installed in sensitive commercial or heritage districts, without care of installation, to blend into the aesthetic neighbourhood value.

Innovation, Science and Economic Development Canada requires commercial antenna tower owners to provide access to other telecoms where structural capacity allows additional attachments. This recommendation is to give sufficient electrical capacity, and fulfilment of other conditions, for the tower's current and future requirements, alleviating the need for the Customer to re-engage HOL to replace the Service Entrance due to incremental increased requirements.

All new metering installations for a metered utility tower service shall have a single Service Entrance at a single service voltage.

All new metering installations for a metered utility tower service shall comprise of one of the following:

- A ganged meter trough with six (6) Meter Sockets and subject to the requirements of Section 6.5.2 of this document. The ganged meter trough shall be subject to Section 5.8 of this document. See HOL specification MCS0082 for more information. In this case, sub-services that take supply from the ganged meter trough shall be limited to less than, or equal to, 200A.
- An approved metering centre with Appropriately rated Service Entrance disconnects switch / breaker with a minimum of six (6) Meter Socket positions and subject to the requirements of both Section 5.5 and Section **Error! Reference source not found.** of this document.
- A Service Entrance disconnect switch and a lockable and sealable splitter trough that provides supply to individual approved Meter Socket bases. Each individual socket base shall have an Appropriately rated individual disconnect switch located on its Line Side. See HOL specification MCS0081 for more information.
 - The installation shall be subject to Section 5.20 of this document. A disconnection switch shall be installed for each meter and connected immediately Upstream of the meter such that:
 - 1-Phase sub-services that take supply from the splitter trough shall be less than, or equal to, 400A. 3-Phase sub-services that take supply from the splitter trough shall be less than, or equal to, 200A.

Disconnects installed under a roof, as per HOL specifications MCS0081 and MCS0082, shall meet the requirements of either CSA Type 3 or better.

All revenue metering equipment shall be installed in a location meeting the requirements for other general services, or on an open air metal corrosion-resistant structure to the following:

- It shall be comprised of channel strut members that support a sheet of marine-grade plywood that meets all the requirements of Section 5.15 of this document that will be used to mount the Service Entrance and revenue metering equipment, or shall comprise of channel strut members and shall have the Service Entrance and revenue metering equipment mounted directly to it.
- The open-air channel strut structure shall be for the exclusive use of Service Entrance and revenue metering equipment. If marine-grade plywood is used, equipment shall be installed only on one (1) side of the plywood.
- It shall have an open-air roof that extends no less than 1000 mm [3' 4"] in all directions over the footprint of the channel strut structure. The roof shall be constructed as per one of the following:

- Metal (such as Corrugated Galvanized Steel) mounted on either the channel-strut structure directly.
- Metal (such as Corrugated Galvanized Steel) on plywood mounted on the channel-strut structure.
- A roof that meets OBC requirements.
- The roof shall be such that it shall provide adequate mechanical protection for both the metering equipment and personnel performing work on the equipment, from both precipitation and falling ice, as per Section 0 of this document.
- The roof shall be slanted allowing water to drain such that it does not drain on personnel while performing work on the metering equipment.

7.8 1-Phase and 3-Phase, Up To 200A, Secondary Metered Outdoor Pedestal, Up To 750V: Installations for Non-Distributed Generation Applications

For 1-Phase, and 3-Phase, services, up to 200A, located such that it isn't practicable to install the metering equipment in a permanent building, or in cases where due to the nature of the service (such as parks, utilities, sports facilities, etc.) it may be preferable to install the metering equipment in a metering pedestal.

This specification describes the minimum requirements that the Customer must meet before connecting to HOL's electrical system.

When approved by HOL, the Customer has the option to meet the requirements listed below or the Customer shall build to HOL's Specifications MCS0043 and MCS0035 for their secondary metered pedestal.

7.8.1 Metering and Equipment Requirements

The pedestal and enclosure shall meet the requirements for metering cabinets already included in this document; see Section 5.5 and Section 7.2 of this document for more information. Further, it shall also be subject to the following:

- Minimum outside metering cabinet dimensions are (H x W x D) 920 mm x 1321 mm x 400 mm [36-1/4" x 52" x 15-3/4"].
- All 120V/240V, 1-Phase, up to 200A, services shall have a 4-Jaw king size Meter Socket base as detailed in Table 1A, located at the end of this document, to be supplied and installed by the Customer in the metering pedestal.
- All 120V/208Y or 347V/600Y, 3-Phase, up to 200A, services shall have an approved 7-Jaw Meter Socket base as detailed in Table 5, located at the end of this document, to be supplied and installed in the metering pedestal by the Customer. The Customer shall supply and install both a full-sized Neutral conductor and an isolated Neutral conductor terminal block. The Neutral conductor shall be used as a voltage reference by the metering equipment.

7.9 Overhead 120V/240V, 1-Phase, Greater Than 200A

Overhead, 120V/240V, 1-Phase, 400A services, shall be permitted on agricultural properties and subject to the following:

- The location of the Customer's Service Entrance equipment shall be approved by HOL's Distribution Design Service Layout unit and in accordance with the ESA and the OESC.

- New installations require all Instrument Transformers to be installed near finished grade for both Maintenance and serviceability purposes.
- Outdoor rated metering enclosures shall be permitted to be mounted on Customer owned utility poles.

If an agricultural premise requests connection of ERF equipment to the existing Service Entrance feeding the premise, HOL shall require existing central metering equipment to be upgraded to current standards and a bi-directional meter shall be installed that meets the requirements of Section 12.

7.9.1 Combination Meter and CT Cabinet Enclosure Option

If approved by HOL's Distribution Design Service Layout unit, the owner shall supply and install a 120V/240V, 1-Phase, 400A transformer rated combination meter and CT enclosure at ground level, with isolated neutral block and 4-pole metering Test Switch included.

The transformer rated combination base metering enclosure shall be located outside, in a location approved by HOL's Customer Service Department and HOL's Metering Services.

Metering Equipment shall be located immediately after and on the Load Side of the main fused disconnect.

The metering enclosure shall be mounted at a height that satisfies the requirements of Section 5.5 of this document.

A splitter trough shall be installed immediately adjacent to the meter base enclosure from which the Customer owned secondary services would be routed to the individual buildings on the property. The splitter trough shall meet the requirements of Section 5.20 of this document.

Connections and installation shall be in accordance with the OESC and subject to the approval of the ESA.

PVC conduit, meeting the requirements of Section 5.12 of this document, shall be used to house all conductors connecting the meter enclosure, Service Entrance disconnect, and the next customer owned device.

Refer to Table 3, located at the end of this document, for a list of HOL approved weatherproof combination base metering enclosure and HOL Specifications MCS0004 and MCS0008 for construction details.

7.9.2 Typical CT Cabinet Option

If the revenue metering is to consist of a typical CT Cabinet, then upon receiving approval from HOL's Distribution Design Service Layout unit to proceed with the installation of the metering equipment, the Customer shall supply and install a CSA approved 120V/240V, 400A Instrument Transformer cabinet.

The cabinet shall be Weatherproof and shall meet all the requirements of Section 5.5 of this document.

The cabinet shall be a minimum size of (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"], and have side-hinged doors opening at the centre.

The minimum height to the bottom of the access doors shall not be less than 460 mm [1' 6"] from the finished grade or floor.

The cabinet is to be located immediately after and on the Load Side of the main Service Entrance fused disconnect.

The Customer shall provide an approved Marine Grade Plywood mounting surface that meets the requirements of Section 5.15 of this document.

The meter socket enclosure shall be mounted at a height that satisfies the requirements of Section 5.5 of this document.

A continuous 27 mm [1"] metering conduit shall connect an approved transformer rated combination base metering enclosure to the Instrument Transformer cabinet. The conduit shall meet all the requirements of Section 5.12 of this document.

Refer to Table 4 and Table 6, located at the end of this document, for a list of HOL approved Meter Socket enclosure and HOL acceptance criteria for the Instrument Transformer cabinet. Refer to the HOL Specification MCS0041 for construction details and MCS0007 wiring details.

7.10 Auxiliary Connections

All of the Customer's connections to the metered service (including fire alarms, exit lights, surge devices, Customer's instrumentation, etc.), with the exception of Fire Pumps (see Section 9 of this document for more information), shall be subject to all of the following:

- All of the Customer's circuits connected to the electrical service shall be made to the Load Side and Downstream of HOL revenue metering; it shall be located in a separate Compartment or cell.
- All interval metered Customers metered by an interval meter with external communication ports: with the exception of the meter's communication ports discussed in Section 6.2 of this document, no Customer owned equipment shall be connected to any internal part of HOL's revenue metering circuitry. Any damage to the revenue metering equipment as a direct, or indirect, result of being connected to the Customer's equipment shall be repaired, or replaced, at the Customer's cost.
- The meter's KYZ outputs, if available, shall be connected to a contact strip for purposes of connecting the Customer's equipment. The contact strip shall serve as the point of demarcation between HOL revenue metering equipment the Customer's equipment.
- With the exception of KYZ outputs from the meter and the meter's factory installed communication ports, if available, no Customer equipment shall be connected to any internal part of HOL's metering circuitry. Any damage to the metering equipment that results directly, or indirectly, from the metering equipment's KYZ outputs or factory installed communication ports being connected to the Customer's equipment shall be repaired, or replaced, at the Customer's cost.

7.11 Unit Metering Multiple Customer Metering System (MCMS)

Where feasible, residential units within a rental or condominium property have the option of MCMS metering. MCMS metering requirements can be found in MCS0052, MCS0055 & MCS0056.

7.12 Interval Metering Requirements

7.12.1 347V/600Y Greater than 200A, 3-Phase Service, or 120V/208Y 800A or more, 3-Phase Service

Interval metering is used by commercial Customers that consume large amounts of energy and settle their energy usage with the IESO. The interval meter shall be interrogated remotely, using the telephone line or wireless service provided and maintained by the Customer to retrieve the interval meter data by a central computer located at HOL.

- Temporary 347V/600Y 3-Phase services with an ampacity of 400A, or less, are exempt from this requirement; refer to Section 10 of this document for more information.
- Fire pump services may be exempt from the communication requirements typically associated with an interval metering installation. Refer to Section 9 of this document for more information.

The Customer shall compensate HOL for all incremental costs associated with the interval meter, including the capital cost of the interval meter itself, the installation costs associated with the interval meter, and costs associated with ongoing maintenance (including allowance for meter failure), verification and re-verification of the meter, infrastructure upgrade, installation, and ongoing provisions of the communication line, or communication link, with the customer's meter.

7.12.2 Meter Requirements

The prerequisites for the installation of the interval meter shall have been completed by the Customer prior to the installation; including the requirement for an active phone line or wireless service.

The Customer shall supply and install a plywood mounting surface, that meets the requirements of Section 5.15 of this document.

The Customer shall supply and install an approved 13-Jaw transformer rated combination base metering enclosure, with provisions for a 10-pole metering Test Switch, which shall be installed at a height that satisfies the requirements of Section 5.13 of this document.

Refer to Table 5A, located at the end of this document, for a list of HOL approved commercial 13-Jaw Meter Socket bases and HOL Specifications MCS0025, MCS0026, and MCS0066 for construction details.

The Customer shall supply and install EMT to house the conductors connecting the Instrument Transformer cabinet, or Compartment, and the 13-Jaw transformer rated combination base metering enclosure in the electrical room. The conduit used shall meet the requirements already contained in this document; see Section 5.12 of this document for more information.

7.12.3 Revenue Interval Metering Communication Requirements

The following meter location provisions shall be provided and installed by the Customer in a location approved by HOL's Metering Services.

7.12.3.1. Wireless Communication

The Customer shall supply and install an external modem enclosure; the enclosure shall be 400 mm x 400 mm x 150 mm [16" x 16" x 6"]. The enclosure shall be installed such that the bottom of the enclosure is mounted at the same height as the bottom of the 13-Jaw transformer rated combination base metering enclosure. The specification of this enclosure can be found in Section 5.5 of this document.

The distance from the external modem enclosure to the 13-Jaw transformer rated combination base metering enclosure shall be between 75 mm [3"] and a maximum of 130 mm [5"].

Both the meter socket base and the external modem enclosure shall be mounted on a 1200 mm x 1200 mm x 15.5 mm [48" x 48" x 5/8"] minimum plywood mounting board. The board shall meet all the requirements set out in Section 5.15.

The Customer shall provide and install a continuous 16 mm [1/2"] diameter EMT complete with bushings at both ends, from a dedicated circuit breaker in a public panel to the 120 VAC 15A outlet mounted in the external modem enclosure.

Refer to HOL Specification MCS0129.

7.12.3.2. Wired Communication

Prior to the installation of an interval meter, the Customer shall provide and install a 16 mm [1/2"] diameter EMT complete with bushings at both ends, from the telephone entrance equipment (i.e. punch-board) to the external modem enclosure. The conduit shall be continuous, meaning it shall not use any unnecessary splice fittings along its run. The shall contain a 2 pair (4 conductors) dedicated, analogue, voice quality telephone line. An RJ-11 (4 pin) telephone jack receptacle is also to be provided

and terminated on the telephone cable within the modem enclosure with 300 mm [12"] to 460 mm [1' 6"] telephone cable to allow for mounting the telephone jack inside the enclosure.

A tag or label bearing the phone number for the telephone circuit shall be attached to the RJ-11 jack at the modem enclosure.

The Customer shall install an enclosure to house the communications equipment. The enclosure:

- Shall meet the requirements for metering enclosures already contained in this document; see Section 5.5 of this document for more information.
- Shall have 21 mm [3/4"] diameter continuous EMT between it and the Meter Socket. The conduit shall house the communications conductors from the meter to the enclosure. The conduit shall meet the requirements of this document; see Section 5.12 of this document for more information.

The telephone cable terminating in the telephone room is to be clearly labelled "HYDRO OTTAWA METERING".

Prior to the interval Meter Installation by HOL, the dial type dedicated telephone line shall be thoroughly tested by the premise-wiring contractor to verify the following:

- Dial tone is available.
- Outbound calls can be made.
- Inbound calls can be received.
- The assigned phone number, and extension (if applicable), is correct.

Plugging a standard telephone set into the jack to make an outbound call and receive an inbound call can accomplish this testing.

When the Customer notifies HOL that the installation of an operational telephone line has been completed, HOL shall schedule the interval meter installation upgrade. HOL's meter technician shall verify that the telephone line is operational. If the telephone line is operational, the metering technician shall install the interval meter, connect the telephone line, and establish communications with HOL's central metering data collection system.

If the telephone line is not operational, the meter installation shall not be upgraded, and the Customer shall be required to correct the defect. When the customer notifies HOL of the defect correction, HOL shall revisit the site and upgrade the meter installation.

Under limited circumstances, an individual customer may use a single phone line to support multiple meters; contact HOL to determine feasibility.

Note: Two (2) Customers, where each has individual meters, may not share a single phone line.

A customer owned phone line may be deemed as an acceptable substitute of a dedicated phone line, at HOL's determination, if the meter can be accessed via a dedicated extension from the Customer's phone system. The phone extension used by the metering equipment shall be for its exclusive use; it cannot be shared with any other telephony device (i.e. fax machines, answering machines, voice mailboxes, etc.). The extension must be accessible via direct dialling a telephone number followed by entering an extension. Further, the extension must be such that it permits inbound calls at all times and permits only local outbound calls. The labour and any cost of assigning the extension and any programmatic changes shall be at the Customer's expense.

7.12.4 Interval Metering Output Request for Load Analysis

Industrial Customers metered with certain types of interval meters may request access to the metering data directly from the metering equipment via an external communications port, or may request from HOL reports containing interval metering data at their expense.

Contact HOL Key Account Coordinators to determine the pre-requisites, availability, and requirements for this type of access.

7.12.5 Manual Collection of Interval Data

If HOL is temporarily unable to retrieve the interval meter data, used when calculating a Customer's bill, HOL shall visit the meter location and collect the data using a manual data retrieval system. At a minimum, such visits are required when the account is due for billing purposes but may occur more frequently to comply with the OEB's Retail Settlement Code.

If the inability to retrieve meter data is due to a failure of communication with the meter or the 120VAC plug used to provide supply to the communications equipment, HOL shall notify the Customer of such failure, and the Customer shall be responsible for repairs. If necessary, HOL shall collect the metered data manually for up to five (5) business days (not including statutory holidays) starting the next business day after notifying the Customer of the issue. Thereafter, if the issue has not been remedied to HOL's satisfaction, HOL shall continue to collect the data manually at either the HOL *Conditions of Service* (ECS0012) - Appendix G, approved manual meter reading charge or the actual time and material charge applicable for each site visit and shall be billed to the Customer at HOL's determination.

7.13 Customer Request for Interval or Non-Interval Meter with KYZ Output for Load Analysis

Interval or non-interval meters shall be installed for any Customer requesting KYZ pulses for peak load control, and load profile or wishing to participate in unique market pricing. The meter provision, installation, maintenance, and service costs shall be at the customer's expense. An agreement for supply, sale, and service can be found in Schedule 12 of this document, shall be required to be signed by the Customer. The agreement shall be used if the meter is requested on a new service or is being requested on an upgraded service.

KYZ outputs are subject to the availability of interval meters capable of providing KYZ metering outputs from HOL's meter vendor. Customer requests for KYZ metering outputs shall be fulfilled on a first-come first-served basis until the supply of meters capable of providing KYZ metering output available to HOL is depleted.

When the Customer requests KYZ outputs, the Customer shall consult with one of HOL's key accounts coordinators for the outline of the conditions and technical requirements, and alternatives that may be equally suitable, for the metering installation.

Prior to providing KYZ outputs, the revenue metering equipment that will act as the source of the KYZ outputs shall be upgraded to meet current HOL and Measurement Canada requirements as per the following this includes, but is not limited to:

- when an ESA permit is issued for work done around or near the revenue metering equipment.
- the replacement of obsolete metering, including the replacement of 2.5-Element metering with 3-Element metering as per Measurement Canada document E-24.
- the replacement of non-standard and/or obsolete services and equipment as per Appendix G of HOL's *Conditions of Service* (ECS0012).

Prior to the installation of an interval or non-interval meter, the customer shall provide and install all supporting equipment for the transfer of the meter KYZ pulses to the customer's termination block/or strip at the meter location.

No more than 24V AC/DC shall be applied to KYZ inputs on the meter. If the normal operation of HOL's metering equipment is interfered with, or damaged, as a result of being exposed to damaging voltages or

currents from the customer owned equipment, the Customer shall be held responsible for the cost of repairing or replacing the damaged metering equipment. If the customer owned equipment is damaged as a result of damaging voltages from the meter, HOL shall not be responsible for the cost of repair or replacement of the customer owned equipment. Therefore, the customer must put provisions in place to protect sensitive equipment attached to the KYZ outputs.

Refer to Section 7.12.2, Meter Requirements, of this document for interval meter installation with KYZ metering outputs.

Refer to Section 7.12.3, Communication Requirements, of this document for details pertaining to interval meter installation with KYZ metering outputs.

Should the interval meter become non-communicative Section 7.12.5 of this document outlines the steps that shall be undertaken to remedy the issue.

Refer to HOL Specification MCS0066 or MCS0129 for construction details.

8. Customer Owned Low Voltage Switchgear

The Customer shall submit two (2) copies of the manufacturer's Switchgear drawings for approval to HOL's Distribution Design Section, with the dimensions showing provisions for, and arrangement of, HOL's revenue metering equipment.

Individual services using switchgear must provide a separate, lockable vertically hinged access door to the instrument transformer/metering compartment on the load side, and immediately adjacent to the switchgear main disconnect compartment. This metering Compartment is to be permanently identified "For Supply Authority Use Only" and shall be provided for each set of metering Instrument Transformers within the Switchgear.

Where instrument transformers are to be installed on the load side secondary bus of switchgear, shop drawings shall be submitted to HOL's Distribution Design Section to ensure that the Instrument Transformers fit. In cases where the Instrument Transformers only meter a portion of the metal clad switchgear, (such as public loads), a separate, lockable, disconnect switch must be installed ahead of the metering Compartment, so that the service can be de-energized without any interruption to the main service supply.

Mounting bolts or nuts for support of the base of the Instrument Transformers shall be installed in a manner which shall permit complete installation and/or removal of the Instrument Transformers from within the Compartment in which they are installed. Fixed mounting studs using nuts or bolts shall be required for this purpose.

When window (doughnut) type CTs are to be installed, the bus shall be sectionalized. The removable bus links through the CTs shall be bolted in the vertical bus section directly above and below the CTs. When three (3) window type CTs are used, for 3-Element metering, they shall be mounted in a staggered arrangement.

When window (doughnut) type CTs are used and the Switchgear bus is larger than the window opening, the Customer or Switchgear manufacturer shall modify the bus to accommodate the CTs.

When required, provision shall be made for the installation of VTs on a 1.52 mm [#16 gauge] steel panel in an accessible location in the Instrument Transformer Compartment. This panel must not obstruct access to the CTs or the removable bus links that pass through the CTs.

A readily accessible grounding stud with a connector suitable for a #10 AWG copper wire or a ground bar provided with three (3) #10-24 tapped holes shall be provided in the Instrument Transformer Compartment. The grounding facility in the Compartment shall be connected directly to the Switchgear ground bus.

An approved 13-Jaw transformer rated combination base metering enclosure shall be supplied, and installed by the Customer in an approved location, separate from the Switchgear. The Customer shall supply and install a run of conduit to house the secondary metering conductors connecting the Instrument Transformer Compartment and the meter location (13-Jaw transformer rated combination base metering enclosure) in the electrical room. The conduit shall be continuous where possible, meaning it shall not use any unnecessary splice fittings along its run. All of the conduit used shall meet the requirements of this document; see Section 5.12 of this document for more information.

Refer to HOL Specifications related to meter enclosed switchgear: MCS0024, MCS0025, MCS0026, MCS0042, MCS0066, MCS0099 and MCS0129 for construction details.

A readily accessible continuous neutral copper bus, made of a material compatible with the material comprising the conductors, of 25 mm x 3 mm [1" x 1/8"] or equivalent (#6 AWG Copper white TW75 wire), with three (3) 10-24 tapped holes, shall be provided in each Instrument Transformer Compartment. If the main Neutral bus passes through a metering Instrument Transformer Compartment, the bus shall be provided with three (3) individual #10-24 tapped holes.

All disconnect switches, and circuit breakers, on the line side of HOL's metering, shall have provisions for sealing and padlocking with a standard HOL padlock. This includes feeder breakers supplying dry-core transformers, which in turn feed meter centres.

The Customer shall provide mechanical protection for the switchgear in the form of bollards, if required, as per Section 5.14.

If required by the OESC or ESA, the Customer shall install a ground-grid around the foundation pad of the switchgear and bond the protective bollards.

Any additional enclosures installed on the outside surface of the switchgear to house revenue metering or ancillary equipment, shall be subject to the requirements of Section 5.5 of this document.

8.1 Check Meter Requirements

If the switchgear is Customer owned and functions to distribute power to multiple individual customers; the switchgear shall be equipped with a check meter intended to register the total amount of power distributed through it.

The check meter shall meet the requirements in Section 5.18.

The check meter shall be installed within a separate enclosure that meets the requirements of this document. The enclosure itself shall be attached to the switchgear it monitors.

8.2 Outdoor Location

The switchgear shall not obstruct any sidewalk, walkway, or pedestrian traffic while any of its doors are in the open position.

The switchgear shall not obstruct any vehicular traffic while any of its doors are in the open position.

The switchgear shall not encroach, obstruct, or reduce the accessibility or serviceability, any adjacent HOL owned equipment while any of its doors are in the open position.

HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both "drive-throughs" and driveways.

The installation location meets or exceeds the requirements of Section 5.4 of this document.

If installed located in, or near, the vicinity of a road or parking lot, the metal enclosed switchgear shall be set back from the road or parking lot such that:

- If the road or parking lot has a curb, with or without a sidewalk, a minimum of 1000 mm [3' 4"] of clearance is required between the outer edge of the switchgear's open door (while the door is opened 90° with respect to the switchgear) or the switchgear's foundation pad and any adjacent sidewalk or the travelled portion of the road.
- Should the road or parking lot not have a curb there shall be a minimum clearance of 4000 mm [13' 1-1/2"].

Refer to HOL document MCS0099 for more information.

8.2.1 Foundation Pad

The enclosure shall sit on a concrete foundation pad. The top of the foundation pad shall be no less than 460 mm [1' 6"] above finished grade. The bottom of the access or cell doors shall not be less than 460 mm [1' 6"] above the foundation pad.

The top of the main Service Entrance disconnect within the enclosure shall be not higher than 1800 mm [6'] above the finished foundation pad.

8.3 Customer Owned Low-Voltage Switchgear with Revenue Metering within the Same Enclosure

At the Customer's option, revenue metering may be installed within the same enclosure as the Customer owned Low-Voltage switchgear, provided it meets the following requirements.

The Ampacity of the main Service Entrance disconnect shall meet the requirements of both HOL's *Conditions of Service* (ECS0012) and the requirements of this document.

Supply taken from the switchgear shall only be used within a single property. A single Customer owned Low-Voltage switchgear supplying multiple separate properties shall not be permitted.

Each property shall be limited to a single Customer owned secondary switchgear per supplying HOL distribution transformer. Multiple Customer owned secondary switchgear, supplied from the same HOL owned distribution transformer, shall not be permitted.

Each property shall have a single point of maintenance contact designated for HOL to contact to co-ordinate a convenient time in the event of planned work.

To promote metering accessibility by the Customer, provisions for the Customer to access to the face of the meter will be made. This may include, but not limited to view-ports that meet requirements of the CSA enclosure type.

This type of installation shall be permitted when multiple general secondary sub-services require supply. Supply for secondary sub-services, taken from the Low-Voltage switchgear, shall be subject to the following:

- Secondary sub-services shall be restricted to general services at 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, less than 200A.
- Secondary sub-services shall be metered at a single voltage; a mix of revenue metering at different voltages, within the same enclosure, shall not be permitted.
- Supply for unmetered secondary sub-service(s) greater than 200A are permitted. The intent of an unmetered secondary sub-service shall be for providing supply to a dedicated electrical room where HOL owned revenue metering is installed.

The use of "Sea Can" shipping containers as an enclosure shall not be permitted.

The roof of the enclosure shall be such that falling precipitation drains to side opposite of the operable doors. Further, the roof shall also have a factory-installed drip-edge. The intent is to prevent falling precipitation from draining onto HOL employees while performing work on the contents of the enclosure.

The enclosure shall have lights, a heater, and a convenience outlet meeting the requirements of Section **Error! Reference source not found.** of this document. Provisions for a public revenue meter hall be included, to record the consumption of the light, heater, and 120V/15A convenience outlet.

The switchgear shall be installed in a generally flat area and shall not require a ladder or step to access or service it. The intent is to provide a safe surface to access and service the contents of the enclosure.

The switchgear shall not be installed in a location that can become a confined space.

The switchgear shall not be installed in a location that limits the accessibility or serviceability of adjacent HOL plant including, but not limited to, HOL owned pad-mounted transformers.

The switchgear shall be installed outside of the 15 m [49' 2-1/2"] sight line triangle at road intersections within the property being served. The switchgear shall be located, measuring from the edge of the door open at 90 degrees closet to the roadway, 1000 mm [3' 4"] away from a roadway with a curb, or 4000 mm [12' 1-1/2"] away from a roadway without a curb. Refer to HOL specification MCS0099 for details.

The switchgear shall not be installed in an area that is, or can become, used to store cleared snow.

The switchgear shall be installed at least 5 m [16' 5"] from any fire-hydrant. If a ground-grid is installed, it shall be such that fire-hydrant(s) shall not encroach it.

A retaining wall shall not be permitted as part of the switchgear construction or installation.

Supply for a fire-pump service taken from ahead of the main Service Entrance disconnect shall not be permitted.

The metering positions within the enclosure shall be subject to the requirements of MCS0105 and MCS0115.

The switchgear shall use either silver-plated Copper, bare Copper, or Aluminum bus between the main Service Entrance disconnect the revenue metering positions.

The Customer will provide a white lettering on a red background Lamacoid SLD of the switchgear's bus and wiring configuration. It shall be posted on the inside of the door of space containing the Check Metering Instrument Transformers or revenue metering. Further, each cell door shall carry a Lamacoid label indicating the contents behind the enclosure or cell door.

9. Fire Pump Services

The intent of this section of the document is not to permit more than one supply point per property but to allow the Customer to take supply for the fire pump, and related equipment, upstream of the service entrance disconnect and HOL owned revenue metering equipment for the building served by the fire pump.

Revenue metering for a fire pump service shall be selected based on the lesser of:

- The nominal Ampacity rating of the fire pump service's disconnect.
- The nominal Ampacity of an over-current device protecting a fire pump service.
- The nominal Ampacity rating of the conductor supplying the pump.

Revenue metering for a fire pump service shall be exempt from the communication requirements typically associated with an interval metering installation for the following:

- Fire Pump services with a nominal ampacity up to, and including, 600A supplied at 347V/600Y.
- Fire Pump services with a nominal ampacity up to, and including, 800A supplied at 120V/208Y.

The OESC permits the installation of a separate fire pump service box in addition to the service entrance of the building the fire pump serves. If supply for the fire pump service or fire pump service box is taken upstream of either the building's service entrance disconnect or the building's revenue metering equipment, the proposed installation shall be subject to review (with the building's electrical SLD) and approval by HOL.

If fire pump service takes supply other than downstream of the revenue metering equipment, the Customer at their expense shall make provisions for the following:

- The installation of conventional metering equipment for each fire pump service supplied. The intent of the conventional metering equipment is to register the consumption of the fire pump service.
- A means of disconnection device on the Line Side and within sight of each revenue meter, and ancillary equipment, of each fire pump service supplied. The intent of the separate means of disconnection is to isolate an individual fire pump service from its source of supply. The disconnection type, location, and labelling shall be as per Section 32 (Rule 32-304 and Rule 32-306) of the OESC.

Refer to HOL document MCS0020 for a typical secondary metering for a multiple unit building.

9.1 Fire Pump Service Permanent Labelling and Tagging

If supply for the Customer's fire pump service is taken upstream of the service entrance main disconnect, then the Customer shall provide nomenclature and signage, in addition to nomenclature and signage provided to satisfy OESC requirements, for the fire pump service that shall conform to the following:

- Label must read "Fire Pump installed Ahead of Main Breaker. Two (2) separate secondary services exist in this room. There is a possibility of electrical back feed."
- Laminated warning label must be located and posted at both the Service Entrance main disconnect for the Fire Pump service and at the main disconnect for the main secondary service (permanently affixed).

- Label shall be presented on a red background with white lettering. Lettering height shall be a minimum of 13 mm [1/2"] in size.
- Laminated label shall be installed such that it shall be as level and plumb as Practicable.

The type of metering that shall be installed is dependant of the size of the Fire Pump Service required. Refer to HOL Specification MCS0020 for more information.

9.2 Fire Pump Service Conductor Size Considerations

Conductors supplying the customer's fire pump circuit shall be taken from upstream of the service entrance disconnect. If the service conductors for the fire pump circuit service are rated for 200 A, or less (e.g., 2/0 RW90 copper), then the meter installation for the fire pump service shall follow the requirements outlines in Section 7.3.2 or 7.3.3 of this document depending on the service voltage. If the conductor is rated for 225 A, or greater (e.g., 3/0 RW90 copper), then the Meter Installation for the Fire Pump service shall follow the requirements outlined in Section 7.3.4 of this document and shall be dependent on the service voltage as per Table 2 of the OESC.

10. Temporary Services

A temporary service is a metered service, as defined in HOL *Conditions of Service* (ECS0012). HOL Design and Construction shall determine the technical details of the service in consultation with the Customer requesting the service.

Temporary 120/240 1-Phase, 3 Wire services with an ampacity of 200A, or less, for a dedicated construction trailer shall not require a service entrance disconnect.

Temporary 347V/600Y 3-Phase services with an ampacity of 600A, or less, shall be monitored using non-interval revenue metering equipment or, if interval metering equipment is used, the installation shall be exempt from the communication requirements typically associated with a revenue interval metering.

The Customer shall be responsible for all associated costs for the installation, safeguarding, and removal of metering equipment required for a Temporary 120V/240V 1-Phase or 347V/600Y 3-Phase service.

For overhead supplied temporary services, either Copper or Aluminum conductor can be used to connect the meter socket base to the overhead service at the service's weather-head, provided it meets the requirements of Section 5.13.2 of this document.

Temporary service, fed from a pole, requires a Weatherproof cabinet of a sufficient size to house the main Service Entrance disconnect/breaker and metering equipment. The Weatherproof cabinet shall meet the requirements for a metering enclosure, already described in Section 5.5 this document, and shall be mounted on a separate structure that does not include HOL owned utility poles and pad-mounted equipment; it is permitted to mount equipment on Customer owned power poles.

Metering on the temporary service shall be disconnected and removed by HOL within the allotted time specified in HOL's *Conditions of Service* (ECS0012) after the customer receives a permanent utility supply of power to their service entrance.

Should it be discovered that supply is being taken from the Line Side of the meter by the Customer, or by its electrician or contractor, for any reason, HOL shall disconnect the Temporary service immediately and, at its determination, recover the cost of the disconnection and reconnection from the Customer.

The use of portable "Sea Can" shipping containers as a Temporary electrical room shall be restricted to supporting a Temporary service. The shipping container shall be subject to all of the following:

- It shall be subject to both the requirements of an electrical room as described in Section 5.6 this document.
- Each "Sea Can" shipping container shall be used on a single Temporary service.
- It shall be subject to both an ESA inspection and approval prior to the installation of metering equipment.
- It shall be Weatherproof.
- Prior to relocating, or removing, the shipping container, HOL shall be notified to disconnect the Temporary service and remove the metering and its related equipment as soon as Practicable.

11. Emergency Power Supplies

Customers with permanently connected 'emergency power supply' (as defined in Section 46 of the OESC), or has provisions to connect a portable emergency power supply, shall comply with all applicable criteria of the OESC.

The Customer shall ensure the output from the Customer's emergency power supply cannot back feed in to HOL's distribution system or back feed through HOL's revenue metering equipment.

All of the requirements outlined for Back-Up Generators within HOL's Conditions of Service (ECS0012).

The Customer shall consult with, HOL Distribution Design Department, prior to the installation of a Permanent generator. The Customer shall provide a SLD showing the provision for the installation of the Permanent generator.

The Customer shall supply and install a transfer switch on the Load Side of the revenue metering external to the utility supply Compartment if required. The transfer switch shall meet the following requirements:

- In the absence of explicit HOL authorization, it shall disconnect the Customer's service entrance from utility supply prior to taking supply from the Customer's generating equipment; this is referred to as a Break-Before-Make Transfer Switch or as an Open Transition Transfer Switch.
- If the Customer instead wants to use a Make-Before-Break Transfer Switch instead, they shall consult with HOL prior to commencing any electrical work to prevent back feed in to HOL's distribution system or back feed through HOL's revenue metering equipment from the Customer owned equipment.

The transfer switch shall supply utility power to the meter in the "normal" state and shall disconnect the service from the utility supply when in its "emergency" state.

HOL personnel shall be required on both the installation and removal of the transfer switch, for breaking and installation of new seals respectively. The Customer shall be responsible for all the associated costs incurred by HOL.

The transfer switch shall be approved by the ESA, CSA, or ULC and shall carry the markings of the approving organization.

If the transfer switch does not have obvious means to visibly verify its state, then subject to HOL's determination:

- The Customer shall provide and install an appropriately sized disconnect switch immediately after, and within view of, the meter and/or Instrument Transformer cabinet. The disconnect switch shall comply with requirements as per Section 5.9.
- No Customer owned equipment shall be installed between the Service Entrance disconnect and the metering equipment enclosure or between the metering equipment enclosure and the load-side disconnection switch.

Refer to HOL Specification ECG0002 for more information.

11.1 Automatic Open Transition Supply Transfer Systems Installed on Meter Socket Bases

Automatic Open Transition Supply Transfer systems installed on an outdoor meter socket base shall be permitted for 120V/240V, 1-Phase, up to 200A services only.

The transfer switch shall require steel locking rings and meter seals to secure the Automatic Open Transition Supply Transfer meter socket adapter to the meter socket base and the revenue meter to the Automatic Open Transition Supply Transfer meter socket adapter.

The Automatic Open Transition Supply Transfer system, if used, shall meet the following requirements:

- It shall disconnect the Customer's Service Entrance from utility supply prior to taking supply from the Customer's generating equipment; this is referred to as a Break-Before-Make Transfer Switch or as an Open Transition Transfer Switch.
- It shall allow the revenue metering equipment to take supply from the utility supply regardless of where the Customer's Service Entrance is taking supply from. The intent is to allow the revenue metering equipment to operate while utility supply is present.

The Customer shall contact HOL's Service Desk (refer to HOL's Conditions of Service (ECS0012) for contact information), prior to installation to obtain a service layout from HOL, stating where they wish to install a transfer switch on their meter socket base to ensure the service will isolate the Customer's service. The Customer shall indicate if they intend to use a licensed electrician to perform the installation.

As per OESC and ESA Bulletin DB-04/17, the installation of an Automatic Open Transition Supply Transfer switch onto a Customer's meter socket base (this includes, but is not limited to, GenerLink collars and other devices deemed by ESA as "Meter Base Mounted Transfer Devices") shall be as per the following:

- When installed by a licensed electrician: HOL does not require an ESA inspection and approval prior to re-installing the revenue meter and re-energizing the Customer's service.
- When installed by someone other than a licensed electrician: HOL requires notification from ESA (in the form of an ESA Connection Authorization Certificate) indicating the installation has been inspected and approved by ESA. This shall be done prior to HOL re-installing the revenue meter and re-energizing the Customer's service.
- Shall only be installed onto a 3-Wire non-transformer rated service; transformer rated services or services that use 1-Element metering shall not be eligible.

11.2 Emergency Power Supplies on Three Phase Services.

Customers that use Back-Up Generators, or plan on installing generators, capable of providing 3-Phase power shall install an Appropriately sized transfer switch. It shall be capable of selecting supply from either the utility supply or the generator's output, but not both simultaneously. Further, the transfer switch shall be capable of isolating the utility supply from the generator's output in either the forward or reverse direction.

12. Energy Resource Facilities

HOL metering services shall provide metering equipment for Energy Resource Facilities (ERFs). In addition to the prerequisites and requirements for metering discussed in this document, it shall be subject to all of the additional requirements of this section.

All ERFs generating above 1MW require Independent Electricity Market Operator approved metering installations.

Prior to committing to the purchase of any equipment and prior to retaining the services of others, Customers shall consult with HOL to determine the installation prerequisites, requirements, restrictions, and any applicable fees that may be required. HOL document ECG0006, Embedded Generation Connection Guideline describes the technical requirements for ERFs and the process for connecting ERFs to HOL's distribution system.

In addition to ESA and OESC requirements, and the requirements contained in all the previous sections of this document, refer to the HOL Specifications found on the Hydro Ottawa Generation Design Specification page for additional requirements.

Metering equipment shall be sized to the DG System Fused Disconnect and DG Source Disconnect, and not the fuse rating.

3-Phase ERFs may be installed on HOL's Grounded-WYE (4-Wire) system, but not HOL's Delta (3-Wire) system.

The Customer shall submit the proposed design for the ERF installation to HOL for review and comment prior to ESA plan approval submission as per the process outline in HOL ECG0006.

Prior to energizing the ERF service, HOL requires that the Customer post a Lamacoid plated electrical SLD at the electrical service. The SLD must be plainly and permanently marked identifying switching arrangements, the disconnect locations, and the type and nameplate rating of the ERF.

All ERF revenue metering equipment, including disconnection devices, isolation devices, shall be installed in a single location, when possible, within view of each other. The purpose of this is to ensure that HOL Meter Technicians can visually check the state of both disconnection and isolation devices prior to commencing work on the metering equipment. This will ensure that the state of the disconnection and isolation devices cannot be changed without the knowledge of the HOL Meter Technician while they perform their work on the metering equipment.

Unless noted otherwise, all disconnection switches shall meet the requirements of Section 5.9 and enclosures shall be subject to all of the following:

- Shall not be used to house additional equipment not intended by its manufacturer except for a single set of spare fuses stored inside the enclosure of the disconnect they are intended to be used with, provided there is ample space within the disconnect's enclosure.
- Shall not take supply from more than one source of supply and shall provide a single source of supply to a single Downstream device.

All of metering equipment including meter socket base(s), disconnect switches, and enclosures used to house HOL owned ancillary revenue equipment, shall carry the following label and all other lamacoids specified in HOL specification MCS0102.



Figure 1: DG System Two Power Sources Warning label

Unless noted otherwise, and in the absence of permission from HOL:

- No Customer owned equipment shall be connected electrically between a DG disconnect and HOL owned revenue metering equipment.
- No Customer owned equipment shall be physically installed between a DG disconnect and HOL owned revenue metering equipment, including the area between the floor and ceiling.

The use of multi-barrel mechanical lugs may be used where practicable. The termination of two (2) or more, conductors within the same mechanical lug barrel shall not be permitted.

Customers with existing transformer rated services that use a separate Instrument Transformer enclosure may be requested to upgrade their service to use a combination socket base metering enclosure. Refer to HOL specification MCS0078 for more information.

The Customer shall ensure that protection systems, including over-current protection, are installed and set as per ERF specifications, OESC, and HOL specification ECG0006.

Customer owned secondary distribution switchgear, as described in Section 8.3 of this document, shall be used only with Customer owned ERF equipment if the switchgear has the appropriate amount of space available to accommodate the required ancillary metering equipment discussed in this section.

All revenue metering equipment, external enclosures, and outdoor mounted disconnects (including, but not limited to, DG System Fused Disconnect and DG Source Disconnect) shall meet the minimum clearances as per HOL specifications MCS0105, MCS0106, MCS0107, and MCS0108.

The Customer shall provide and install a disconnect between the output of the ERF and the metering equipment. The switch shall be used to isolate the metering equipment from the output of the ERF. The switch shall provide visible isolation. Moulded case breakers are not acceptable. The disconnecting means shall be labelled "DG Source Fused Disconnect".

The Customer shall provide and install PVC conduit, with provisions that allow for linear expansion due to a change in temperature, to house all of the conductors between the Meter Socket base and the distributed generation disconnection switches. This shall be done subject to the requirements of the ESA, the OESC, and Section 5.12 of this document.

The installation of the metering equipment and disconnection and isolation devices shall be installed in one of the following locations:

- For residential services, the metering equipment shall be located on the side or front of the residence as per Section 6.1.1.
- A single dedicated electrical room; the electrical room itself shall be subject to Section 5.6 of this document.
- In an enclosure that meets the requirements of Section 5.5 of this document. With prior approval of HOL, the DG Source Disconnect and the DG System Fused Disconnect may be installed outside of the CSA rated enclosure used to house the HOL owned revenue metering equipment.

In this case, the disconnects shall be installed adjacent to, and within easy and obvious sight of, the enclosure used to house the HOL owned revenue metering equipment.

- A Permanent Weatherproof enclosure of the Customer's own construction. It shall consist of Permanent walls covered in brick, siding, or stucco, and shall be covered by a Permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of the OBC. Use of "Sea Can" shipping containers as a Permanent Weatherproof enclosure shall not be permitted.
- Pedestal mounted metering may be used at HOL's determination. It shall meet all of the requirements of Section 7.2 of this document, with the exception that it may be installed in proximity to, and within sight of, the pad-mounted distribution transformer on the Line Side of the Service Entrance.

12.1 Load Displacement

Customers who own generating equipment capable of delivering energy within acceptable parameters back into HOL's distribution system may be eligible for load displacement metering.

A single HOL provided net Bi-Directional Meter shall be used to determine the amount of energy delivered to a Customer's service entrance and received into the HOL system for billing purposes.

HOL may require a second meter installed at the output of the ERF where it connects to the distribution system within which it is embedded for validation and Gross Load Billing purposes.

Installations such as these can be used by Customers that are primarily interested in off-setting their consumption of utility supplied energy by using their own generating equipment. The Customer may intend to consume all of their generating capacity within the premise and not deliver any energy to HOL's distribution system. Load Displacement Metering measures only the received energy that is delivered to the HOL system after all the loads in the Customers' premise have been offset by generation. There is therefore a difference between the total generation of the premise and the net of what is received by HOL.

Should the ERF produce less than twenty five percent (25%) of the customer's minimum load the requirement for a bidirectional meter shall be reassessed by HOL.

Contact HOL to consult with either HOL Distribution Design section to determine eligibility and requirements.

12.1.1 Net Metering

Subject to the requirements outlined in the latest revision of the Distribution System Code, Ontario Regulation 541/05, and the latest revision of HOL's *Conditions of Service* (ECS0012) HOL shall offer Net Metering to eligible Customers on a first-come, first-served basis.

As per O. Reg. 541/05, a generator is eligible for net metering when:

- the electricity is solely generated from renewable energy sources;
- the electricity is generated primarily for the Customers own use;
- the electricity distribution does not rely upon the HOL distribution system;
- any excess generated electricity is conveyed into the HOL distribution system; and
- the Customer is not party to any contract or agreement, other than the Net Metering agreement, to sell generated electricity to HOL.

12.1.2 Individual Residential Services

The Customer is to follow all the requirements set out in Section 6.4 in regards to meter socket base selection. In addition the Customer shall install a DG System Fused Disconnect as per the requirements of Section 5.9 to isolate the revenue meter from the ERF.

The approved meter base, an approved DG System Fused Disconnect switch, and LOP device, as required, shall be installed outside of the residence as per Section 6.1. Refer to HOL Specification MCS0083 ($\leq 200A$) and MCS0085 ($\leq 400A$) for construction details.

The Customer shall provide and install PVC conduit from the outdoor enclosures to the inside equipment. This shall be done subject to the requirements of Section 5.12 of this document.

12.1.3 Townhouses and Condominiums

The Customer is to follow all the requirements set out in Section 6.5 in regards to meter socket base. In addition the Customer shall install a DG System Fused Disconnect as per the requirements of Section 5.9 to isolate the revenue meter from the ERF.

When metering equipment is located outdoors the customer shall ensure that all ancillary equipment is installed outdoors as per Section 6.5 and HOL Specifications MCS0084 and MCS0086.

When metering equipment located indoors the customer shall install a plywood mounting board, as per Section 5.15 for the mounting of an approved DG System Fused Disconnect switch, an approved DG Source Disconnect switch, and a LOP device as required. Installation shall be as per HOL Specification MCS0063 or MCS0064, whichever is most relevant.

The Customer shall provide and install EMT to house all of the conductors between the meter centre or splitter trough, the additional Meter Socket base, the distributed generation disconnection switches, and the first enclosure containing distributed generation equipment. This shall be done subject to the requirements of Section 5.12 of this document.

12.1.4 Commercial Services

The Customer is to follow all the requirements set out in Section 7 in regards to meter socket base. In addition the Customer shall install a DG System Fused Disconnect and a DG Source Disconnect switch as per the requirements of Section 5.9. The Customer shall install a plywood mount board as per Section 5.15 for the metering equipment, including the disconnect switches and LOP devices.

The approved meter base, an approved DG System Fused Disconnect switch, an approved DG Source Disconnect switch, and an LOP device, as required, shall be mounted onto the plywood mounting board.

12.2 Feed in Tariff (FIT Requirements) [LEGACY]

The Feed in Tariff (FIT) program was terminated in 2017. As there are established metering systems connected to the HOL Network this section will remain as part of GCS0008 until such a time that the existing systems have been upgraded to Net Metering or Load Displacement systems.

The Customer shall install the following in support of the metering equipment to be installed:

- The Customer shall provide and install a suitably rated, and approved, load-break fused distributed generation disconnection switch as per HOL Specification ECG0015.
- The Customer shall provide and install an approved Meter Socket base (see tables located at the end of this Section of the document for a list of approved Meter Socket bases) for the purposes of installing a Bi-Directional Meter. The Bi-Directional Meter shall be supplied and installed by HOL as per HOL Specification ECG0015.

- The Customer shall provide and install a suitably rated, and approved, load-break DG Source Disconnection switch as per HOL Specification ECG0015.
- If Customer owned intermediate transformation is used to adjust the distributed generated output to the Service Entrance voltage, the equipment that senses LOP (which may include, but is not limited to, power electronics and Instrument Transformers) shall be installed on the Load Side of the DG Source Disconnect switch. The installation of the equipment that senses LOP shall meet the requirements discussed above in this section.
- If installed in a dedicated electrical room, all equipment shall be installed on a plywood mounting board that meets the requirements of Section 5.15 of this document.

In addition, the generator isolating disconnect switch from the ERF is required to be Service Entrance rated with over-current protection and provision for grounding of the Neutral (identified) conductor. Both the system disconnect switch and generator isolating disconnect switch must be approved for use in Ontario per OESC rule 2-024 as "Suitable For Service Equipment" and shall provide a visible open point; moulded breakers are not acceptable.

The disconnect switch shall be installed on the same wall as the Meter Socket, within view of the Meter Socket.

HOL shall provide two (2) Smart Meters, one to measure the consumption of utility supplied energy for the load Customer and also a Bi-Directional Meter capable of measuring both the amount of delivered energy consumed by the generation equipment (at times when the generation equipment is not generating power) and the amount of energy received back to the distribution system from the Distributed Generator.

Refer to HOL Specification MCS0053 for meter base wiring details.

HOL shall provide an additional bi-directional Smart Meter to measure the amount of energy delivered from the distribution system to the Customer also the energy received back to the distribution system from the Distributed Generator.

12.2.1 FIT for Townhouses and Condominiums

If the existing metering is done through a splitter trough or a metering centre, the Customer shall supply and install a plywood mounting board, as per Section 5.15 of this document.

The approved meter base, an approved DG System Fused Disconnect switch, and an approved DG Source Disconnect switch shall be mounted onto the plywood mounting board. Installation shall be as per HOL Specification MCS0063 or HOL Specification MCS0064, whichever is most Appropriate. Refer to HOL Specification MCS0058 for construction detail.

The Customer shall provide and install EMT to house all of the conductors between the meter centre or splitter trough, the additional Meter Socket base, the distributed generation disconnection switches, and the first enclosure containing distributed generation equipment. This shall be done subject to the requirements of Section 5.12 of this document.

12.2.2 FIT for Commercial Services

The approved meter base, an approved DG System Fused Disconnect switch, and an approved DG Source Disconnect switch shall be mounted onto a single plywood mounting board. Installation as per HOL Specification MCS0058.

For 3-phase generation greater than 200A, all the customer's metering shall be installed in a single dedicated electrical room; the electrical room shall be provided and be subject to Section 5.6

A second connection at the transformer secondary spades is only feasible for generation with the following Service Entrance types:

- Generation connected to an underground service at less than 400A and fed from a 3-Phase overhead bank of transformers.
- Generation connected to an underground service at less than 800A fed from a 3-Phase pad-mounted transformer.

Tables

Table 1: Hydro Ottawa Acceptable Criteria For Meter Base Socket For Overhead 120V/240V, 1-Phase, 3-Wire, 100A Or 200A Services

Service Rating	Meter Base Rating	Meter Base Minimum Dimensions (H x W x D)	Meter Base Requirements
120/240V 1-Phase 3-Wire 100A	100A, 600V	346 mm x 187 mm x 105 mm [13-5/8" x 7-3/8" x 4-1/8"]	CSA approved Overhead weather-proof CSA Type 3R King size metal Meter Socket base c/w: High strength non-tracking blocks Mechanical lugs on Line Side Safety shields on Line Side Metal screw type lock Sealing Ring Suitable standard 4-Jaw socket base acceptable to the ESA
120/240V 1-Phase 3-Wire 200A	200A, 600V	432 mm x 305 mm x 121 mm [17" x 12" x 4-3/4"]	

Table 1A: Hydro Ottawa Acceptable Criteria For Meter Base For Underground 120V/240V, 1-Phase, 3-Wire, ≤200A Services

Service Rating	Meter Base Rating	Meter Base Minimum Dimensions (H x W x D)	Meter Base Requirements
120V/240V 1-Phase 3-Wire 100A or 200A	200A, 600V	432 mm x 305 mm x 121 mm [17" x 12" x 4-3/4"]	CSA approved Underground Weatherproof type CSA Type 3R King size metal Meter Socket base c/w: <ul style="list-style-type: none">• High strength non-tracking blocks• Compression lugs on Line Side; [1/2"] studs• Safety shields on Line Side• Metal screw type lock Sealing Ring• Suitable standard 4-Jaw socket base acceptable to the ESA

Note: All Underground Meter Socket Bases must have Compression Lug Terminations for the Secondary Supply Conductors.

Due to voltage drops from the distribution transformer to the Meter Socket base, the residential Customer shall provide, and install, 63 mm [2-1/2"] conduit on all underground, 1-Phase, secondary services, when installing 250 kcmil Copper secondary conductors. Installation as per HOL specification ECS0002.

Table 2: Hydro Ottawa Approved Underground Multi-Position Meter Gang Socket Trough For Residential 120V/240V, 1-Phase, 3-Wire, 400A Multi-Unit Service

Service Rating	Manufacturer	Catalogue Number	Enclosure Size (H x D x W)	2 – 6 Multi-Gang Meter Socket Requirements
120V/240V 1-Phase 3-Wire 400A Service	EATON (CUTLER-HAMMER)	2KU4CLX Series to 6KU4CLX Series	579 mm x 156 mm x 941 mm [22-13/16" x 6-1/8" x 37-1/16"] to 564 mm x 156 mm x 1881 mm [22-3/16" x 6-1/8" x 74-1/16"]	Factory Bused 400A Main 200A 600V per position CSA Weatherproof enclosure 3 rating c/w: <ul style="list-style-type: none"> • Two blank compartments • Extended bus bars • [1/2"] Compression studs • One knock out for incoming cable for 100 mm [4"] conduit • 4-Jaw Meter Socket • Screw type metal lock Sealing Rings • Underground Services Only
	HYDEL	MSC820TW Series to MSC860TW Series	578 mm x 159 mm x 949 mm [22-3/4" x 6-1/4" x 37-3/8"] to 578 mm x 159 mm x 1886 mm [22-3/4" x 6-1/4" x 74-1/4"]	
	ABB (MICROELECTRIC)	BSC42-VG Series BSC42-VGH Series to BSC46-VG Series BSC46-VGH Series	511 mm x 162 mm x 889 mm [20-1/8" x 6-3/8" x 35"] to 511 mm x 162 mm x 1778 mm [20-1/8" x 6-3/8" x 70"]	

Note: All Underground Multi-Gang Meter Socket Trough must have Compression Lug Terminations for the Secondary Supply Conductors.

Note: Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.

Table 3: Hydro Ottawa Approved Weatherproof Combination Base Metering Enclosure For Underground 120V/240V, 1-Phase, 3-Wire, 225A To 400A Service

Service Rating	Manufacturer	Catalogue Number	Base Metering Enclosure Requirements
120V/240V 1-Phase 3-Wire 225A to 400A	ABB	JS4B-ST	CSA approved Underground Weatherproof type CSA Type 3R metering base enclosure c/w: <ul style="list-style-type: none"> Line Side terminations: double [1/2"] studs to accommodate compression lugs for underground service (1 x 500 kcmil or 2 x 250 kcmil) Load Side terminations: tunnel type connectors, dual rated for 1 x 500 kcmil or 2 x 250 kcmil <ul style="list-style-type: none"> Isolated Neutral Conductor Twin covers allow access to either Compartment Meter Socket configuration for 5-Jaw meter with self-shorting on left side <ul style="list-style-type: none"> (H x W x D): 78 mm x 514 mm x 213 mm [30-5/8" x 20-1/4" x 8-3/8"]
	HYDEL	CT4-TS-OT	
	EATON	TCC5-TS	

Notes:

- 1) Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.
- 2) All Underground combination base metering enclosure must have compression lug Line Side terminations and a grounded Neutral conductor when utilized for residential Service Entrance.
- 3) The electrician shall supply and install the compression lugs on the secondary conductors for the service to the metering base enclosure. The enclosure Load Side terminations shall have mechanical lugs for the secondary conductors.
- 4) Units shall be provided without a 3-Wire CT. This shall be supplied and installed by HOL Metering Services on site.

Applications:

- 1) Instrument transformer rated enclosures are required for services that exceed 200A.
- 2) CTs provide low current directly proportional to the higher service current requirements.
- 3) For example, a 400/5, 3-Wire CT provides 5A to the 2-Wire meter when the current in the service is 400A.

Table 4: Hydro Ottawa Approved 1-Phase, 20A, 600V, Transformer Rated 5-Jaw Meter Socket Bases with Provision For Test Switch For 240V, 1-Phase, 3-Wire, >200A Service

Service Rating	Manufacturer	Catalogue Number	Meter Socket Base Requirements
120V/240V 1-Phase 3-Wire 400A or 600A	EATON (CUTLER-HAMMER)	TSU5	CSA approved 20A, 600V transformer rated Weatherproof CSA Type 3R Meter Socket base c/w: <ul style="list-style-type: none"> • Meter Socket configuration for 5-Jaw meter • CSA approved for use with Copper conductors only • Conductor range for #14 AWG - #10 AWG • Metal screw type lock Sealing Ring • Provisions for metering Test Switch • Bottom cover is lockable and sealable
	DURHAM	RSTL5-2K	
	HYDEL	CTS405PW	
	ABB (MICROELECTRIC)	CT105	

Applications:

- 1) Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.
- 2) Instrument Transformer rated Meter Sockets are required for services that exceed 200A.
- 3) CTs provide low current directly proportional to the higher service current requirements.
- 4) For example, a 400/5, 3-Wire CT provides 5A to the 2-Wire meter when the current in the service is 400A.

Table 5: Hydro Ottawa Approved Commercial 7-Jaw Meter Socket Bases For 120V/208Y and 347V/600Y, 2-Phase and 3-Phase, 100A and 200A Services

System	Manufacturer	Catalogue Number	
		100A	200A
120V/208 or 347V/600Y 3- Phase 4-Wire	EATON (CUTLER-HAMMER)	P17-0-IN1	P27-IN2
	HYDEL	SFC703RW	STC703RK
	ABB (MICROELECTRIC)	PL17-INTCV	PL27-INTCV
INDIVIDUAL NETWORK SERVICE 2-Phase AND 3-Phase 120V/208Y	EATON (CUTLER-HAMMER)	P17-0-IN1	P27-IN2
	HYDEL	SFC703RW	STC703RK
	ABB (MICROELECTRIC)	PL17-INTCV	PL27-INTCV

Isolated Neutral Requirements:

- 1) Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.
- 2) A full size Neutral conductor shall be provided to all 7-Jaw Meter Socket bases.
- 3) The Neutral conductor must be terminated in the Meter Socket base on an isolated neutral block and a white #10 AWG Copper Neutral tap shall be supplied to the 6th jaw in the 7-Jaw Meter Socket base.

Table 5A: Hydro Ottawa Approved Commercial 13-Jaw Transformer Rated Meter Socket Bases For 3-Phase, 4-Wire, >200A Secondary And Primary Services

Service Rating	Manufacturer	Catalogue Number	Meter Socket Base Requirements
120V/208Y or 347V/600Y 3-Phase 4-Wire >200A Service	EATION (CUTLER-HAMMER)	TSU13	13-Jaw Meter Socket base are required for a 3-Phase, 4-Wire, 3-Element, Secondary and Primary Service. CSA approved Weatherproof type CSA Type 3R, 20A, 600V Meter Socket base c/w: <ul style="list-style-type: none"> • CSA approved for Copper only • Conductor range for #14 AWG - #8 AWG • Metal screw type lock Sealing Ring • Provisions for 10-pole metering Test Switch • Bottom cover is lockable and sealable
	DURHAM	RSTL13-2K	
	HYDEL	CTS130PW	
	ABB (MICROELECTRIC)	CT113	

Note: Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.

Table 5B: Hydro Ottawa Approved Commercial 8-Jaw Transformer Rated Meter Socket Base For 3-Phase, 3-Wire, "Delta"-Connected, Primary Service

Service Rating	Manufacturer	Catalogue Number	Meter Socket Base Requirements
600V Δ 3-Phase 3-Wire Service	EATION (CUTLER-HAMMER)	TSU8	8-Jaw Meter Socket base are required for a 3-Phase, 3-Wire, 2-Element, Primary Service CSA approved Weatherproof type CSA Type 3R, 20A, 600V Meter Socket base c/w: <ul style="list-style-type: none"> • CSA approved for Copper only • Conductor range for #14 AWG -#8 AWG • Metal screw type lock Sealing Ring • Provisions for 10-pole metering Test Switch • Bottom cover is lockable and sealable
	DURHAM	RSTL8-2K	
	HYDEL	CTS800PW	
	ABB (MICROELECTRIC)	CT108	

**HOL no longer provides New 600V "Delta"
Connected Secondary on New Installations**

Note: A 600V, 3-Phase, 3-Wire Delta connected secondary service is **not** a standard HOL service voltage. HOL does not provide self-contained 600V, 3-Phase, 3-Wire Delta meters for new, added, or upgraded secondary services.

Table 6: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear, using Copper Conductor

Service Voltage	Phase	Wire	Service Rating (A)	Maximum Conductor Size (Conduit)	Conductor Type	Instrument Transformer Cabinet Dimension (H x W x D)	Instrument Transformer Compartment In Switch Gear
120V/240V	1	3	400A	Single Run: Up To 600 MCM	RW90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up To 4/0 AWG	RW90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			600A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 400 MCM	RW90 Cu	1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
120V/208Y or 347V/600Y	3	4	400A	Single Run: Up To 600 MCM	RW90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up To 4/0 AWG	RW90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			600A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 400 MCM	RW90 Cu	1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			≥ 800A Amp	Bus Bar	N/A	N/A	Yes

- Notes:**
- 1) In Table 6, the term ‘Single Run’ denotes the use of a single conductor and the term ‘Single Parallel Run’ denotes the use of two (2) conductors.
 - 2) 3-Phase, 4-Wire, service is not available for residential Customers.
 - 3) 120V/240V, 1-Phase, 3-Wire, 600A and 120V/208Y or 347V/600Y, 3-Phase, 4-Wire 600A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 600A services will not accept conductors larger than 600 MCM; as per OESC Table 2, 600 MCM-Cu conductor does not provide sufficient ampacity for a 600A service.

Table 6 Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear, using Copper Conductor (Continued)

Notes on Secondary Service Conductors:

- 1) The Line Side conductors shall be identical in type, number of conductors, and conductor size.
- 2) The Load Side conductors shall be identical in type, number of conductors, and conductor size.
- 3) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.
- 4) Secondary conductors shall enter and leave the Instrument Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged, then a (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] instrument transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs.
- 5) Where parallel conductors are required for the metering installation, the Customer shall provide properly sized double barrel mechanical lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the line and Load Side of the CTs.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the material the conductors are comprised of.
- 8) The instrument transformers shall be supplied and installed on site by HOL Metering Services.

Table 6A: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Single Copper Conductors in Free Air (Aluminum-Sheathed Cable)

Service Voltage	Phase	Wire	Service Rating (A)	Maximum Conductor Size	Conductor Type	Instrument Transformer Cabinet Dimension (H x W x D)	Instrument Transformer Compartment In Switch Gear
120V/240V	1	3	400A	Single Run: Up to 250 MCM	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up to 1/0 AWG	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
			600A	Single Run: Up to 500 MCM	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up to 3/0 AWG	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
120V/208Y or 347V/600Y	3	4	400A	Single Run: Up to 250 MCM	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up to 1/0 AWG	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
			600A	Single Run: Up to 500 MCM	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Single Parallel Run: Up to 3/0 AWG	RA90 Cu	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A

Note:

In Table 6A, the term ‘Single Run’ denotes the use of a single conductor and the term ‘Single Parallel Run’ denotes the use of two (2) conductors.

**Table 6A: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Single Copper Conductors in Free Air (Aluminum Sheathed Cable)
(Continued)**

Secondary Service Conductors:

- 1) All Line Side conductors shall be identical in type, number of conductors, and conductor size.
- 2) All Load Side conductors shall be identical in type, number of conductors, and conductor size.
- 3) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.
- 4) Secondary conductors shall enter and leave the Instrument Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged, then a (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Instrument Transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs.
- 5) Where parallel conductors are required for the metering installation, the Customer shall provide properly sized double barrel mechanical lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the line and Load Side of the CTs.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are used, only one (1) of the conductors 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 (3) individual #10 AWG conductors.
- 8) The Instrument Transformers shall be supplied and installed on site by HOL Metering Services.

Table 6B: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear, using Aluminum Conductor

Service Voltage	Phase	Wire	Service Rating (A)	Maximum Conductor Size (Conduit)	Conductor Type	Instrument Transformer Cabinet Dimension (H x W x D)	Instrument Transformer Compartment In Switch Gear
120V/240V	1	3	400A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 300 MCM	RW90 Al	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			600A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 600 MCM	RW90 Al	1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
120V/208Y OR 347V/600Y	3	4	400A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 300 MCM	RW90 Al	900 mm x 900 mm x 300 mm [36" x 36" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			600A	Single Run: Not Permitted	N/A	N/A	N/A
				Single Parallel Run: Up To 600 MCM	RW90 Al	1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]	N/A
				Bus Bar	N/A	N/A	Yes
			≥ 800A	Bus Bar	N/A	N/A	Yes

Notes on Secondary Aluminium Conductors:

- 1) 400A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 400A services will not accept conductors larger than 600 MCM; as per OESC Table 4, 600 MCM-Al conductor does not provide sufficient Ampacity for a 400A service.
- 2) 600A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 600A services will not accept conductors larger than 600 MCM; as per OESC Table 4, 600 MCM-Al conductor does not provide sufficient Ampacity for a 600A service.
- 3) In Table 6B, the term ‘Single Parallel Run’ denotes the use of two (2) conductors per phase.

Table 6B: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear, using Aluminum Conductor (Continued)

Notes on Secondary Aluminium Conductors: (Continued)

- 1) 3-Phase, 4-Wire, service is not available for Residential Customer. Aluminum conductor terminated using compression lugs to the Line Side and Load Side of the (in-line) CT(s) within the Instrument Transformer cabinet; mechanical lugs are not permitted to be used with Aluminum conductor for these types of installations.
- 2) The Line Side conductors shall be identical in type, number of conductors, and conductor size.
- 3) The Load Side conductors shall be identical in type, number of conductors, and conductor size.
- 4) The minimum length of each conductor for both the Line Side and Load Side of the bar type (in-line) CTs will be 1200 mm [4'] shall be provided within the Instrument Transformer cabinet. This will enable the conductors to be trained in place for the termination and to ensure that strain is not applied to the CTs for the metering installation.
- 5) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.
- 6) Secondary conductors shall enter and leave the Instrument Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged then (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Instrument Transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs. Refer to Schedule 2, Schedule 4, Schedule 6, and Schedule 8, of this document, for Instrument Transformer cabinet layout details.
- 7) Parallel conductors are required for the metering installation, the Customer shall provide properly sized compression lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the Line Side and Load Side of the CTs.
- 8) The Customer will train the secondary conductors and cut the length of the conductors, and shall be responsible for the pressing of the compression lugs for termination to the bar-type (in-line) CT (s).
- 9) HOL Metering personnel shall be responsible to complete the terminations to the bar-type (in-line) CT (s) for the installation.
- 10) Where a Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.
- 11) Parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the type of conductors.
- 12) "Stranded Bi-Metallic Pin Terminals" shall not be permitted when transitioning from Aluminum conductor to Copper conductor for the metering installation, as per Section 9.2.1.1.5 of this document.
- 13) The Instrument Transformers shall be supplied and installed on site by HOL Metering Services.

Table 7: Hydro Ottawa Approved 2 to 6 Multi-Gang Meter Socket Trough for Overhead, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services

Overhead Service	Manufacturer	Catalogue Number	Enclosure Size (H x D x W)	Multi-Gang Meter Socket Requirement(s)
120V/240V 1-Phase 3-Wire 100A Service	EATON (CUTLER- HAMMER)	2KN1 Series to 6KN1 Series	308 mm x 121 mm x 589 mm [12-1/8" x 4-3/4" x 23-3/16"] to 308 mm x 121 mm x 1376 mm [12-1/8" x 4-3/4" x 54-3/16"]	2 - 6 Multi-Gang Meter Socket Requirements: Factory Bused 200A Main, 100A, 600V per position CSA Weatherproof enclosure NEMA Type 3R rating c/w: <ul style="list-style-type: none"> • Tunnel style line, load and neutral lugs • 4-Jaw Meter Socket • Screw type metal lock Sealing Ring
	HYDEL	SD220PW Series to SD620PW Series	305 mm x 127 mm x 381 mm [12" x 5" x 15"] to 305 mm x 127 mm x 1143 mm [12" x 5" x 45"]	
	ABB (MICROELECTRIC)	BE2-V or BE2-VH Series to BE6-V or BE6-VH Series	371 mm x 132 mm x 406 mm [14-5/8" x 5-3/16" x 16"] to 371 mm x 132 mm x 1220 mm [14-5/8" x 5-3/16" x 48"]	
120V/240V 1-Phase 3-Wire 200A Service	EATON (CUTLER- HAMMER)	2K2 Series to 4K2 Series	384 mm x 130 mm x 665 mm [15-1/8" x 5-1/8" x 26-3/16"] to 384 mm x 130 mm x 1110 mm [15-1/8" x 5-1/8" x 43-11/16"]	2 - 4 Multi-Gang Meter Socket Requirements: Factory Bused 200A Main, 200A, 600V per position , CSA Weatherproof enclosure CSA Type 3R rating c/w: <ul style="list-style-type: none"> • Tunnel style line, load and neutral lugs • 4-Jaw Meter Socket • Screw Type meter lock Sealing Rings
	HYDEL	H22R Series to H24R Series	384 mm x 137 mm x 451mm [15-1/8" x 5-3/8" x 17-3/4"] to 384 mm x 137 mm x 895 mm [15-1/8" x 5-3/8" x 35-1/4"]	
	ABB (MICROELECTRIC)	BD2-V or BD2-VH Series to BD4-V or BD4-VH Series	394 mm x 138 mm x 445 mm [15-1/2" x 5-7/16" x 17-1/2"] to 394 mm x 138 mm x 889 mm [15-1/2" x 5-7/16" x 35"]	

Note: Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.

Table 8: Hydro Ottawa Approved 2 – 6 Multi-Gang Meter Socket Trough for Underground, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services

Underground Service	Manufacturer	Catalogue Number	Enclosure Size (H x D x W)	2 - 6 Multi-Gang Meter Socket Requirements
120V/240V 1-Phase 3-Wire 100A or 200A Service	EATON (CUTLER-HAMMER)	2KNU1CLX Series to 6KNU1CLX Series	308 mm x 121 mm x 589 mm [12-1/8" x 4-3/4" x 23-3/16"] to 308 mm x 121 mm x 1376 mm [12-1/8" x 4-3/4" x 54-3/16"]	Factory Bused 200A Main, 100A, 600V per position, CSA rated Weatherproof enclosure CSA Type 3R rating c/w <ul style="list-style-type: none">• 4-Jaw Meter Socket• Blank wiring Compartment• 1/2" Studs to accommodate compression type main line and neutral lugs• Screw type metal lock Sealing Rings• Underground Services Only
	HYDEL	MCC220TW Series to MCC620TW Series	305 mm x 127 mm x 572 mm [12" x 5" x 22-1/2"] to 305 mm x 127 mm x 1321 mm [12" x 5" x 52"]	
	ABB (MICROELECTRIC)	BEC2-V or BEC2-VH Series to BEC6-V or BEC6-VH Series	384 mm x 127 mm x 614 mm [15-1/8" x 5" x 24-3/16"] to 384 mm x 127 mm x 1464 mm [15-1/8" x 5" x 57-5/8"]	

Underground Service	Manufacturer	Catalogue Number	Enclosure Size (H x D x W)	2 - 4 Multi-Gang Meter Socket Requirements
120V/240V 1-Phase 3-Wire 100A or 200A Service	EATON (CUTLER-HAMMER)	2KU2CLX Series to 4KU2CLX Series	384 mm x 130 mm x 665 mm [15-1/8" x 5-1/8" x 26-3/16"] to 384 mm x 130 mm x 1110 mm [15-1/8" x 5-1/8" x 43-11/16"]	Factory Bused 200A Mains, 200A, 600V per position CSA rated Weatherproof enclosure CSA Type 3R rating c/w: <ul style="list-style-type: none">• 4-Jaw Meter Socket• Blank wiring Compartment• 1/2" Studs to accommodate compression type main line and neutral lugs• Screw type metal lock Sealing Rings• Underground Services Only
	HYDEL	MSC22R Series to MSC24R Series	384 mm x 137 mm x 673 mm [15-1/8" x 5-3/8" x 26-1/2"] to 384 mm x 137 mm x 1118 mm [15-1/8" x 5-3/8" x 44"]	
	ABB (MICROELECTRIC)	BDC2-V or BDC2-VH Series To BDC-4V or BDC-4VH Series	397 mm x 133 mm x 667 mm [15-5/8" x 5-1/4" x 26-1/4"] to 397 mm x 133 mm x 1111 mm [15-5/8" x 5-1/4" x 43-3/4"]	

Note: All Underground Multi-Gang Meter Socke Trough must have Compression Lug Terminations for the Secondary Supply Conductors.

Note: Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.

Table 9: Meter Sockets

Meter Socket types that are required for all services up to 200A. The requirements are indicated below and refer to HOL Specifications MCS0016 and MCS0018 for wiring details.

Voltage	Number of Phases	No. of Wires	Configuration	Ampacity	Meter Socket Type
120V/240V	1-Phase	3-Wire	Not Applicable	≤ 200A	4-Jaw Socket Base
				>200A to 600A	5-Jaw Socket Base
120V/208Y	2-Phase	3-Wire	Grounded-WYE	≤ 200A	7-Jaw Socket Base (if in Stand-Alone Meter Base) or 5-Jaw Socket Base (if part of Metering Centre)
	2-Phase	3-Wire	Grounded-WYE	≤ 200A	7-Jaw Socket Base
	3-Phase	4-Wire	Grounded-WYE	≤ 200A	7-Jaw Socket Base
347V/600Y	3-Phase	4-Wire	Grounded-WYE	≤ 200A	7-Jaw Socket Base

Table 10: Secondary Services

Transformer Rated Meter Socket Types and Number of Required Metering Instrument Transformers:

Voltage	No. of Phases	No. of Wires	Configuration	Ampacity	Meter Socket Type	Meter	No. of Metering Inst. Transformers (Provisions For)	
							CTs	PTs
120V/240V	1-Phase	3-Wire	Not Applicable	>200A to 600A	5-Jaw Meter Socket Base	1-Phase, 1-Element, 10A, 240V, 2-Wire	1 – 3-Wire	0
							2 – 2-Wire	0
120V/208Y	3-Phase	4-Wire	Grounded-WYE	> 200A	13-Jaw Meter Socket Base	3-Phase, 3-Element, 10A, 120V, 4-Wire	3 – 2-Wire	0
347V/600Y	3-Phase	4-Wire	Grounded-WYE	> 200A	13-Jaw Meter Socket Base	3-Phase, 3-Element, 10A, 120V, 4-Wire	3 – 2-Wire	3

Table 11: Hydro Ottawa Approved Utility Pedestal Services 600V, 1-Phase, 100A, 4-Jaw Meter Socket Base And Circuit Breaker For 240V, 1-Phase, 3-Wire, 30A Service

Note: The equipment listed in this table is restricted for use on services described in Section 7.4.4 of this document.

Service Rating	Manufacturer	Catalogue Number	Meter Socket Base Requirements
120V/240V 1-Phase 3-Wire 30A Service	EATON (CUTLER-HAMMER)	RC1N BRH230	CSA approved 100A, 600V rated Weatherproof type CSA Type 3R Meter Socket base c/w: <ul style="list-style-type: none">• Meter Socket configuration for 4-Jaw meter
	HYDEL	JA000RWT-HI	<ul style="list-style-type: none">• CSA approved for Copper only• Conductor range for #6 AWG to #1/0 AWG• Metal screw type lock Sealing Ring

Note: Contact HOL Metering Group for suitable substitute in the event any of the above approved model is no longer available.

Schedules

Schedule 1: 1-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

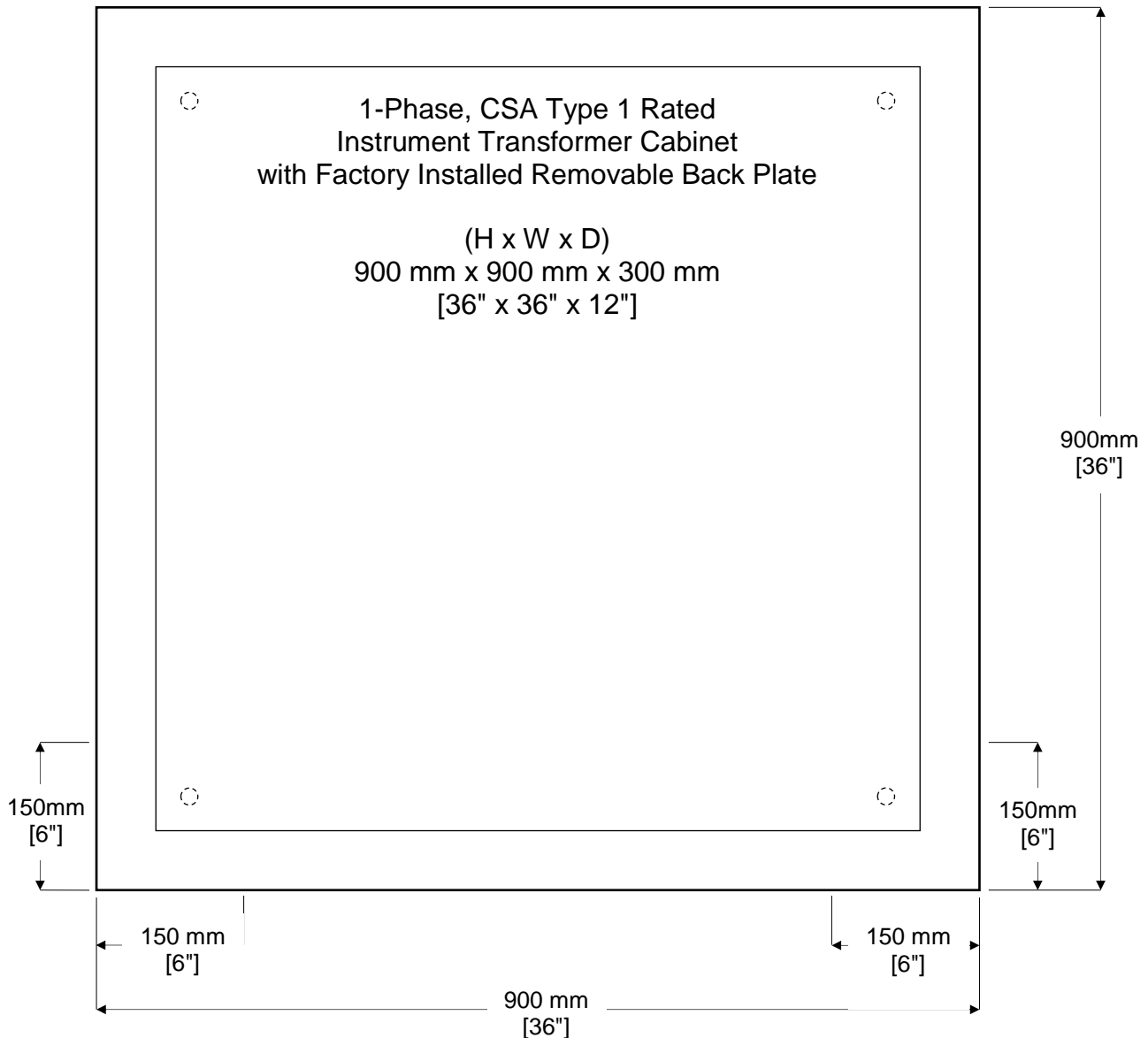


Figure 2: 1-Phase, Rated Tpe 1 Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, for 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.

Schedule 1: 1-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 1-Phase, CSA Type 1 rated Instrument Transformer cabinets and enclosures that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 2, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering group after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) The installation shall utilize a 3-Wire bar type (in-line) CT.
- 6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor shall not be part of the metering circuit.
- 7) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 2: 1-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

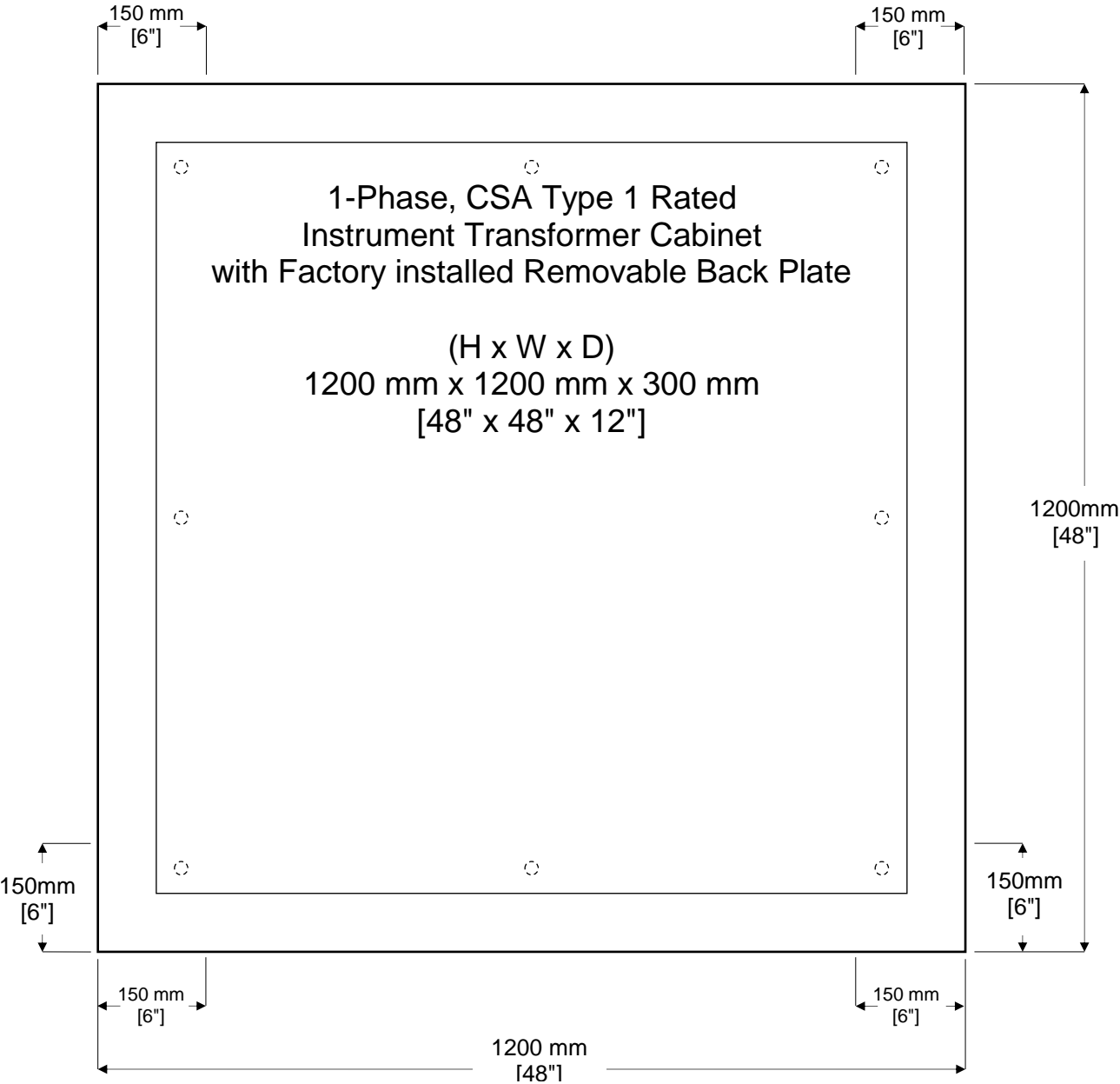


Figure 3: 1-Phase, Type 1 Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, for 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]

Note: Drawing is not to scale.

Schedule 2: 1-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 1-Phase, CSA Type 1 rated Instrument Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48"x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 3, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) The installation shall utilize 3-Wire bar type (in-line) CT.
- 6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor is not part of the metering circuit.
- 7) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 3: 1-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

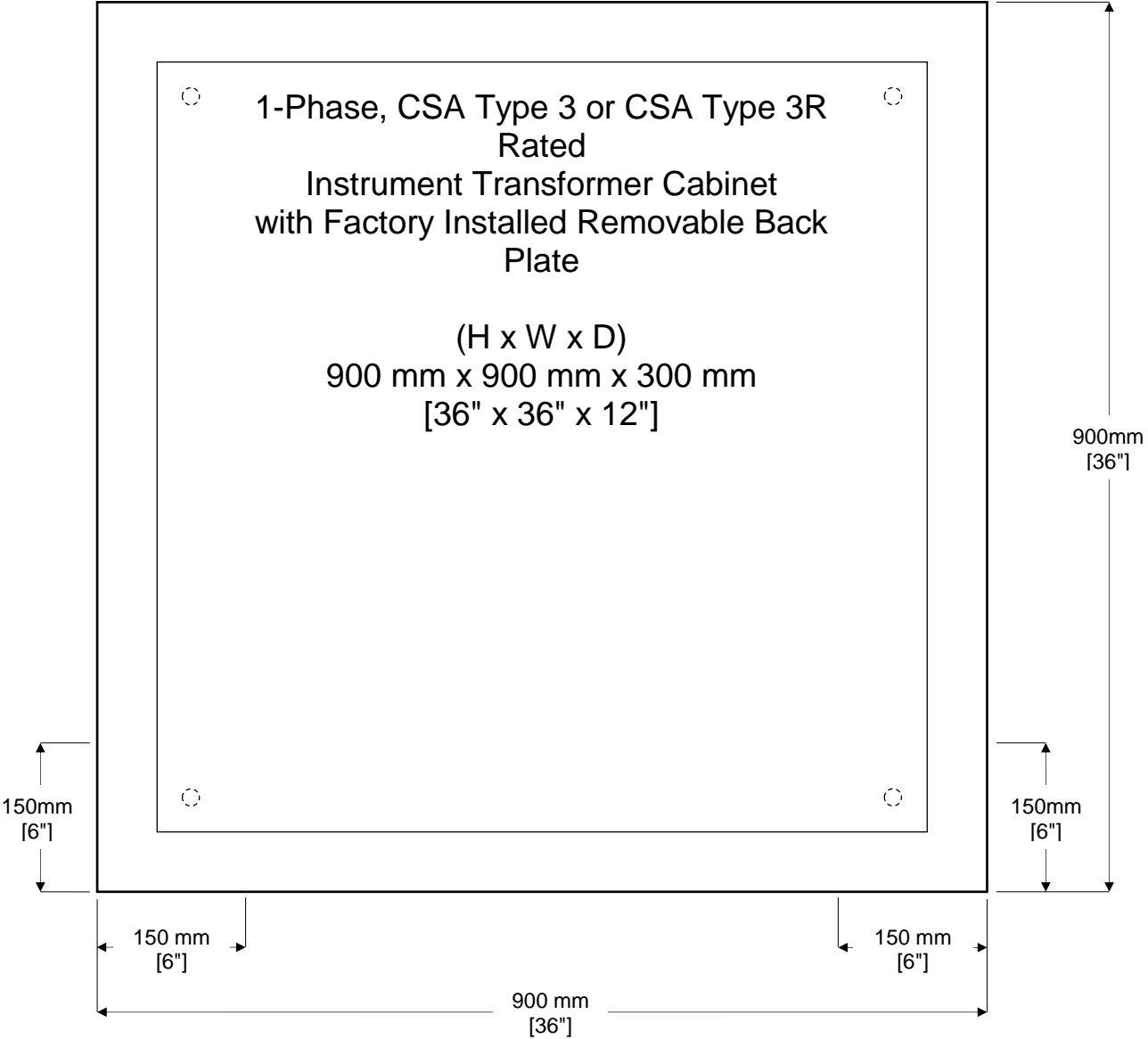


Figure 4: 1-Phase, Type 3 or better Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.

Schedule 3: 1-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 1-Phase, CSA Type 3 or CSA Type 3R rated Instrument Transformer cabinets and enclosures that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 4, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering group after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) The installation shall utilize a 3-Wire bar type (in-line) CT.
- 6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor shall not be part of the metering circuit.
- 7) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 4: 1-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

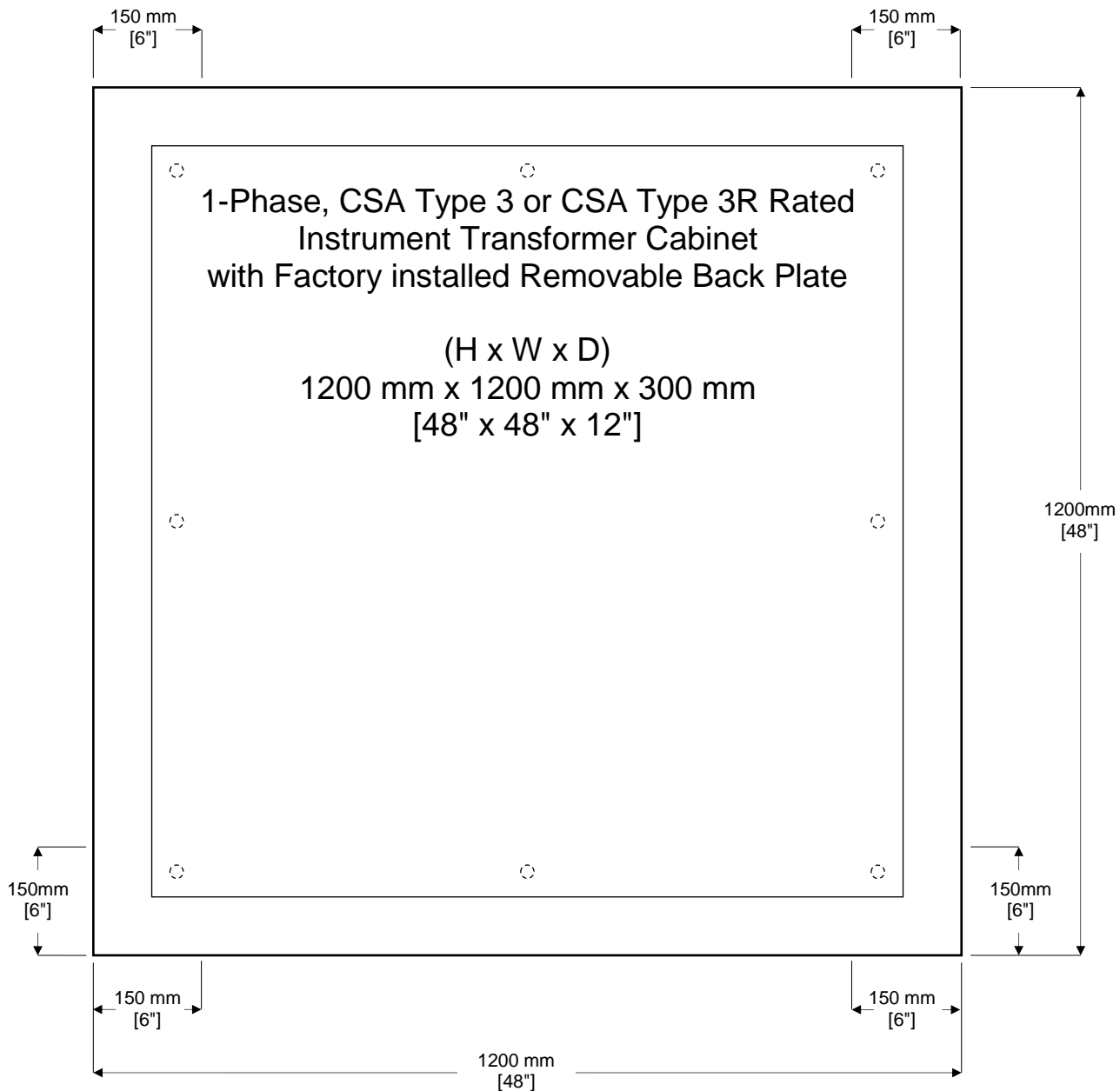


Figure 5: 1-Phase, Type 3 or better Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]

Note: Drawing is not to scale.

Schedule 4: 1-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 1-Phase, CSA Type 3 or CSA Type 3R rated Instrument Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 5, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) The installation shall utilize 3-Wire bar type (in-line) CT.
- 6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor is not part of the metering circuit.
- 7) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 5: 3-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

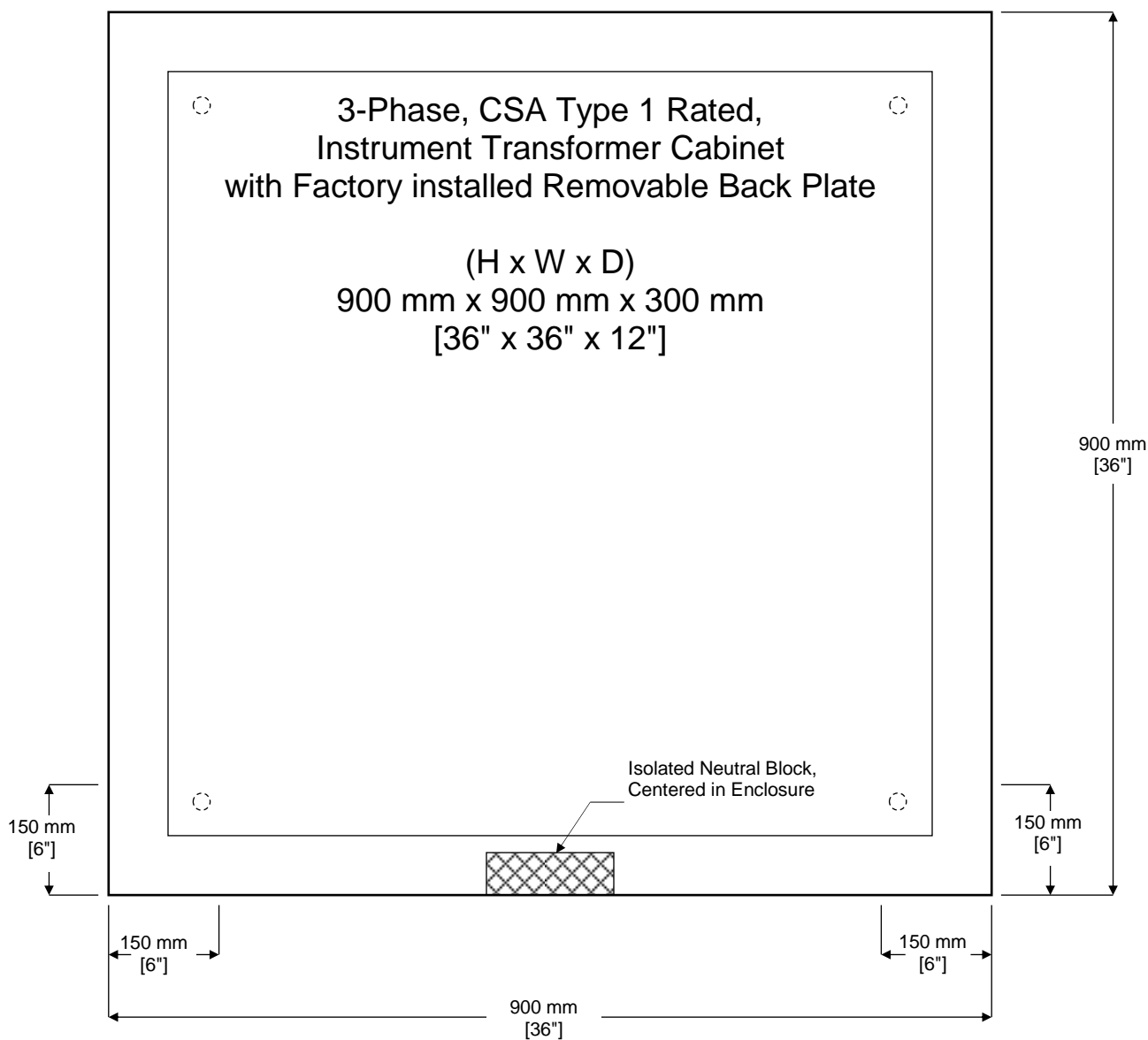


Figure 6: 3-Phase, Type 1 Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, for 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.

Schedule 5: 3-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 3-Phase, CSA Type 1 Rated Instrument Transformer cabinets and enclosures that are 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of the cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 6, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed in the centre at the bottom of the cabinet as shown in Figure 6. This terminal block is required regardless if the Neutral conductor continues past the Instrument Transformer cabinet to the Customer's equipment or not.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker, or switch, to the Instrument Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are required, only one (1) of the conductors 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 (3) individual #10 AWG conductors.
- 8) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 6: 3-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

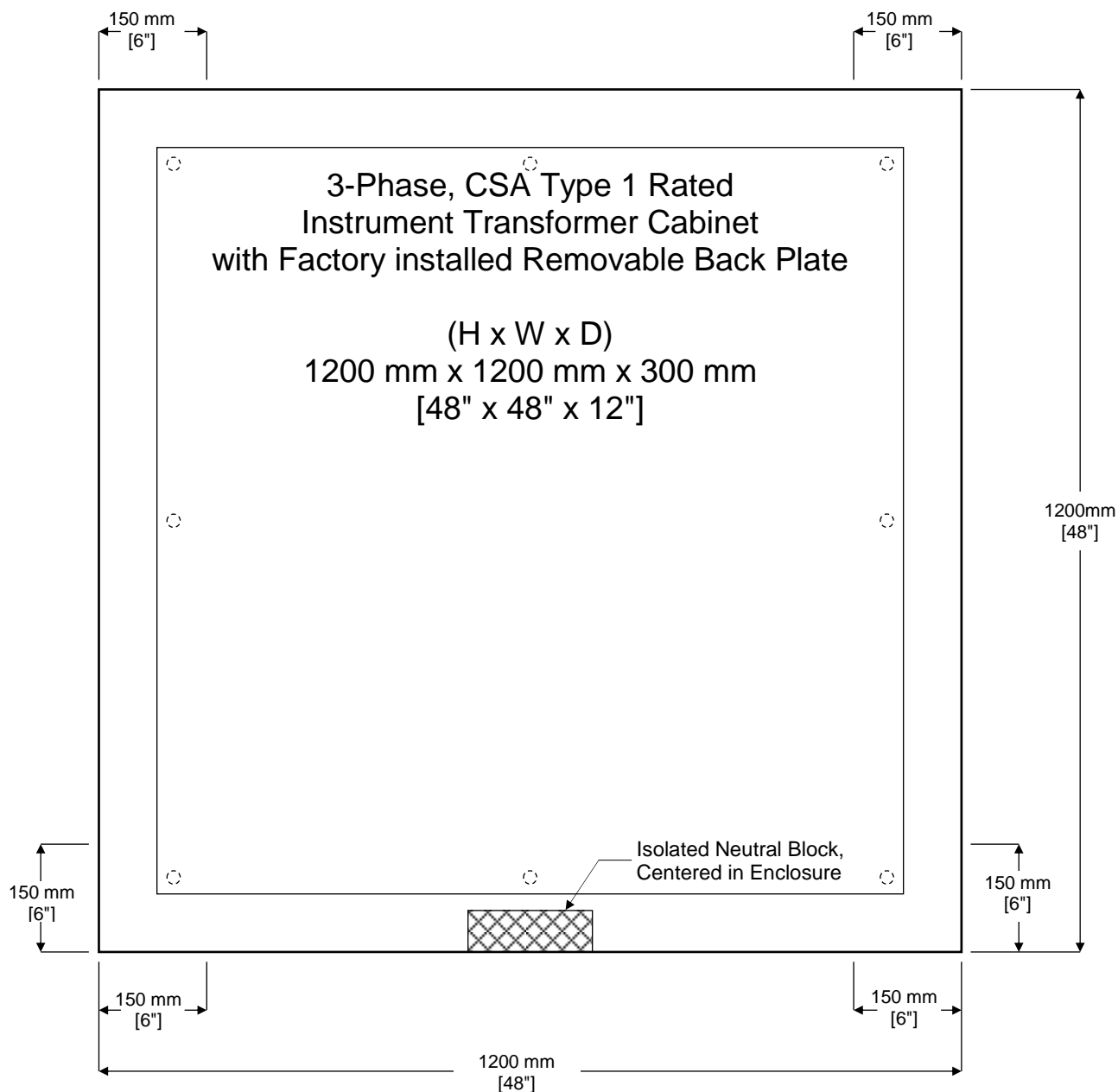


Figure 7: 3-Phase, Type 1 Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, for 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]

Note: Drawing is not to scale.

Schedule 6: 3-Phase, CSA Type 1 Rated, Instrument Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 3-Phase, CSA Type 1 Rated Instrument Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of the cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 7, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) An isolated neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed in the centre at the bottom of the cabinet as shown in Figure 7. This terminal block is required regardless if the Neutral conductor continues past the Instrument Transformer cabinet to the Customer's equipment or not.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker, or switch, to the Instrument Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are required, only one (1) of the conductors 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 (3) individual #10 AWG conductors.
- 8) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 7: 3-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

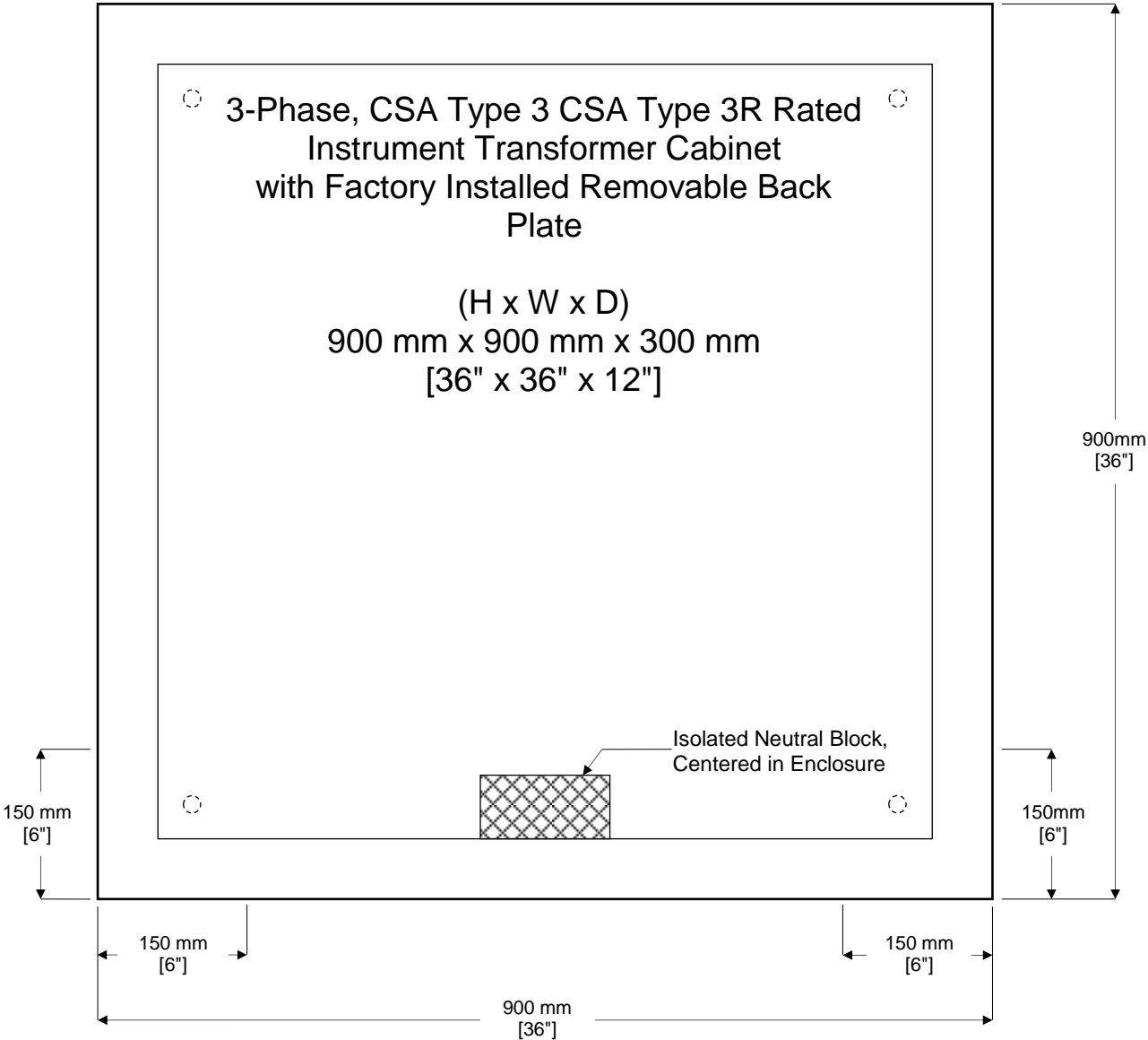


Figure 8: 3-Phase, CSA Type 3 or CSA Type 3R Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.

Schedule 7: 3-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 3-Phase, CSA Type 3 or CSA Type 3R rated Instrument Transformer cabinets that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of the cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 8, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed on the cabinet's back plate or mounting plate, at the bottom of the cabinet as shown in Figure 8. This terminal block is required regardless if the Neutral conductor continues past the Instrument Transformer cabinet to the Customer's equipment or not.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker, or switch, to the Instrument Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are required, only one (1) of the conductors 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 (3) individual #10 AWG conductors.
- 8) Any deviation from these requirements requires prior approval from HOL Metering.

Schedule 8: 3-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

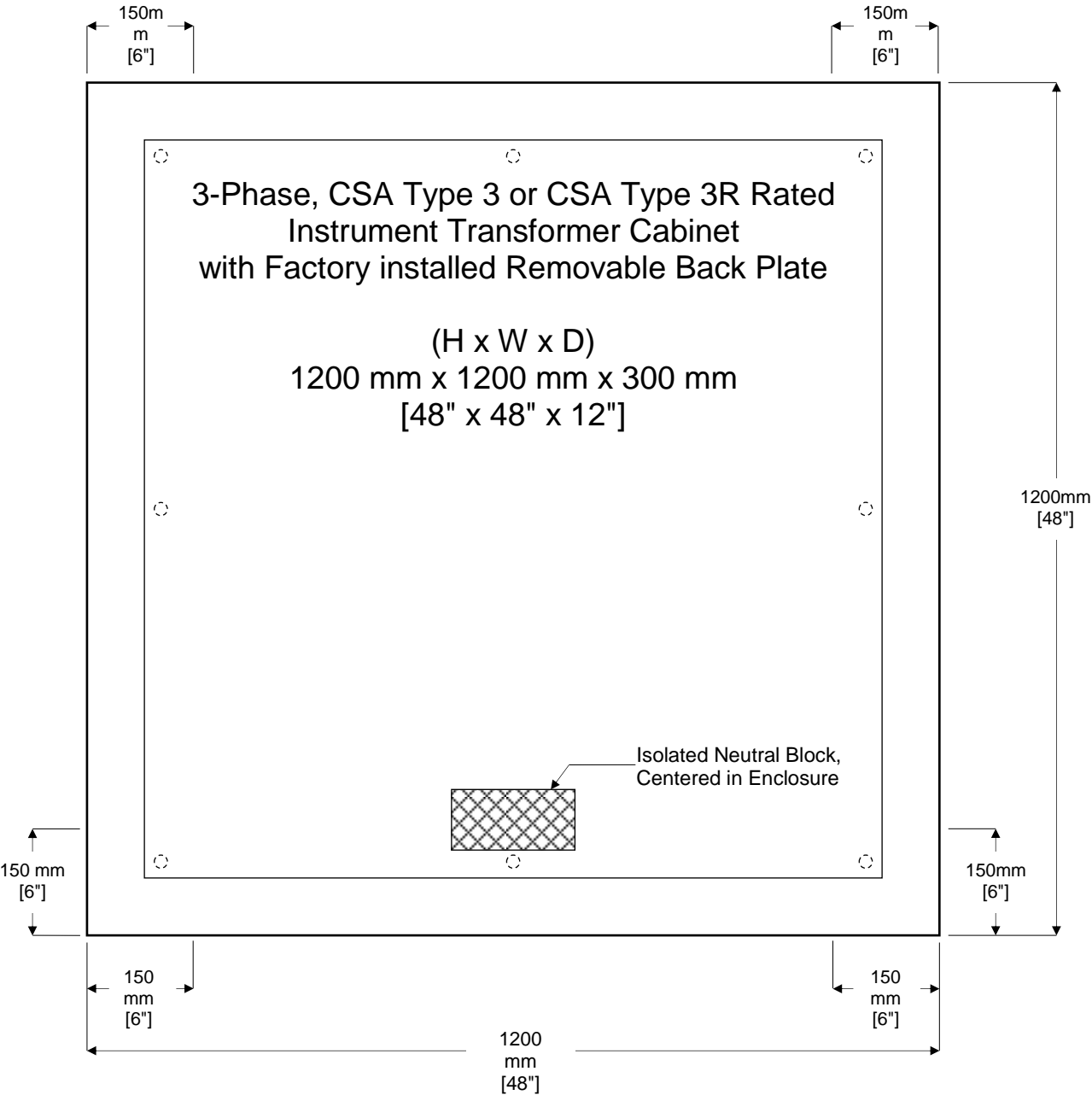


Figure 9: 3-Phase, Type 3 or **better** Rated Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.

Schedule 8: 3-Phase, CSA Type 3 or CSA Type 3R Rated, Instrument Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet (Continued)

Notes:

- 1) This schedule applies only to 3-Phase, CSA Type 3, CSA Type 3R, rated Instrument Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.
- 2) The Instrument Transformer cabinet shall be mounted such that:
 - 2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
 - 2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of the cabinet.
- 3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 9, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.
- 4) The Customer's electrician installing the Instrument Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrument Transformer cabinet.
- 5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed on the cabinet's back plate or mounting plate, at the bottom of the cabinet as shown in Figure 9. This terminal block is required regardless if the Neutral conductor continues past the Instrument Transformer cabinet to the Customer's equipment or not.
- 6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral bus of the main breaker, or switch, to the Instrument Transformer cabinet, terminating on the isolated neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.
- 7) Where parallel Neutral conductors are required, only one (1) of the conductors 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 (3) individual #10 AWG conductors.
- 8) Any deviation from these requirements requires prior approval from HOL Metering.

**Schedule 9: Residences Separated by a Non-Shared
Driveway that is at least 3000 mm [10'] in Width**

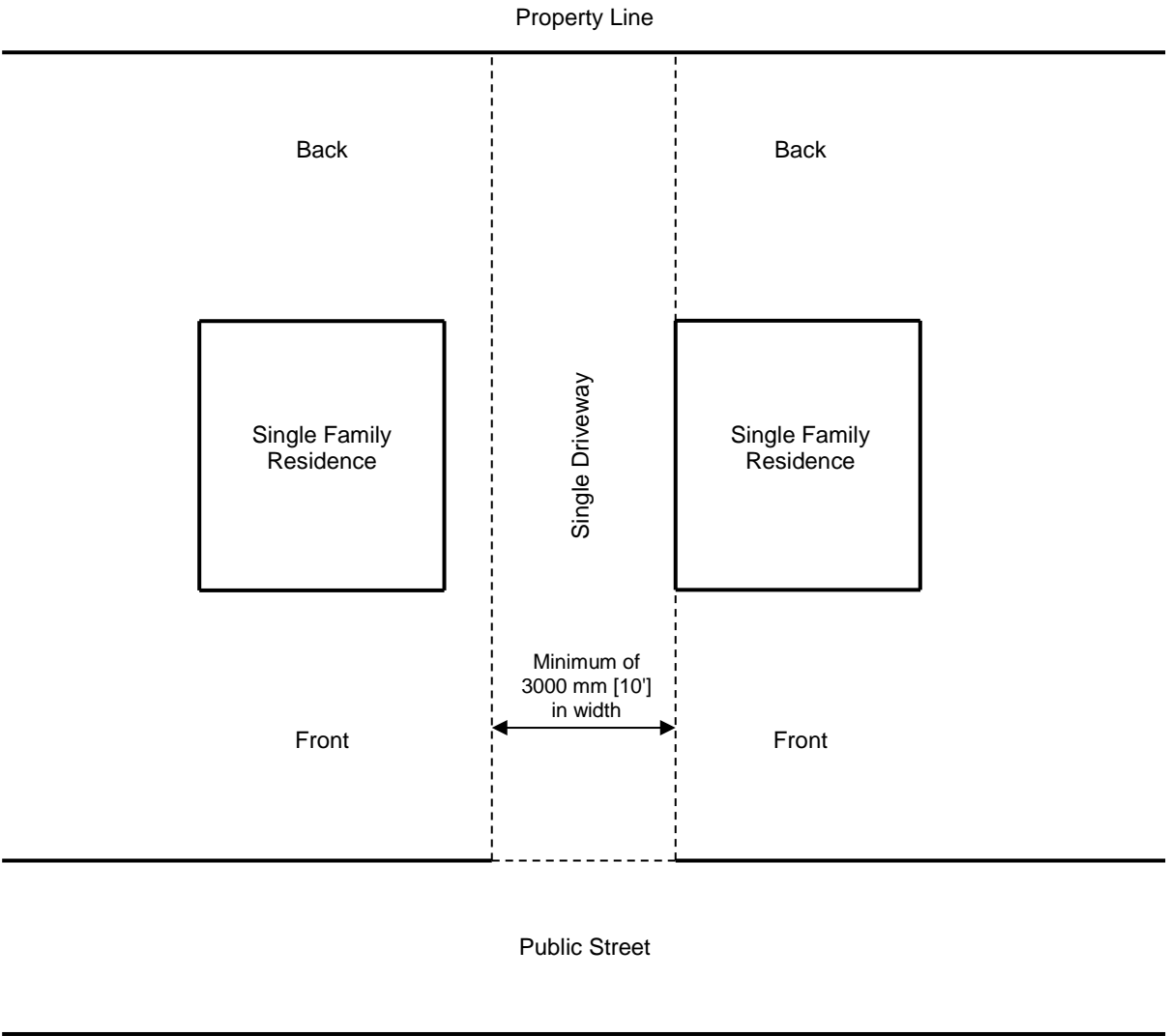


Figure 10: Two residences separated by a non-shared driveway that is at least 3000 mm [10'] in width

Note: Drawing is not to scale.

Schedule 10: Residences Separated by a Shared Driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in Width

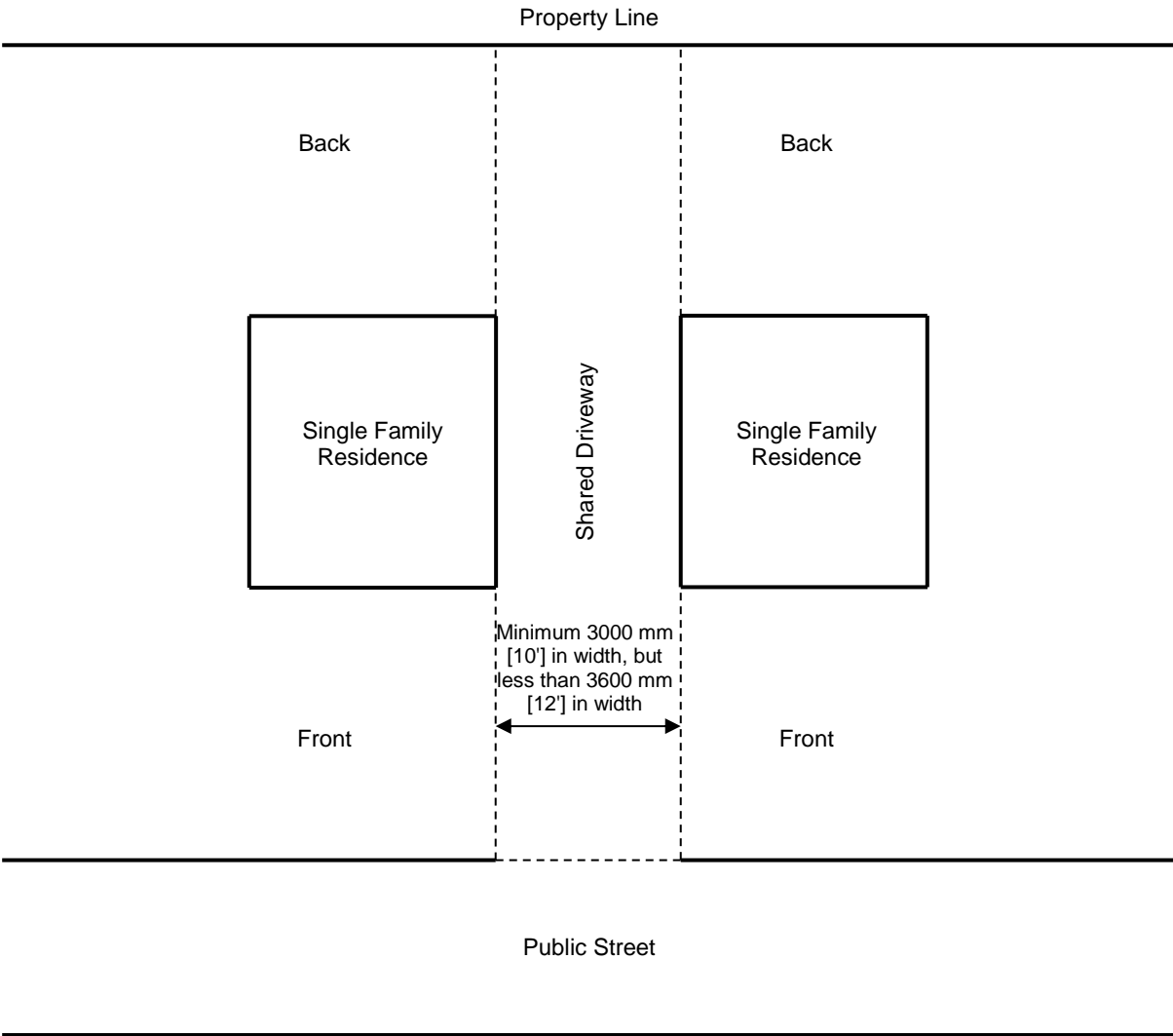


Figure 11: Two residences separated by a shared driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in width

Note: Drawing is not to scale.

Schedule 11: Residences Separated by a Shared Driveway that is at least 3600 mm [12'] in Width

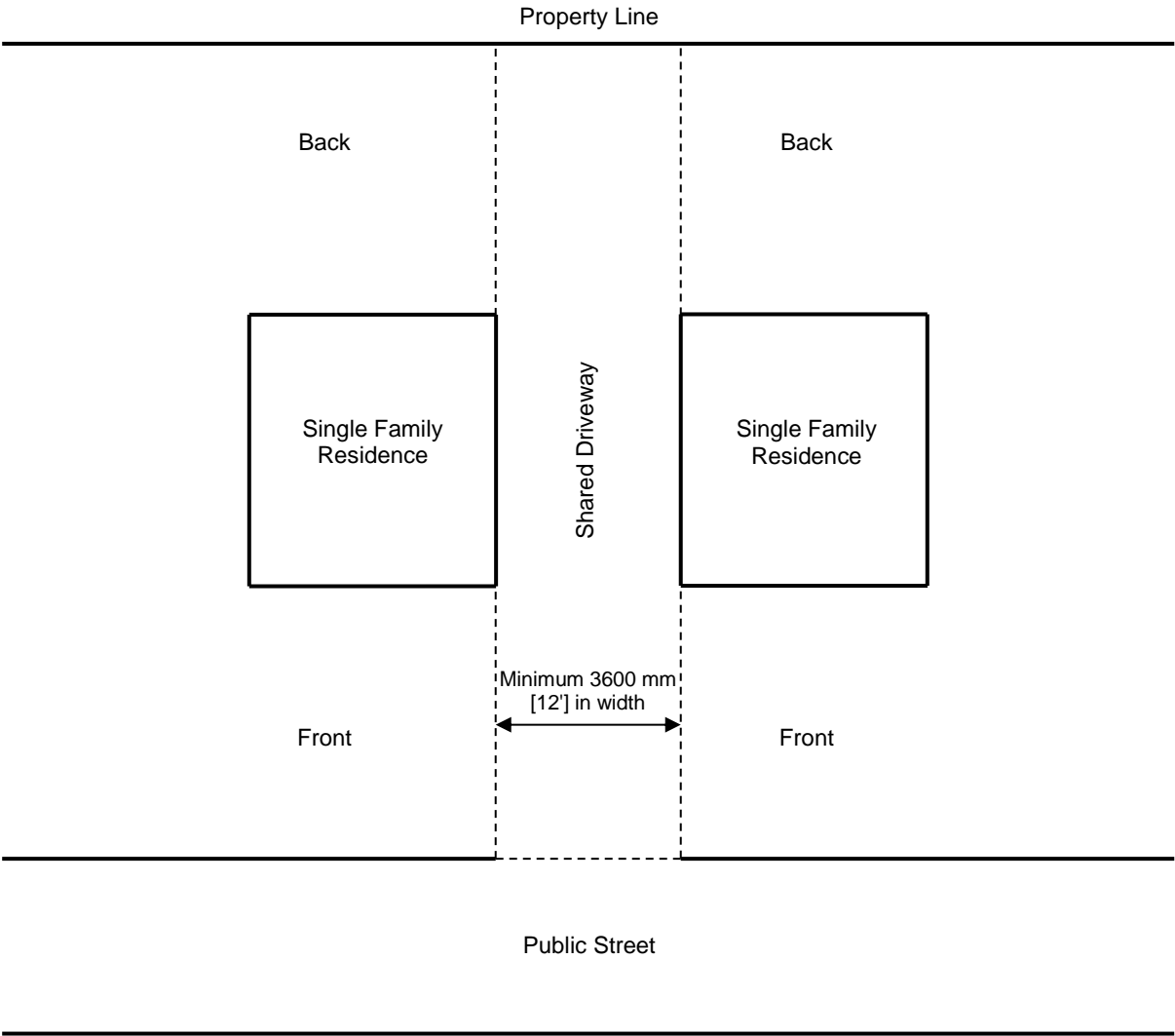


Figure 12: Two residences separated by a shared driveway that is at least 3600 mm [12'] in width

Note: Drawing is not to scale.

Schedule 12: Sale and Service Agreement for KYZ Outputs as per Section 7.13

The next two pages contain the text of the agreement to be signed by the Customer when they request KYZ pulse outputs for new or existing service, as per Section 7.13 of this document.

END USER LICENSE AGREEMENT FOR METERING PRODUCTS

BETWEEN:

_____,

Hereinafter called the "Purchaser"

AND:

Hydro Ottawa

In consideration of a payment by the Purchaser of \$_____ to Hydro Ottawa for the purchase of the meter(s) provided, the Purchaser agrees to the following terms and conditions.

This Hydro Ottawa End User License Agreement accompanies Measurement Canada Approved metering products and any related legal metrology materials. Please read this Agreement carefully. At the end, you will be asked to accept this agreement.

Upon acceptance of this Agreement, Hydro Ottawa shall provide this product to the Purchaser with the understanding that the Purchaser will adhere to the guidelines set out. Hydro Ottawa shall retain the ownership of the revenue meter through the course of its installation on the customers premise and after the end of its useful in service life.

Requirement for Legal Metrology

The Purchaser as the end user shall be aware that metering products sold by Hydro Ottawa are Measurement Canada approved meters and are suitable for installation and use for revenue metering. The Government of Canada has specific requirements for legal metrology as administered by Measurement Canada through the Electricity and Gas Inspection Act and Specifications.

Hydro Ottawa shall sell a meter to the Purchaser, sealed, certified, with an accredited Hydro Ottawa meter certificate or that of a Measurement Canada recognized meter verifier.

Warranty

The meter(s) are provided with a one year manufacturer's warranty, transferable from the original manufacturer (_____), which is applicable from the date of delivery. Hydro Ottawa makes no warranty, expressed or implied, as to the meter(s) use or performance. Hydro Ottawa does not and cannot warrant the performance or results the Purchaser may obtain by using the meter(s). Hydro Ottawa makes no warranties, expressed or implied, as to non-infringement of third party rights, merchantability, or fitness for any particular purpose.

Indemnification

The purchaser agrees to indemnify and save harmless Hydro Ottawa, its agents and employees from all actions, causes of action, claims and demands for or in respect to any loss, damage or injury to property or persons, including third parties, agents or others, arising from or incidental to the operation or use of the meter being purchased.

Governing Law and General Provisions.

This agreement will be governed by the laws of the province of Ontario. If any part of this agreement is found void and unenforceable, it will not affect the validity of the balance of the agreement, which shall remain valid and enforceable according to its terms. This agreement shall automatically terminate upon failure by the purchaser to comply with its terms. This agreement may only be modified in writing signed by an authorized signing officer of Hydro Ottawa. This agreement is binding upon the purchaser's heirs, executors, administrators, successors, agents or assigns.

The Purchaser's acceptance of the foregoing agreement shall become binding upon signature below by an authorized signing officer.

In witness whereof, this agreement is executed this _____ day of _____, 20____ at

_____, in the Province of _____.

Signing officer's printed name

_____, ☐
Authorized signing officer's signature (seal)

Purchaser's full address and phone number

Witness' printed name

_____, ☐
Witness' signature (seal)