This Legal Acknowledgement Form shall be governed by the laws of the Province of British Columbia and the applicable federal laws of Canada. In the event of conflicts or inconsistencies, if any, between or among this Legal Acknowledgement Form and the terms and conditions of the Standard, the provisions set out in this Legal Acknowledgement Form take precedence.

Disclaimer

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b) for the purpose of connecting equipment to BC Hydro equipment;
c) with the prior written consent of BC Hydro, or
d) as required by law.

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BC Hydro notes that the Standard may be revised from time to time and recommends that any person using the Standard in accordance with this Legal Acknowledgement Form confirm it is using the most recent version. BC Hydro is not liable for reliance on past versions of the Standard that may be stored electronically.

Scope

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

Purpose of Standards

BC Hydro objectives require standardization to:

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

Responsibility

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

Use of Stock Materials

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

Revisions to Manual

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

Mailing Addresses

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

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

Information Bulletin:

BC Hydro Pad-Mounted Transformer Installation on Private Property

1.0 Items Covered

This bulletin contains revised construction standards for the installation of BC Hydro-owned pad-mounted transformers on private property.

ES54	F3-06.01 TO F3-06.08	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE
ES54	F3-07.01 TO F3-07.11	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING

2.0 Overview

This bulletin contains further information regarding the installation of BC Hydro-owned pad-mounted type transformers on private property — in particular, in close proximity to a customer-owned building or inside a building alcove.

BC Hydro Information Bulletin No. 2013-011, issued September 27, 2013, provided the necessary construction details and design information for the installation of BC Hydro-owned pad-mounted transformers inside a customer-owned building alcove. The major change was the implementation of the equipotential grounding method stipulated by BC Electrical Code (BCEC) Section 36 for improved safety. Accordingly, alcove and similar installations within a footprint of the building (per ES54 F3-06 standards) are subject to BC Building Code (BCBC) and shall comply with applicable BCEC rules. All exposed metal structures and conductive surfaces (including concrete walls having steel rebar) located within the alcove shall be connected to the transformer grounding bus, which is connected to the customer building ground and the BC Hydro counterpoise. In addition,

the contractor shall provide BC Hydro with a signed Contractor's Declaration contained herein.

Installations on private property outside the customer building footprint, but less than 3 m away from the conductive building walls, shall comply with ES54 F3-07 standards. All exposed metal structures and conductive surfaces located within 3 m of the BC Hydro transformer shall be bonded to the transformer grounding bus. In addition, the contractor shall provide BC Hydro with a signed Contractor's Declaration and the customer's consultant shall submit the sealed Grounding Report template contained in the ES54 F3-07 standard.

Most recently, BC Hydro inspectors encountered several cases of customer building construction in progress, with the concrete walls poured and BC Hydro transformer located close to the concrete building wall. In these installations, the customer building did not comply with grounding methods acceptable to BC Hydro. In response, BC Hydro Distribution Standards developed a remedial procedure (refer to ES54 F3-07.05) for the customer to follow and to achieve the necessary compliance.

3.0 Action

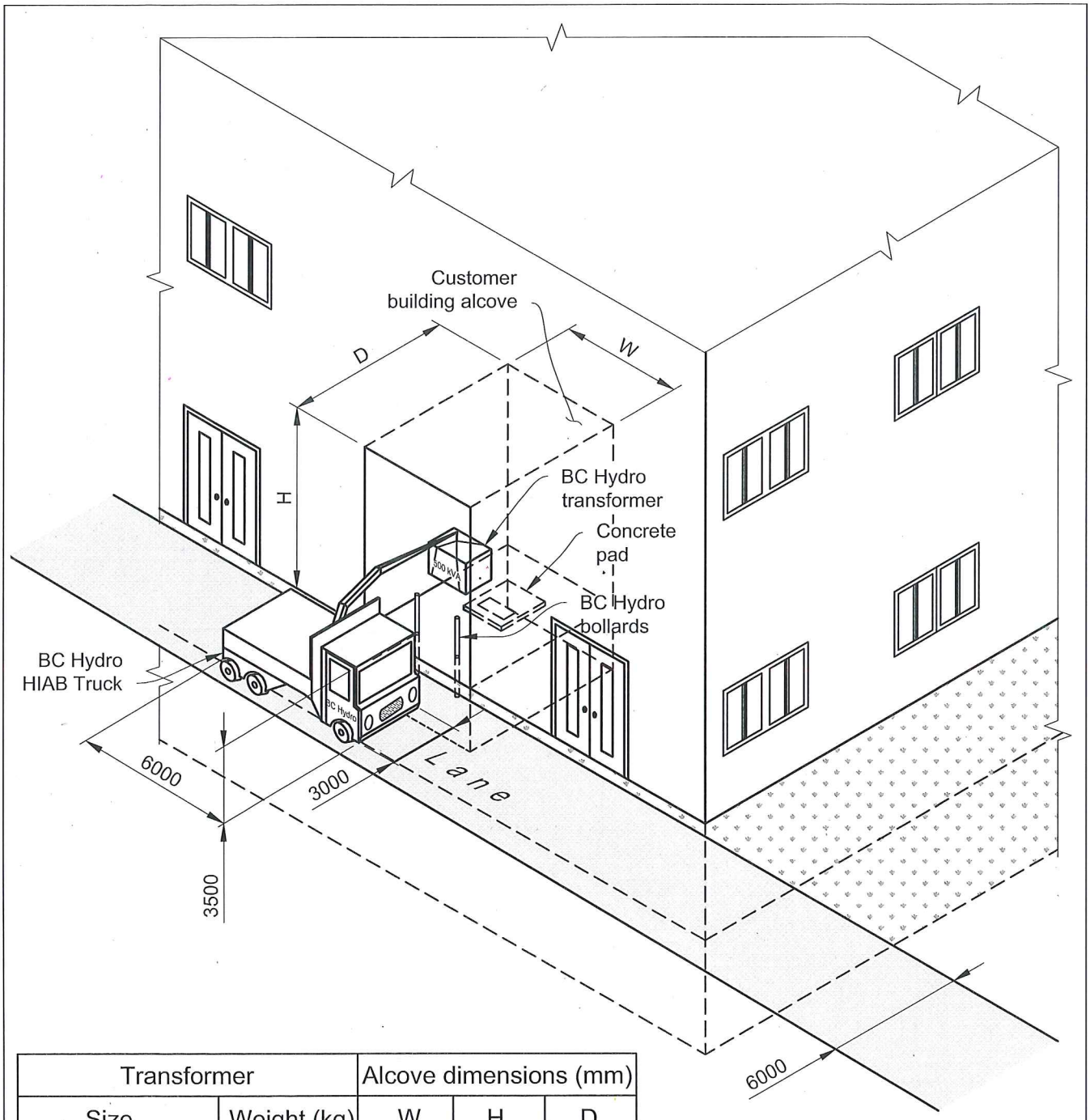
Effective March 1, 2016, all customer buildings that require BC Hydro pad-mounted transformer installation in close proximity to, or within the footprint of, the building perimeter, shall comply with the new and revised construction standards listed in Section 1.0.

4.0 Distribution Standards Contact

Name: Mark Kelvin	email: mark.kelvin@bchydro.com
Phone #: 604-529-5679	Cell #: 604-220-3905

5.0 Approval

Recommended		Reviewed		Approved	
M. KELVIN		C. PICASSI		F. DENNERT	
Date:	2016-03-14	Date:	2016-03-15	Date:	2016-03-16



Transformer		Alcove dimensions (mm)		
Size	Weight (kg)	W	H	D
LPT	2000	3100	4600	3200
PMT<500 kVA	4000	3700	4600	3600
500≤PMT≤1500 kVA	7000	4200	4600	4200

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD
M. KELVIN	C. PICASSI	F. DENNERT	PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. KELVIN

DISTRIBUTION STANDARDS BC Hydro

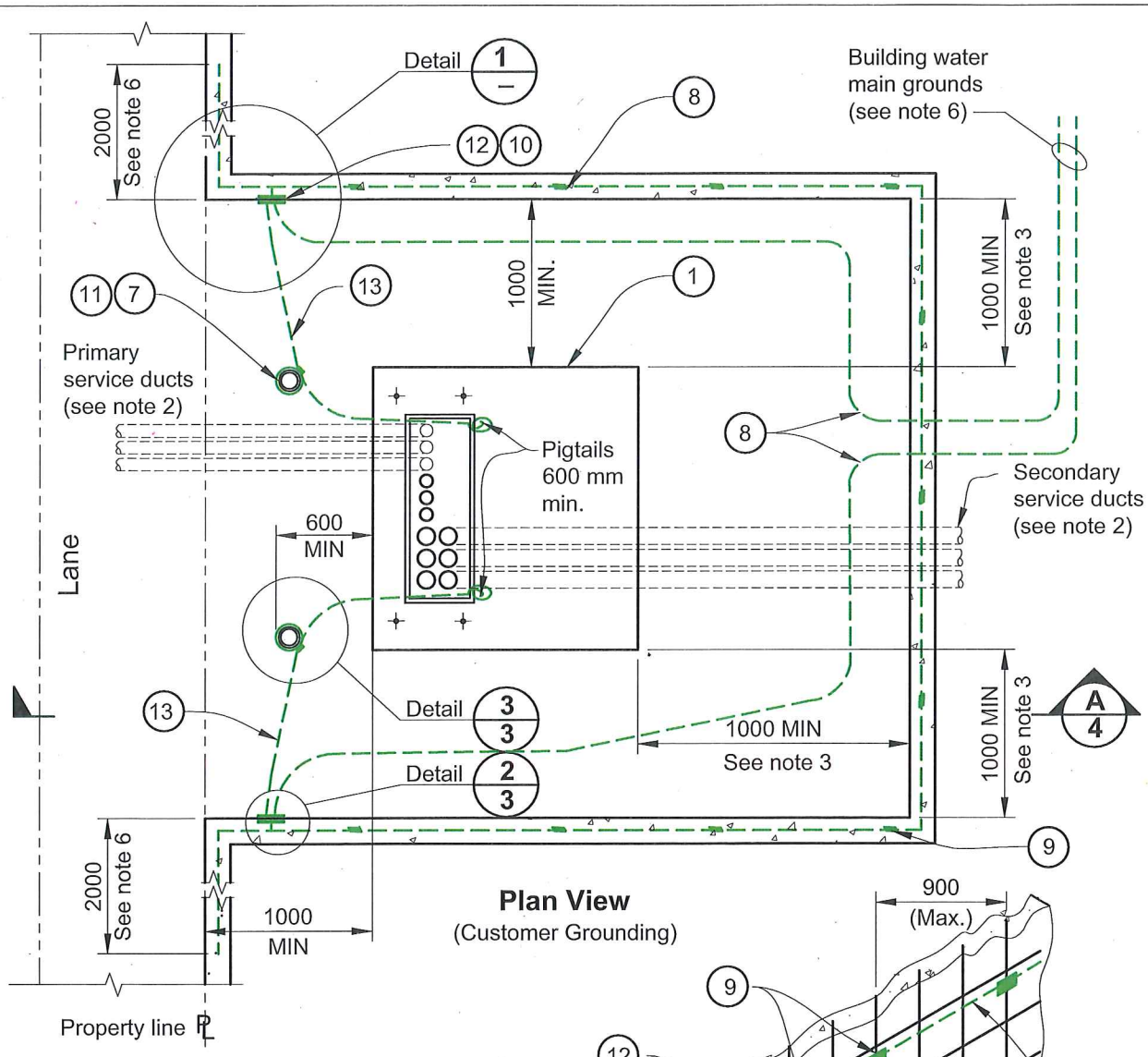
ISSUED: FEB 2016
REPLACES: AUG 2015
ORIGINALLYISSUED: MAY 1999

BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE

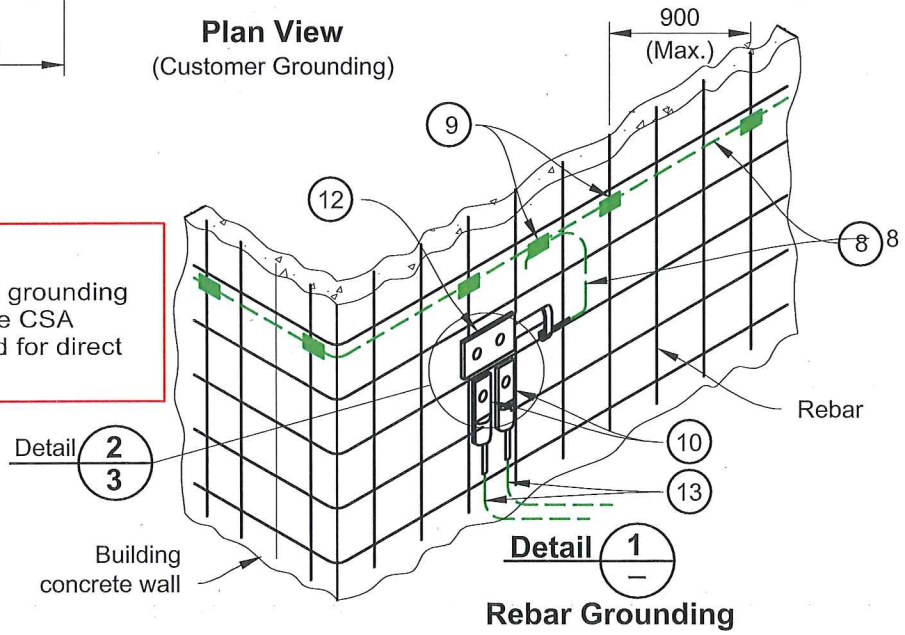
ES54 F3-06.01

R 8

REVISIONS: R.8 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED. FEB '16 MK



Plan View
(Customer Grounding)



Rebar Grounding

CAUTION:
All customer owned grounding components shall be CSA certified and marked for direct burial installation.

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BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE

PAGE 2 OF 8

ES54 F3-06.02

R 8

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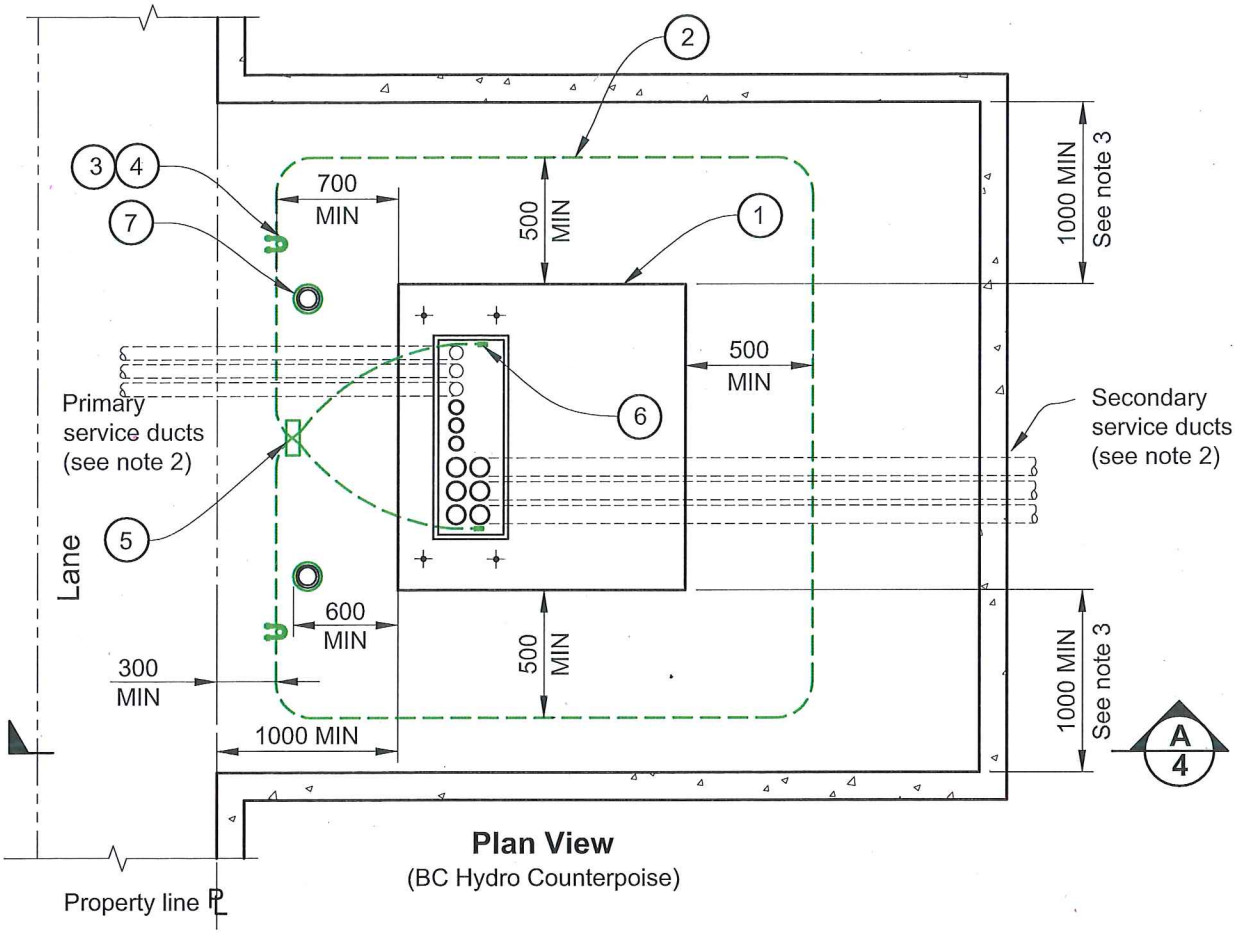
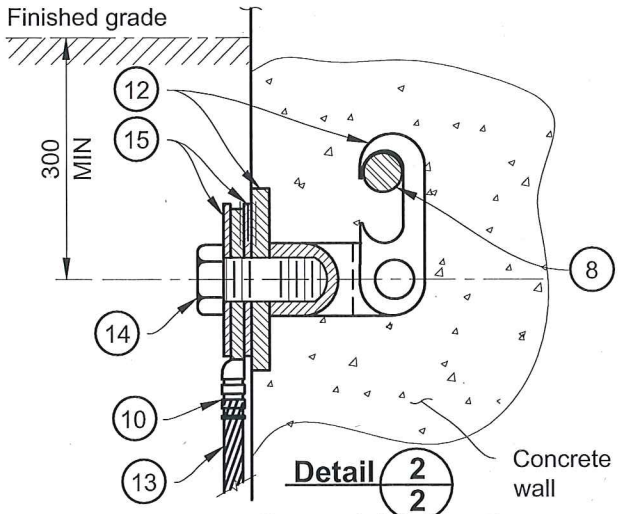
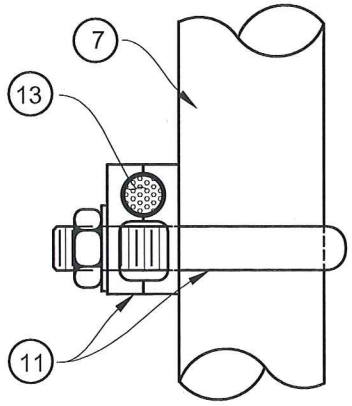


Plan View
(BC Hydro Counterpoise)



Detail 2/2
Rebar Ground Connection



Detail 3/2
Bollard Grounding Clamp

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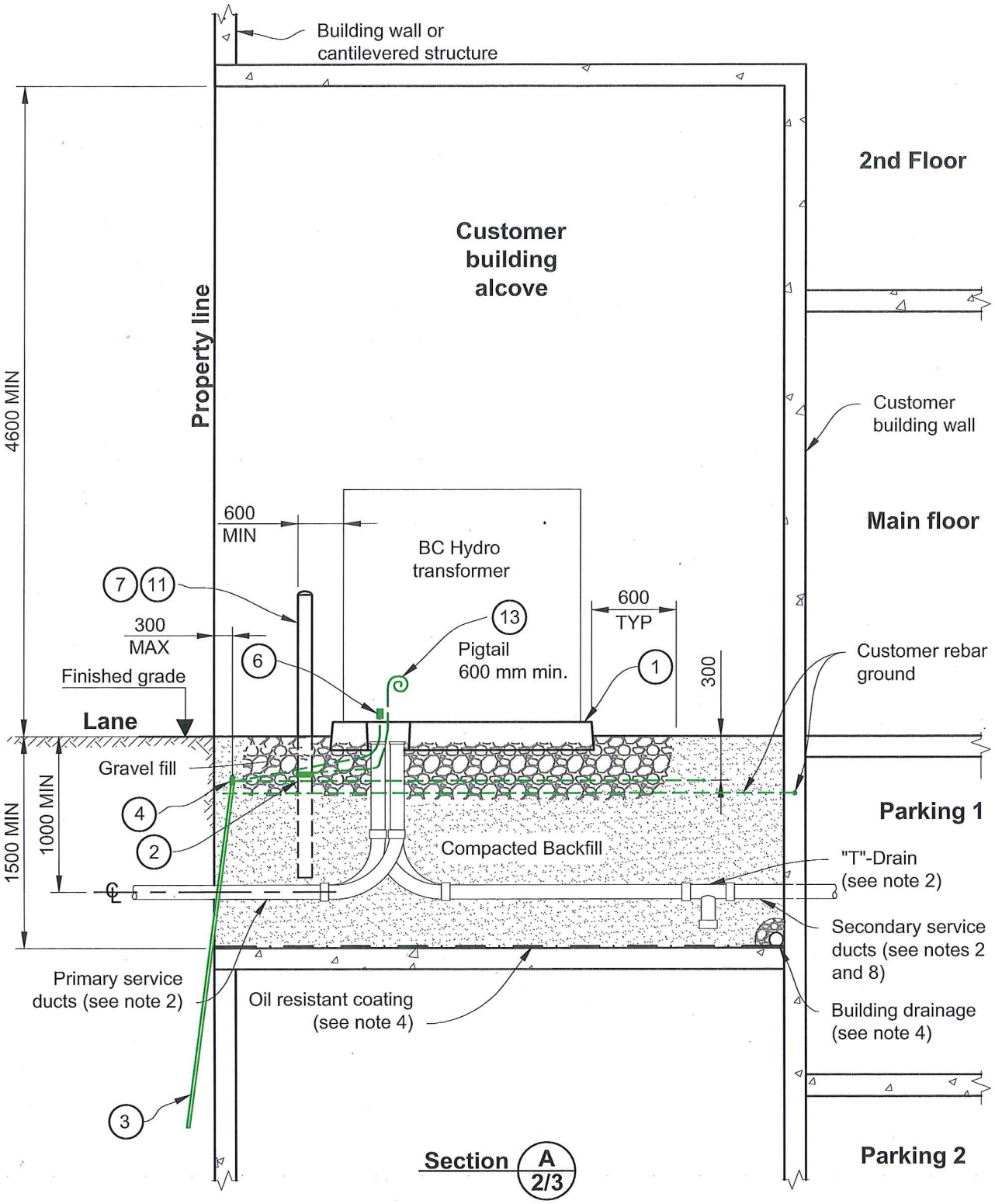
BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE



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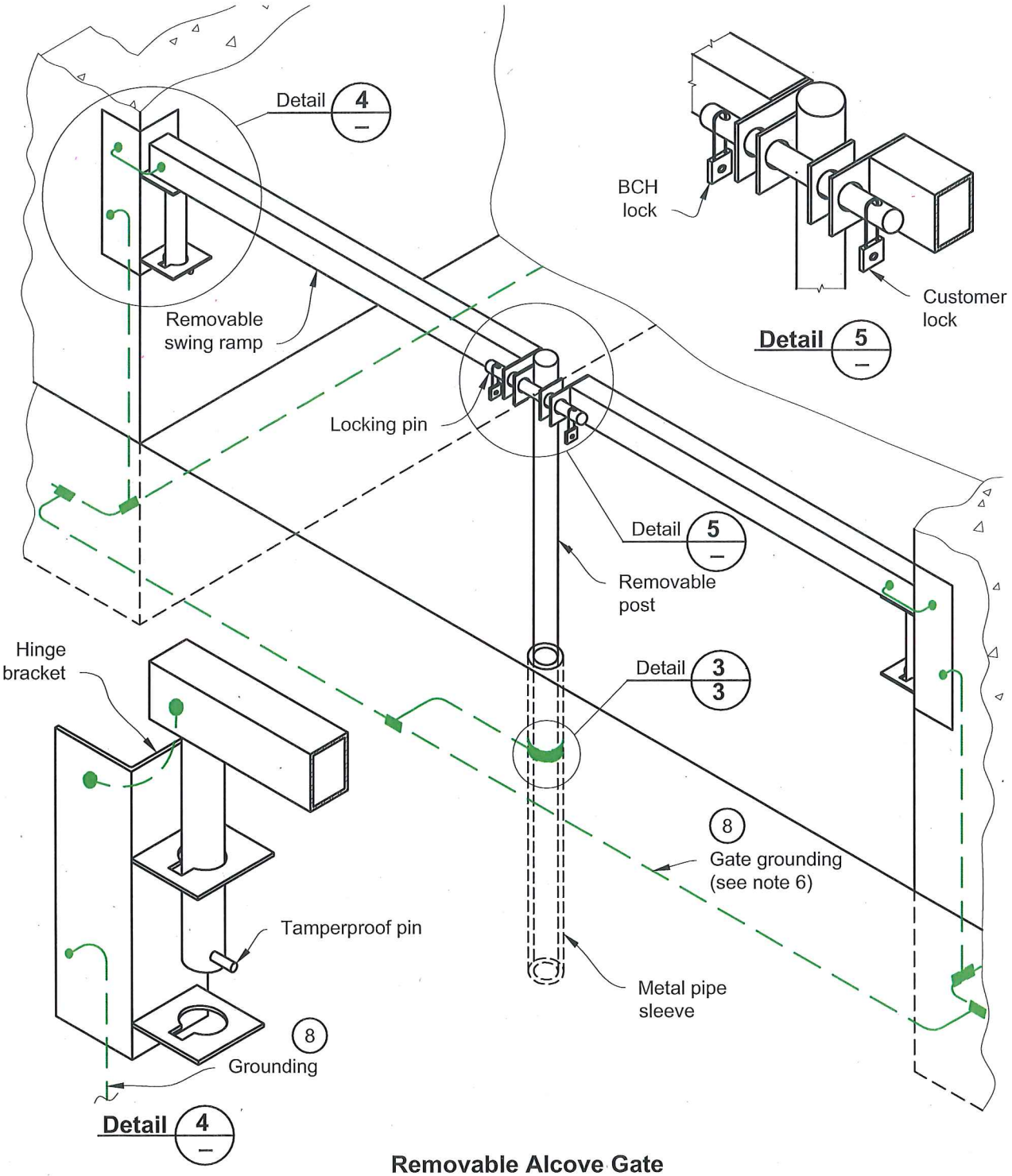
BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE

PAGE 4 OF 8

ES54 F3-06.04

R 8



Removable Alcove Gate
(Optional- See note 6)

REVISIONS: R.8 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED. FEB '16 MK

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DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: MAY 1999	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE	
		PAGE 5 OF 8	ES54 F3-06.05 R 8

Notes

1. An alcove design inside a customer building, or an installation within the footprint of the building, shall be used under special circumstances. It is not intended to hide the PMT or LPT, or to feed other customers – it is used where the building is built to the property line. The customer must obtain approval from the local BC Hydro designer for each alcove installation, including the location of the transformer pad, and installation details of all primary and secondary ducts, ground rods and counterpoise.

2. The BC Hydro designer shall advise the customer on duct size, the number of primary and secondary ducts, acceptable duct runs and the duct drain connection – subject to approval by the Authority Having Jurisdiction (AHJ). The depth of duct burial shall not exceed 1800 mm. BC Hydro shall not be responsible for damage to the customer building resulting from transformer oil leakage.

3. BC Hydro will require a specific Right of Way (ROW) for the alcove area or an installation within the footprint of the building. The customer shall prepare the ROW drawing and forward it to the BC Hydro designer. It is the customer's responsibility to provide an as-constructed survey plan to confirm the specific location of the ROW area. For maintenance and operating access, BC Hydro requires an unobstructed operating area of 3.0 metres in front of the transformer, and 1.0 metre maintenance access on all other sides.

4. Customer development permit drawings must show the location of the BC Hydro pad-mounted transformer installation on private property. Moreover, all pad-mounted transformers located inside the building footprint are subject to the requirements of the BC Building Code and BC Electrical Code and the applicable local regulations and bylaws. Accordingly, the customer shall provide a certified structural design, compacted fill and building structure to support the weight of the BC Hydro concrete pad, transformer and cables above. In addition, the customer shall provide an oil-resistant coating on the surrounding building and foundation walls. BC Hydro shall not be responsible for damage to the customer building resulting from transformer oil leakage.

5. For mechanical protection of pad-mounted equipment in traffic areas, BC Hydro requires the installation of BC Hydro standard protective bollards. The BC Hydro designer will determine the exact number and layout of the protective bollards around the transformer pad. A chain-link fence or custom-built gates may be acceptable in some areas, in agreement with the BC Hydro designer, for the improved safety and cleanliness of a particular alcove installation – subject to the approval of the AHJ.

6. Safety grounding inside the building alcove, or an installation within the footprint of the building, is subject to the requirements of the BCEC Section 36. All components and materials shall be CSA (or equivalent) certified. The ES54 F3-06 standard shows the minimum BC Hydro grounding requirements for equipotential grounding, although the BCEC requires a minimum of four ground rods. However, the customer shall provide a copy of the certified grounding report to the BC Hydro designer and the AHJ. To meet the necessary BCEC requirements, the customer may enhance the grounding design, add ground rods and loops, or connect the remote ground to the building water main. All

exposed metal structures, metal siding, fence and poles located within 3.0 metres of the BC Hydro transformer concrete pad shall be bonded to the BC Hydro transformer ground bus.

7. All concealed grounding installations shall be inspected by the BC Hydro civil inspector before pouring concrete and placing backfill. The contractor shall fill-out and provide the signed Installer's Declaration on page 8 to the BC Hydro civil inspector confirming that the grounding and ducting installations are in compliance with BC Hydro standards.

8. The customer shall supply and install all ducting on private property, CSA type DB2. All secondary service ducts located inside the building shall be concrete-encased.

Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	Transformer concrete pad	Specified by BCH Designer	1	BC Hydro
2	Counterpoise, Ø ¾", galvanized steel	106-2510	As Required	BC Hydro
3	Ground rod, Ø ⅝" x 8', galvanized steel	420-1093	2	BC Hydro
4	Connector, counterpoise to ground rod, galvanized steel	420-1157	2	BC Hydro
5	Rope clamp, Ø ¾", galvanized steel	420-0965	2	BC Hydro
6	Cap, heat shrink, 1.2" x 3"	394-0605	2	BC Hydro
7	Protective bollard, Ø 4" pipe, galvanized steel	400-0059	2	BC Hydro
8	2/0 AWG Cu bare stranded	N/A	As Required	Contractor
9	Ground connector ¾" rebar to 2/0 Cu bare direct burial, ILSCO GPL-6, T&B 54890 C-tap or equivalent	N/A	As Required	Contractor
10	Compression lug for 2/0 Cu Burndy YGHA26 or equivalent	N/A	4	Contractor
11	Pipe grounding clamp, Ø 4" pipe to 2/0 Cu bare Burndy GD2226 or equivalent	N/A	2	Contractor
12	Ground plug direct burial Burndy YGF29-2N	N/A	2	Contractor
13	2/0 AWG Cu insulated 1 kV green, stranded	N/A	As Required	Contractor
14	Bolt S/S ½" dia x 1" long	N/A	4	Contractor
15	Washer S/S ½" dia	N/A	8	Contractor

Reference Standards

C22.1	Canadian Electrical Code, Part 1
ES54 U2-02	Stanchion Installation Details
ES54 R1-01	Grounding of Pad-Mounted Enclosures
ES54 Section F	Transformers

REVISIONS: R.8 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED. FEB '16 MK

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M. KELVIN	C. PICASSI	F. DENNERT	PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. KELVIN

DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: MAY 1999	PAGE 7 OF 8	ES54 F3-06 .07 R 8

BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE

Please complete this page and provide to the BC Hydro Civil Inspector
All fields on this page are mandatory to avoid processing delays.

CUSTOMER DUCT AND GROUNDING – INSTALLER'S DECLARATION

BC Hydro Reference No. ES54 F3-06	Electrical Permit No.:	
Name of Installer:	Installer Phone No.:	Cell:
Service Address:		
Lot No.:	City:	Postal Code:
Installers Registration No.:	Duct Permit No.:	
The Electrical Safety Regulations require that persons installing underground electrical raceway shall be registered as an Electrical Contractor and shall hold a valid certificate of qualification.		
Name of Owner:	Owner's Phone No:	

SITE PLAN

Please indicate:
- North arrow
- OUTLINE OF BUILDING FOUNDATION
- LOCATION OF BC HYDRO EQUIPMENT
- GROUNDING and DUCTING

1. This declaration does not constitute an authorization for connection.
2. Any discrepancy between the above BC Hydro reference and the actual installation must be approved in advance by a BC Hydro Service Representative.

I AM THE INSTALLER AND HEREBY CERTIFY THAT THE SERVICE DUCT AND ALL GROUNDING INSTALLATION HAS BEEN INSTALLED TO COMPLY WITH BC HYDRO REQUIREMENTS.

Signature of Permit Holder

Print Name

Date

REVISIONS: R.8 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED. FEB '16 MK

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY INSIDE BUILDING ALCOVE	
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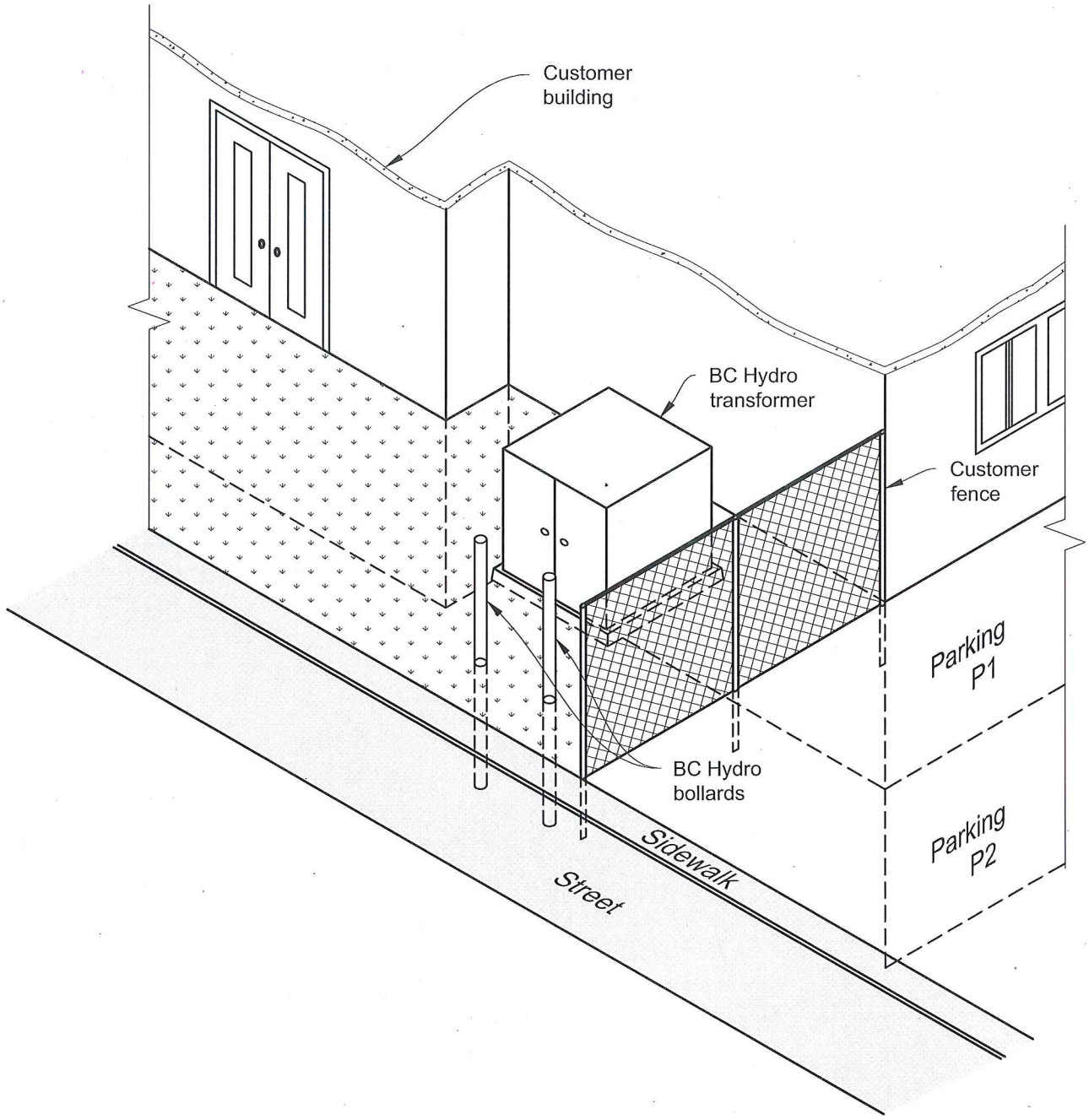
DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: MAY 1999			PAGE 8 OF 8	ES54 F3-06 .08 R 8



REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD
M. KELVIN	C. PICASSI	F. DENNERT	PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. KELVIN

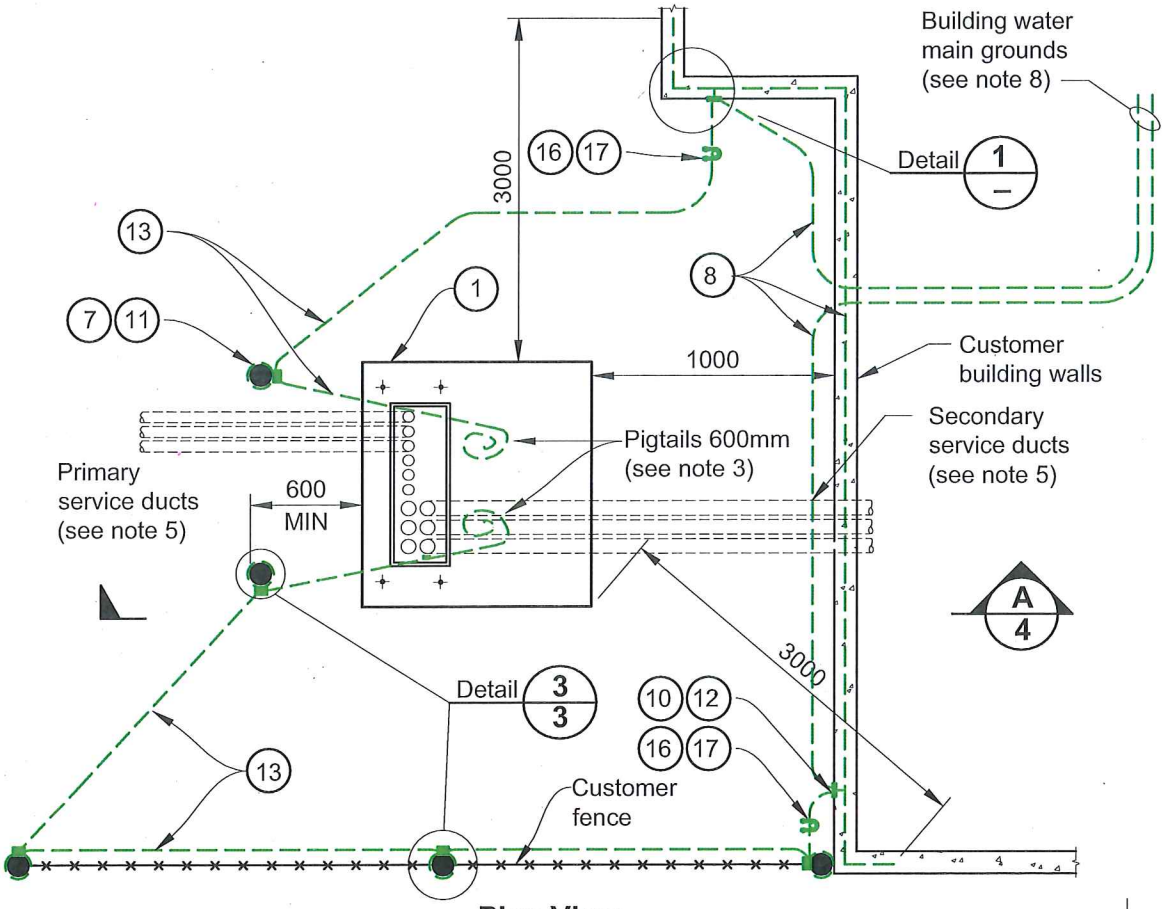
DISTRIBUTION STANDARDS BC Hydro

ISSUED: FEB 2016
REPLACES: AUG 2015
ORIGINALLYISSUED: FEB 2015

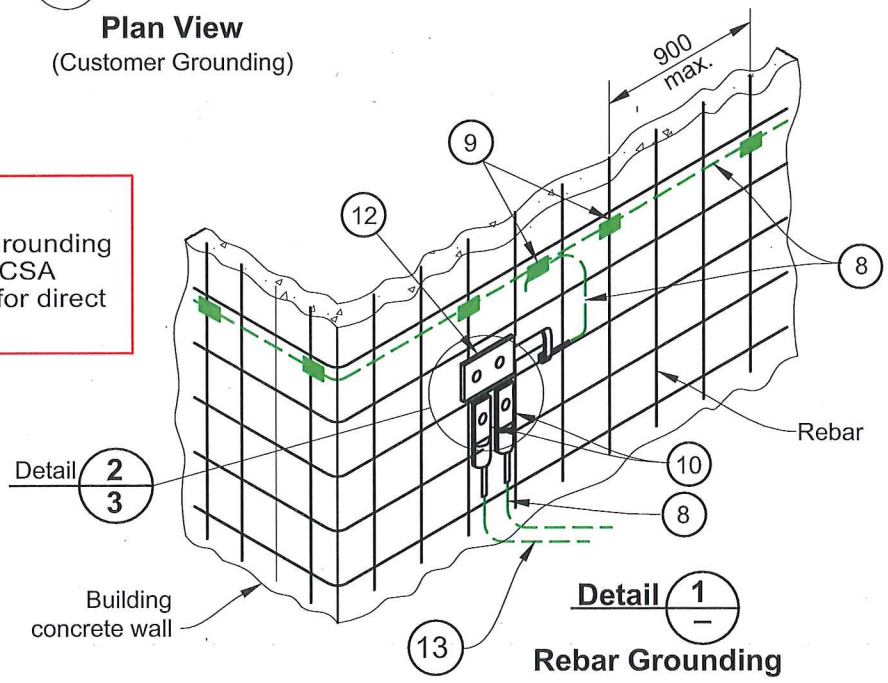
BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING

ES54 F3-07.01

R 2



Plan View
(Customer Grounding)



Rebar Grounding

CAUTION:
All customer owned grounding components shall be CSA certified and marked for direct burial installation.

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

DESIGNED	RECOMMENDED	ACCEPTED
M. KELVIN	C. PICASSI	F. DENNERT

ENGINEER OF RECORD: PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA, M. KELVIN

DISTRIBUTION STANDARDS
BC Hydro

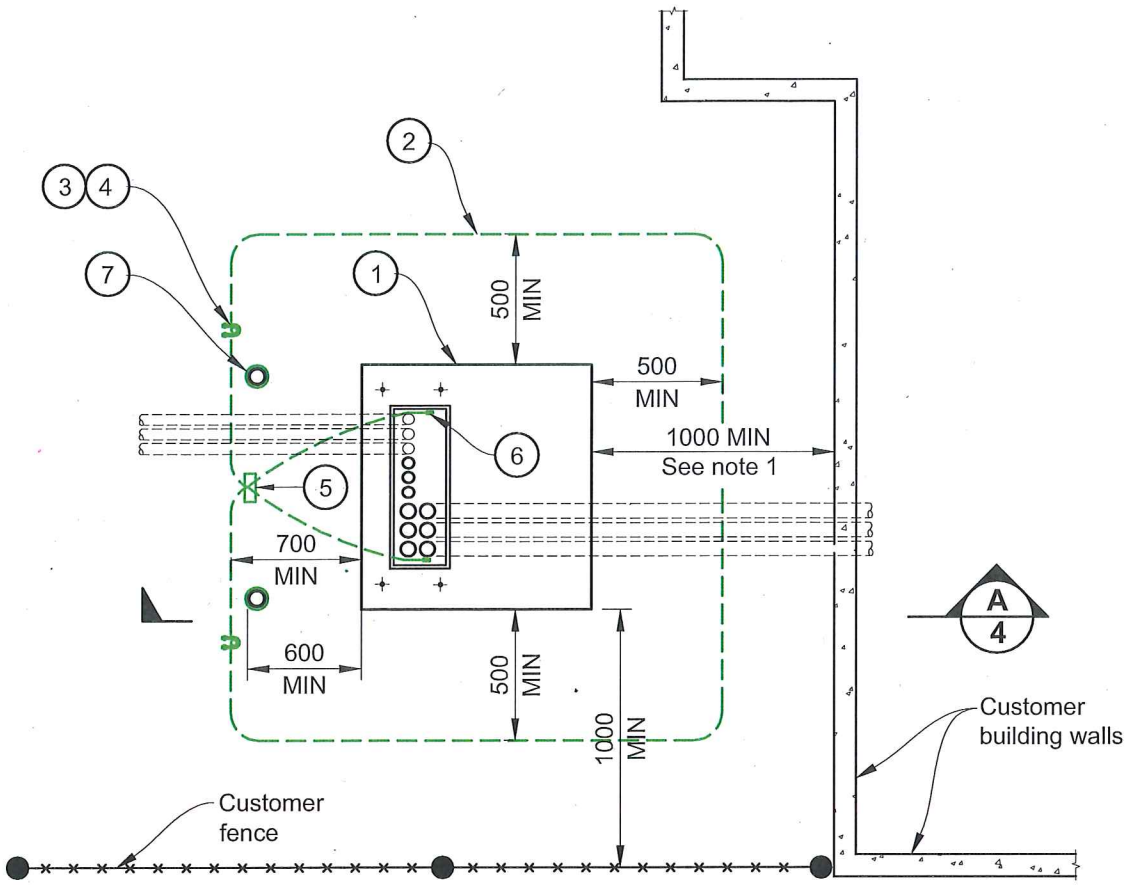
ISSUED: FEB 2016
REPLACES: AUG 2015
ORIGINALLYISSUED: FEB 2015

BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING

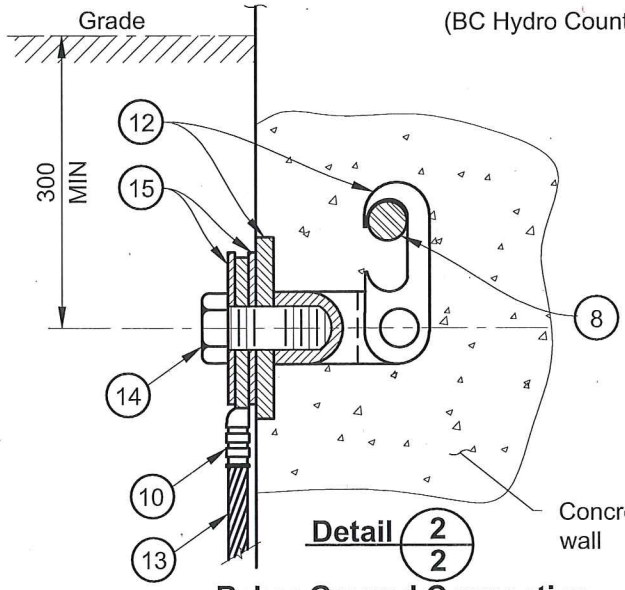
PAGE 2 OF 11

ES54 F3-07.02

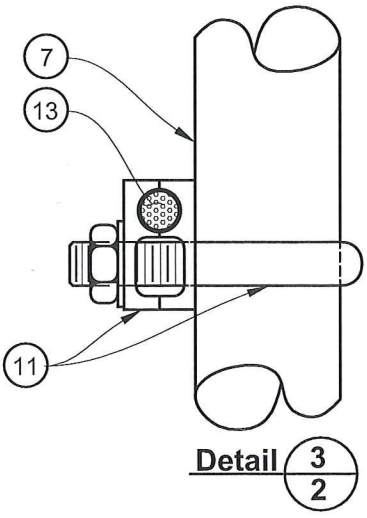
R 2



Plan View
(BC Hydro Counterpoise)



Rebar Ground Connection
(See Note 7)



Bollard Grounding Clamp
(See Note 3)

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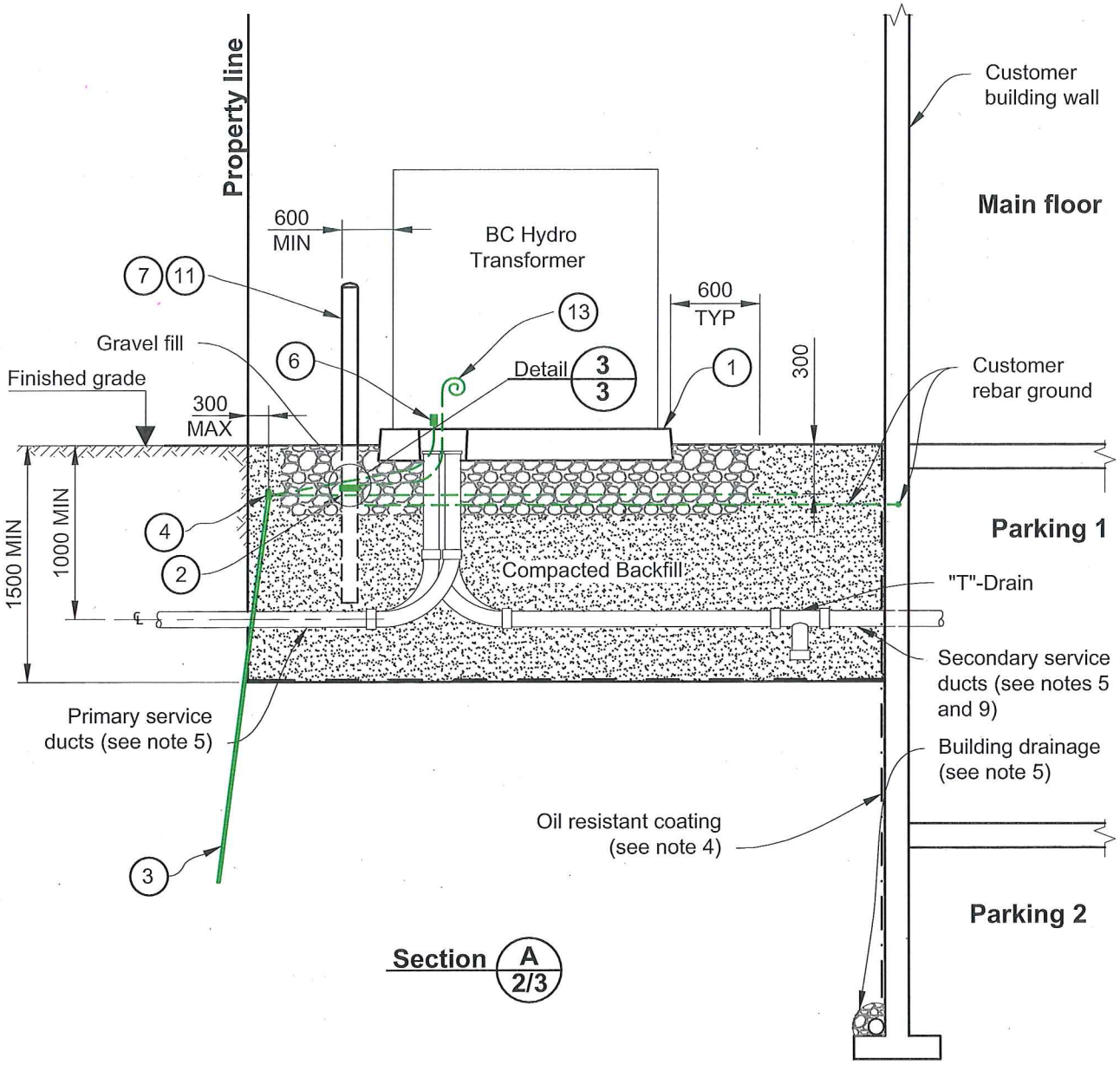
DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: FEB 2015	PAGE 3 OF 11	ES54 F3-07.03 R 2

BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK



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DESIGNED	RECOMMENDED	ACCEPTED
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ENGINEER OF RECORD
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M. KELVIN

DISTRIBUTION STANDARDS
BC Hydro

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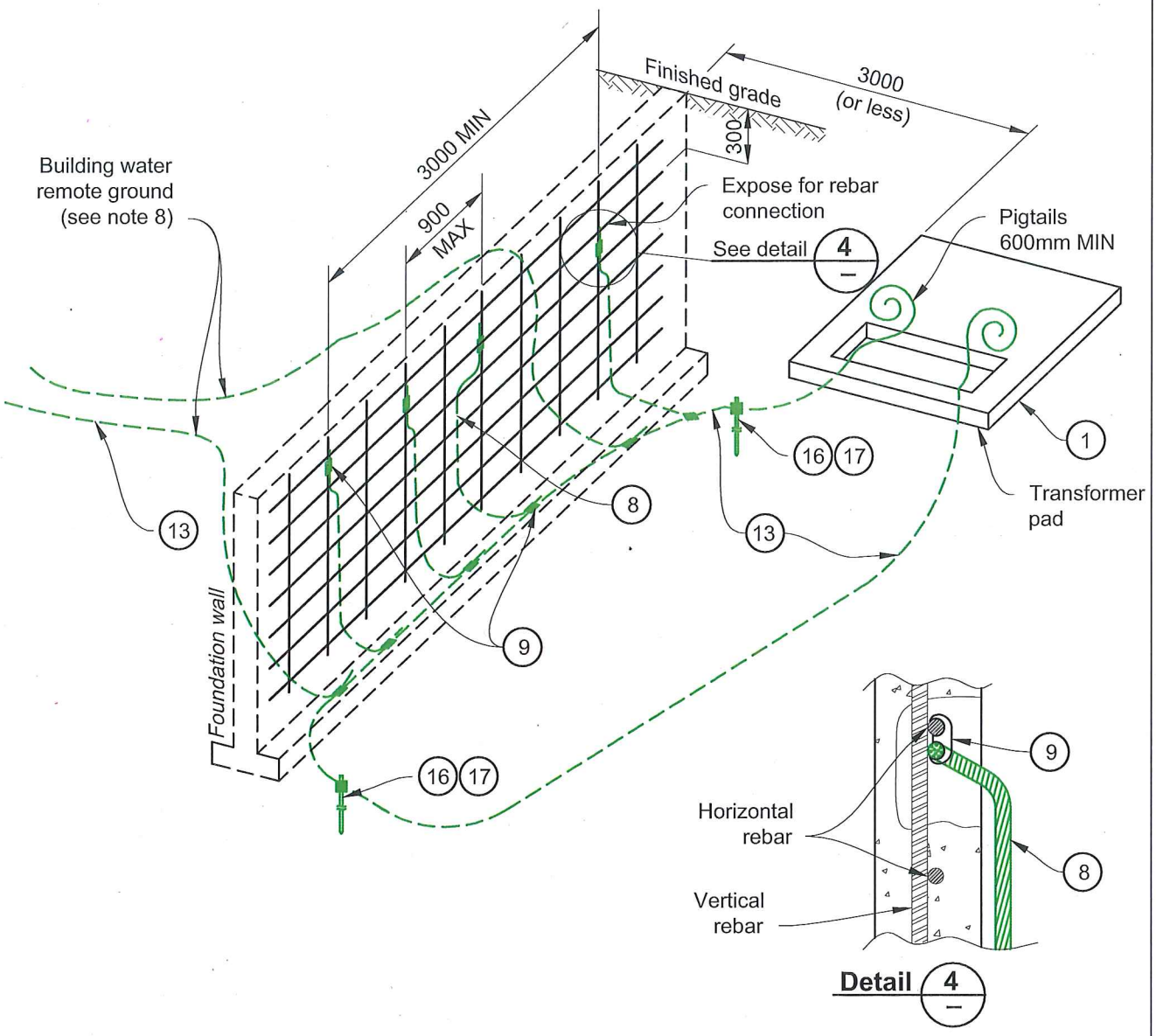
BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING

ES54 F3-07.04

R 2



Foundation wall grounding
(after the wall poured)

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

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Notes

1. This standard covers the installation requirements for BC Hydro PMTs or LPTs located on private property, outside the footprint of a building, but located within 3 metres of a customer building structure. Installations **inside** the footprint of a customer building shall comply with the latest revisions of the ES54 F3-06 standard.

2. BC Hydro requires a specific Right of Way (ROW) for the installation on private property. The customer must prepare the ROW drawing and forward it to the BC Hydro designer. It is the customer's responsibility to provide an as-constructed survey plan to confirm that the PMT or LPT is within the specific ROW area.

3. The customer's building permit drawings must show the location of the BC Hydro pad-mounted transformer located within 3.0 m of the customer building, including the installation details of all primary and secondary ducts, ground rods and the BC Hydro counterpoise, and the customer ground rods, grounding conductors and rebar connections. The location of the transformer pad and all installation details shall be acceptable to the BC Hydro designer and local jurisdiction.

4. The customer shall provide a certified design and compacted fill to support the weight of the BC Hydro concrete pad, transformer and all cables. In addition, the customer shall provide an oil-resistant coating on adjacent foundation walls, and adequate drainage. BC Hydro shall not be responsible for damage to customer buildings resulting from transformer oil leakage.

5. The BC Hydro designer shall advise the customer on duct size, the number of primary and secondary ducts, acceptable duct runs, and the duct drain connection – subject to approval by the local Building Department. The depth of duct burial shall not exceed 1800 mm.

6. For maintenance and operating access, BC Hydro requires an unobstructed operating area of 3.0 metres in front of the transformer and 1.0 metre maintenance access on all other sides.

7. For mechanical protection of pad-mounted equipment in traffic areas, BC Hydro requires the installation of BC Hydro standard protective bollards. The BC Hydro designer shall determine the exact number and layout of the protective bollards around the transformer pad. A chain-link fence or custom-built gates may be acceptable in some areas, in agreement with the BC Hydro designer, for improved safety and cleanliness.

8. Foundation and building wall rebar, or metal siding, fencing and other exposed metal and conductive structures located within 3.0 metres of the BC Hydro transformer concrete pad, shall be bonded to the BC Hydro transformer ground bus. All concealed grounding and ducting installations shall be inspected by the BC Hydro civil inspector before pouring concrete and placing backfill. Upon completion, the contractor shall complete the attached Installer's Declaration and provide it to the BC Hydro civil inspector, confirming that the grounding and ducting installation is in compliance with BC Hydro standards.

9. Following the installation of the BC Hydro ground and the customer grounding portion, the customer shall provide BC Hydro a stamped Grounding Report on (Pages 10 and 11), for acceptance by

the BC Hydro design representative. All potential limit calculations shall be based on the available fault current levels – not the system ultimate fault levels. BC Hydro fault levels will be estimated by the engineer for the area and provided to the customer's consultant by the BC Hydro design representative. A Grounding Report may not be required for non-conductive building walls, provided that the concrete foundation wall rebar is grounded and the exposed foundation concrete curb projects less than 450 mm above the finished grade.

10. The customer shall supply and install CSA type DB2 duct, concrete-encased inside the building, including engineered structural supports to hold the weight of the service cables and conduits, and to withstand the required cable pulling forces during installation and removal of service conductors.

Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	Transformer concrete pad	Specified by BCH Designer	1	BC Hydro
2	Counterpoise, Ø ¾", galvanized steel	106-2510	As Required	BC Hydro
3	Ground rod, Ø ⅝" x 8', galvanized steel	420-1093	2	BC Hydro
4	Connector, counterpoise to ground rod, galvanized steel	420-1157	2	BC Hydro
5	Rope clamp, Ø ¾", galvanized steel	420-0965	2	BC Hydro
6	Cap, heat shrink, 1.2" x 3"	394-0605	2	BC Hydro
7	Protective bollard, Ø 4" pipe, galvanized steel	400-0059	As Required	BC Hydro
8	2/0 AWG Cu bare stranded	N/A	As Required	Contractor
9	Ground connector ¾" rebar to 2/0 Cu bare direct burial, ILSCO GPL-6, T&B 54890 C-tap or equivalent	N/A	As Required	Contractor
10	Compression lug for 2/0 Cu Burndy YGHA26 or equivalent	N/A	4	Contractor
11	Pipe grounding clamp, Ø 4" pipe to 2/0 Cu bare Burndy GD2226 or equivalent	N/A	As Required	Contractor
12	Ground plug direct burial Burndy YGF29-2N	N/A	2	Contractor
13	2/0 AWG Cu insulated 1 kV green, stranded	N/A	As Required	Contractor
14	Bolt S/S ½" dia x 1" long	N/A	4	Contractor
15	Washer S/S ½" dia	N/A	8	Contractor
16	Ground rod, per CEC	N/A	2	Contractor
17	Connector, 2/0 AWG Cu to ground rod	N/A	2	Contractor

Reference Standards

C22.1	Canadian Electrical Code, Part 1
ES54 U2-02	Stanchion Installation Details
ES54 R1-01	Grounding of Pad-Mounted Enclosures
ES54 Section F	Transformers

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD
M. KELVIN	C. PICASSI	F. DENNERT	PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. KELVIN

DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: FEB 2015	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING	
		PAGE 8 OF 11	ES54 F3-07.08 R 2

Please complete this page and provide to the BC Hydro Civil Inspector
All fields on this page are mandatory to avoid processing delays.

CUSTOMER DUCT AND GROUNDING – INSTALLER'S DECLARATION

BC Hydro Reference No. ES54 F3-07	Electrical Permit No.:	
Name of Installer:	Installer Phone No.:	Cell:
Service Address:		
Lot No.:	City:	Postal Code:
Installers Registration No.:	Duct Permit No.:	
The Electrical Safety Regulations require that persons installing underground electrical raceway shall be registered as an Electrical Contractor and shall hold a valid certificate of qualification.		
Name of Owner:	Owner's Phone No:	

SITE PLAN

Please indicate:
- North arrow
- OUTLINE OF BUILDING FOUNDATION
- LOCATION OF BC HYDRO EQUIPMENT
- GROUNDING and DUCTING

1. This declaration does not constitute an authorization for connection.
2. Any discrepancy between the above BC Hydro reference and the actual installation must be approved in advance by a BC Hydro Service Representative.

I AM THE INSTALLER AND HEREBY CERTIFY THAT THE SERVICE DUCT AND ALL GROUNDING INSTALLATION HAS BEEN INSTALLED TO COMPLY WITH BC HYDRO REQUIREMENTS.

Signature of Permit Holder

Print Name

Date

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	BC HYDRO PAD-MOUNTED TRANSFORMER ON PRIVATE PROPERTY NEXT TO CUSTOMER BUILDING	
M. KELVIN	C. PICASSI	F. DENNERT			
DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: FEB 2015			PAGE 9 OF 11	ES54 F3-07.09 R 2

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

GROUNDING REPORT for BC HYDRO EQUIPMENT

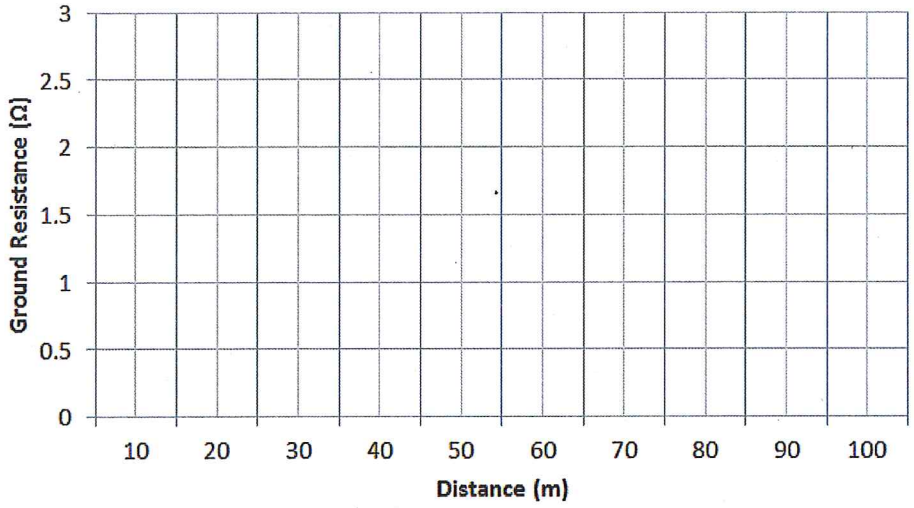
Service Address: _____

Lot No._____ **City** _____ **Postal Code** _____

Name of Owner: _____ **Contact Phone:** _____

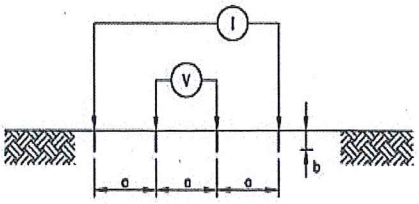
Step 1 – Fall of Potential Measurement

Trav. Distance (m)	10	20	30	40	50	60	70	80	90	100
Meter Reading (Ω)										



Graph 1 – Fall of Potential Graph (R_g)

Step 2 – Soil Resistance Measurement



$$\rho_E = \frac{4\pi a R_w}{1+\frac{2a}{\sqrt{a^2+4b^2}}-\frac{a}{\sqrt{a^2+b^2}}} = \_\_\_\_\_ \Omega\text{-m} \qquad R_w = \frac{v}{I}$$

or $\rho_E = 100\ \Omega - m$ (per IEEE 80)

Diagram 1 – Earth Resistance (ρ_E) per Wenner Method

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M. KELVIN	C. PICASSI	F. DENNERT			
DISTRIBUTION STANDARDS BC Hydro	ISSUED: FEB 2016 REPLACES: AUG 2015 ORIGINALLYISSUED: FEB 2015			PAGE 10 OF 11	ES54 F3-07.10 R 2

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

Step 3 – Grid Potential Rise

E_{L-L} = _____ kV (from BC Hydro) $I_{g\ fault}$ = _____ kA (present from BC Hydro)

E_{L-N} = _____ kV (from BC Hydro) $Z_h = \frac{E_{L-N}}{I_g}$ = _____ Ω (calculated)

R_g = _____ Ω (from Graph 1) $I_{g\ max} = \frac{E_{L-N}}{(R_g+Z_h)}$ = _____ kA (calculated)

$\mathbf{E_{GPR}} = \boldsymbol{R_g} * \boldsymbol{I_{g\ max}}$ = _____ **kV** (calculated)

Step 4 - Step Voltage

$\boldsymbol{E_{step}} = \boldsymbol{\rho_E} * \boldsymbol{K_s} * \boldsymbol{K_i} * \frac{\boldsymbol{I_{g\ max}}}{\boldsymbol{L}}$ = _____ **kV** (calculated)

$K_i = 1$ for square grid) ρ_E = _____ Ω-meters (soil resistivity from Diagram 1)

$K_s = 0.53$ for 0.25 m < h < 2.5 m (depth of electrodes); 0.3 m (depth of grid)

$L = L_c + 1.15L_r$ = _____, $L_c = Loop\ length$ (m) and $L_r = Total\ rods\ (m)$

Step 5 - Touch Voltage

$\boldsymbol{E_{touch}} = \frac{\boldsymbol{\rho_E} * \boldsymbol{I_{g\ max}} * \boldsymbol{K_i} * \boldsymbol{K_m}}{\boldsymbol{L}}$ = _____ **kV** (calculated)

$K_m = \frac{1}{2}\pi\left(\frac{\ln D^2}{16*h*d}\right) + \frac{1}{\pi(\ln(\frac{3}{4})*(\frac{5}{6})\ldots)} = 1.18$ $K_i = 1$ (for N = 1, for square grid)

Step 6 – Report Summary (per BCEC Section 36)

	BCEC Potential Limits	Calculated Potentials
Grid Potential Rise, (E_{GPR})	5000 V (Rule 36-304)	(from Step 3)
Step Voltage, (E_{step})	(per Table 52)	(from Step 4)
Touch Voltage, (E_{touch})	(per Table 52)	(from Step 5)

Comments: _____

_____

Name: _____

Signature: _____

Date: _____

P.Eng. Stamp

REVISIONS: R.2 - TITLE CHANGE, CLEARANCES, ACCESS, GROUNDING AND HARDWARE REVISED FEB '16 MK

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