



Information Bulletin:

Revised ES54 S0-05 General Notes Service Ducts and Trenches

1.0 Items Covered

ES54 S0-05 R2 General Notes Service Ducts and Trenches

This advisory and the standard listed above can be found at bchydro.com/distributionstandards.

2.0 Overview

This advisory describes the latest revisions to ES54 S0-05 R2:

- a. Secondary service cables pose a lower risk of electrical safety hazard compared to primary service cables when damaged. BC Hydro no longer requires authenticated documentation for secondary service duct foundation wall penetrations. Site-specific design for primary service duct foundation wall penetrations is still required, but submission of authenticated documentation is only upon BC Hydro's request. This revision aims to streamline the submission process;
- b. Substantive changed content in the revised standard is marked by green vertical revision lines in the left margin;
- c. This advisory is referenced by number in the Revision Notes section in the revised standard; and
- d. ES54 S0-05 R2 has been released and posted online. The previous revision of the standard (ES54 S0-05 R1) is appended to this advisory for reference to help make it easier to understand the changes.

Changes in ES54 S0-05 R2 are described in the following table:

Page	Section	Changes
1	Application and References	Revised <i>Application</i> to reference ES54 sections E and F. Added new external document references.
2	Note 2 Materials	Revised note 2.c to add reference to Table 1.
3	Table 1 and Note 2 Materials	Added new Table 1 <i>Engineering parameters for primary or secondary service duct</i> . Added new note 2.o on cable operating temperature and dead weight.

Page	Section	Changes
4	Note 3.2 Service in Duct	Revised note 3.2.g to accept alternative design by customer's professional of record and add new content on service ducts beneath structural foundations and footings. Revised note 3.2.h to clarify customer's responsibilities for duct foundation wall penetration design. Added new note to 3.2.i to clarify requirements on primary and secondary service duct foundation wall penetration design and submittals. Revised note 3.2.j to delete "clearance" for zero lot line buildings.
5	Figure 2	Revised detail title to remove "secondary" and delete scale.
5	Figure 3	Revised detail title to delete scale.
6	Figure 4	Revised detail title to delete scale.
6	Figure 5	Revised detail title to delete scale.
7	Figure 6	Revised detail title to delete scale.
7	Figure 7	Revised detail title to update "zero property line" and delete scale.
8	Figure 8	Revised detail C1 title to delete scale. Revised detail C2 title to delete scale. Revised detail C3 to add a 5" service duct and delete scale. Revised Figure 8 title to update with "zero property line" wording.

3.0 Action

ES54 S0-05 R2 is effective immediately.

Designers, Engineers, and Civil Inspectors

Designers, engineers, and civil inspectors should familiarize themselves with the revisions to ES54 S0-05 R2.

Customer and Customer Representatives

Customers and customer representatives, including electricians, project managers, consultants, and contractors, should familiarize themselves with the revisions to ES54 S0-05 R2.

4.0 Contact

Customer and Customer Representatives

Please direct questions and concerns to your local BC Hydro representative.

BC Hydro Employees and Contractors

Please direct questions and concerns related to the standard to distribution.standards@bchydro.com.

Prepared by: Tim Ismagilov

Date: 2025-03-26

Application

This standard describes BC Hydro requirements for customer civil work on private property for supply service ducts and trenches for all services (primary, secondary, single-phase, and three-phase). See ES54 sections H *Duct* and W *Construction Specifications* for BC Hydro requirements for all other civil work on private property and public corridors.

Revision Notes

Removed reinforced concrete duct bank options for build building foundation wall penetrations. Clarified what documents customer must provide for foundation penetrations. Differentiated between primary and secondary trenches. Other minor updates. Changes are marked by green vertical revision lines in the left margin. This revision released concurrently with Standards and Equipment Advisory 2022-010 R1 Information Bulletin: *Revised ES54 S0-02 Services General Notes and Release of ES54 S0-05 Service Ducts and Trenches*.

References

BC Hydro Distribution Standards

ES54 S0-02 Services General Notes

External Documents

ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
BCEC	Canadian Electrical Code, Part I (CSA C22.1) adopted for BC and enforced by Technical Safety BC (TSBC)
CSA A23.3	Design of concrete structures
CSA C22.2 No. 211.1	Rigid types EB1 and DB2/ES2 PVC conduit
CSA C22.2 No. 211.2	Rigid PVC (unplasticized) conduit
CSA C22.3 No. 7	Underground systems

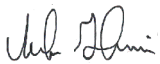
Notes

1. Types of Installation

Direct burial of supply service ducts on private property. BC Hydro does not accept direct burial of supply service cables.

2. Materials

- Materials from the stub-off on private property shall be supplied, installed, and maintained by the customer.
- Minimum burial depth for supply service ducts should be 900 mm below finished grade. Sections of secondary services that cannot meet minimum burial depth shall be mechanically protected using methods described in note 2.n. The cover layer shall not be reduced, and the burial depth shall not be less than 450 mm without the local BC Hydro distribution engineer's acceptance. Service ducts for primary services

Designed: M. Kelvin, P. Eng		Professional of Record 2023-06-27  Permit To Practice-1002449	Services General Notes Service Ducts and Trenches	
Checked: M. Kelvin, P. Eng				
Reviewed: M. Stevens, P. Eng		Issued: 2023-06-30 Effective: 2023-07-31	DISTRIBUTION STANDARDS	ES54 S0-05 R1
Approved: H. Giesbrecht, P. Eng				

and 400 A and greater secondary services that cannot meet minimum burial depth require a local BC Hydro distribution engineer's acceptance prior to installation. See note 2.I.

- c. Underground and concrete encased ducts and fittings shall be CSA-certified grey rigid-type DB2/ES2 PVC CSA C22.2 No. 211.1 or grey rigid PVC duct CSA C22.2 No. 211.2 (Schedule 40 PVC).
- d. Above ground exposed ducts and fittings shall be grey rigid PVC duct CSA C22.2 No. 211.2 (Schedule 40 PVC).
- e. A drainage tee is required to drain water from the supply service duct before it enters service equipment or penetrates a building envelope. A drainage tee is not required when the installed drainage tee will be higher than the finished grade of the supply ducts at the property line.
- f. The minimum nominal bending radius of ducts and fittings is 900 mm for 75 mm (3") and 100 mm (4") ducts and 1050 mm for 125 mm (5") ducts.
- g. Pull string shall be #8 polypropylene string or greater.
- h. Cover and base fill material shall be screened sand or earth with a maximum partial size of 4.75 mm as per ASTM D2487, compacted to 95% modified proctor density to ensure adequate heat dissipation, drainage, and compaction, and to prevent mechanical damage to the direct buried ducts. See Section A and Elevations 1 through 3.
- i. Backfill material shall be selected native material for non-traffic areas compacted to 85% modified proctor density. Selected native material shall be granular material free from frozen lumps, ashes, refuse, vegetable, organic or foreign matter, granular material over 100 mm in any dimension, or other deleterious materials. See Section A and Elevations 1 through 3.
- j. Surface restoration is the customer's responsibility. 100 mm of surface layer material is recommended when matching existing grade.
- k. For traffic areas such as driveways and parking lots, backfill and road surface preparation or restoration shall be per the local regulatory authority having jurisdiction (AHJ) specifications, such as the MMCD or a city's design criteria manual. A permit from the local regulatory AHJ is likely required for road surface restoration work.
- l. Service trenches shall have 150 mm wide "Caution Buried Electrical Line Below" tape or board installed along the centreline of the trench. Caution boards are required for primary services and reduced depth secondary services. See Section A and Elevations 1 through 3.
- m. 15M concrete rebar inserts are required on zero lot line clearance applications for BC Hydro to join reinforced concrete duct bank to the building foundation wall. The customer shall supply the corresponding threaded splice bar to the insert, minimum length 200 mm (8"), to BC Hydro. See Elevation 5.
- n. Riser sections above the minimum burial depth shall have adequate mechanical protection per BCEC rule 12-102 (3) or CSA C22.3 No. 7 rule 7.3.2. See Elevations 2 and 3. This is not required for surface mounted risers visible from the exterior of the building. See Elevation 1.

3. Installation Requirements

3.1 General

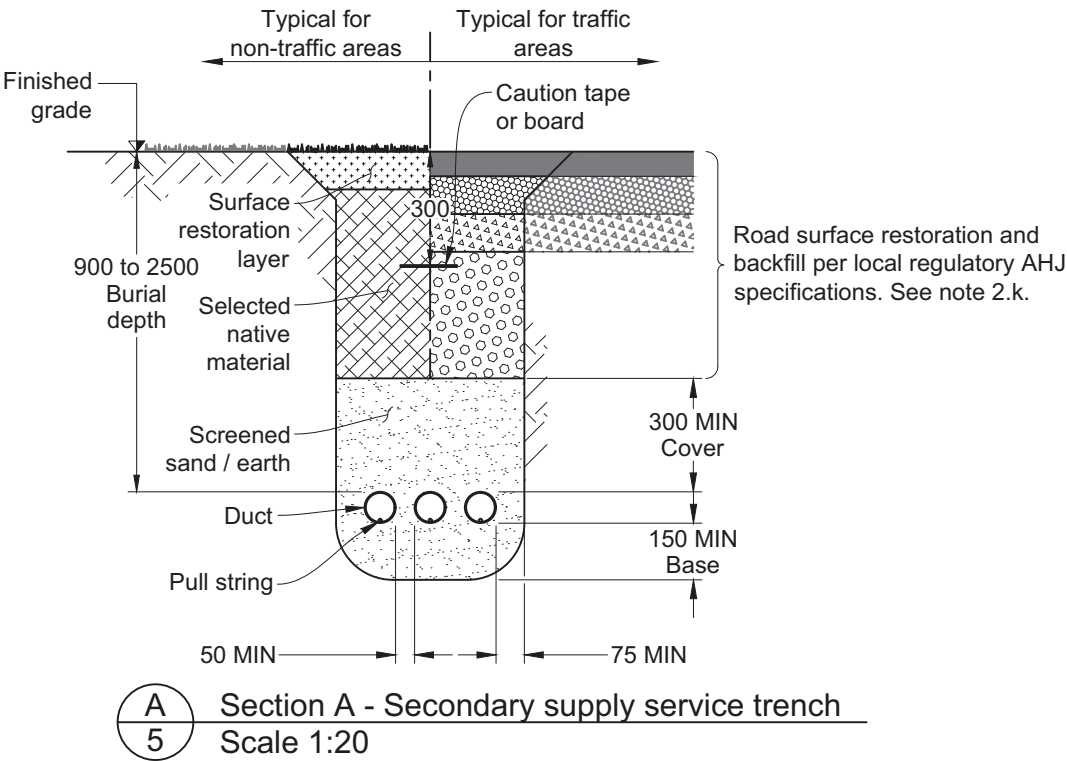
- a. BC Hydro civil work requirements are based on 50-year service life expectancy.
- b. Civil work, materials, and maintenance related to this standard are the customer's responsibility.
- c. The service duct trench shall be in direct line-of-sight from the property line stub-off to the service duct entry into the building. The base of the trench shall be graded to the depth of the BC Hydro duct stub-off, typically 900 mm to the top of the BC Hydro duct.
- d. The minimum separation from service ducts to other underground systems shall be 300 mm, except for roof / auxiliary drains or when the service duct is concrete encased or otherwise mechanically protected per CSA C22.3 No. 7, in which case the minimum separation may be reduced to 50 mm. See Plan 1 and Elevation 1.

3.2 Service in Duct

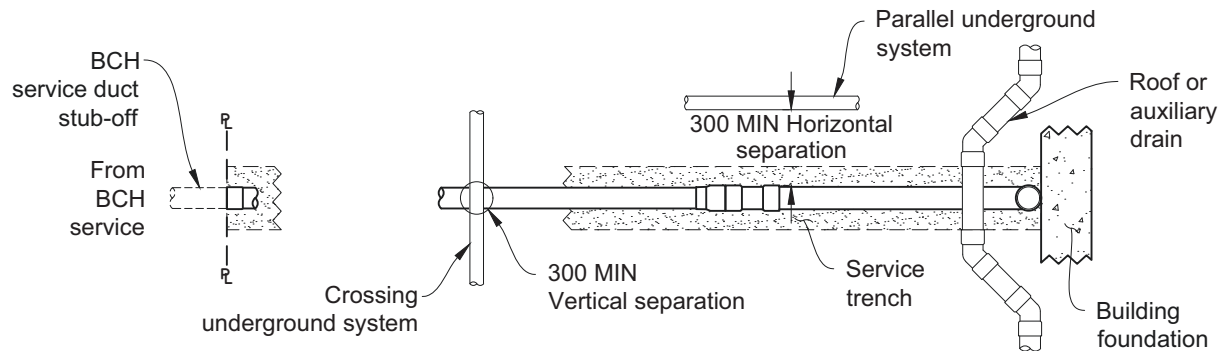
- a. The customer shall couple their duct onto the BC Hydro duct stub-off at the property line and discard any markers or duct caps. Customer ducts shall not cross the property line nor enter BC Hydro's service box directly. The customer duct may only be coupled to the designated BC Hydro service duct.
- b. BC Hydro may require a customer-owned BC Hydro standard pull box if the service duct length between the BC Hydro duct stub-off and the service entrance exceeds 50 m. Please consult with your BC Hydro designer.
- c. BC Hydro may require a customer-owned BC Hydro standard pull box if the total sum of duct bends in the service duct between the BC Hydro duct stub-off and the service entrance (including any 90° vertical riser) exceeds 135°. Please consult with your BC Hydro designer.
- d. The customer is responsible for installing adequate service duct drainage in accordance with BCEC rules.
- e. A pull string shall be installed in the service duct and tied securely at the service entrance and to the string in the BC Hydro duct stub-off. If no string is found in the stub-off, the customer shall contact BC Hydro for further instructions.
- f. The service duct shall be kept free of obstructions and foreign material, including sand and gravel, throughout its length. The duct shall be proved by mandrel test before the final connection is made to the BC Hydro duct stub-off and before a pull string is installed.
- g. The service duct shall be protected from damage caused by foundation settlement and excavation backfill. To minimize settlement and subsequent damage to the service duct and supply service cable, fill material shall be as per note 2 and compacted in 150 mm lifts.
- h. Duct foundation wall penetration design is the responsibility of the customer. For all primary services and 400 A or greater secondary services (excluding single-phase residential secondary services), the customer shall supply the BC Hydro designer with one of the following:
 - i. A professional engineer authenticated document showing the engineered design that prevents shearing of service ducts; or
 - ii. A professional engineer or geoscientist authenticated document confirming there is no differential settlement that may cause damage to service ducts for the lifetime of the service.
- i. The BC Hydro service duct may be concrete encased to the property line for zero lot line clearance buildings. In such cases the customer will be required to provide the connection between the reinforced duct bank and the foundation wall at the point of duct penetration. The duct bank rebar shall be joined with a CSA approved rebar connection or splice system. Cast-in anchors/inserts, post-installed expansion (torque-controlled and displacement-controlled), undercut, and adhesive anchors are permitted to be part of the mechanical rebar connection or splice system provided they meet the requirements of CSA A23.3 Annex D. The minimum size of the rebar connection or splice system is 15M and shall meet the spacing requirements shown in Section C. Contact the BC Hydro designer to determine if BC Hydro service ducts are concrete encased.



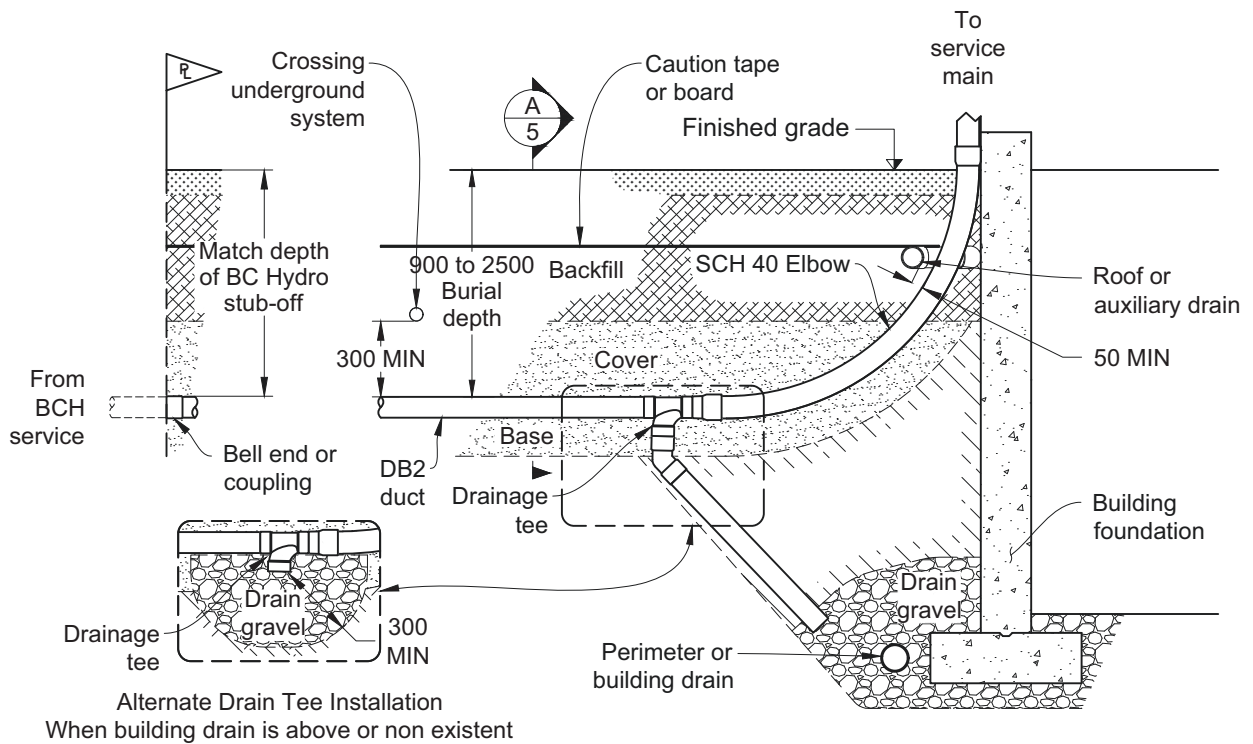
Figure 1 – Service ducts sheared due to settlement and lack of rebar reinforcement



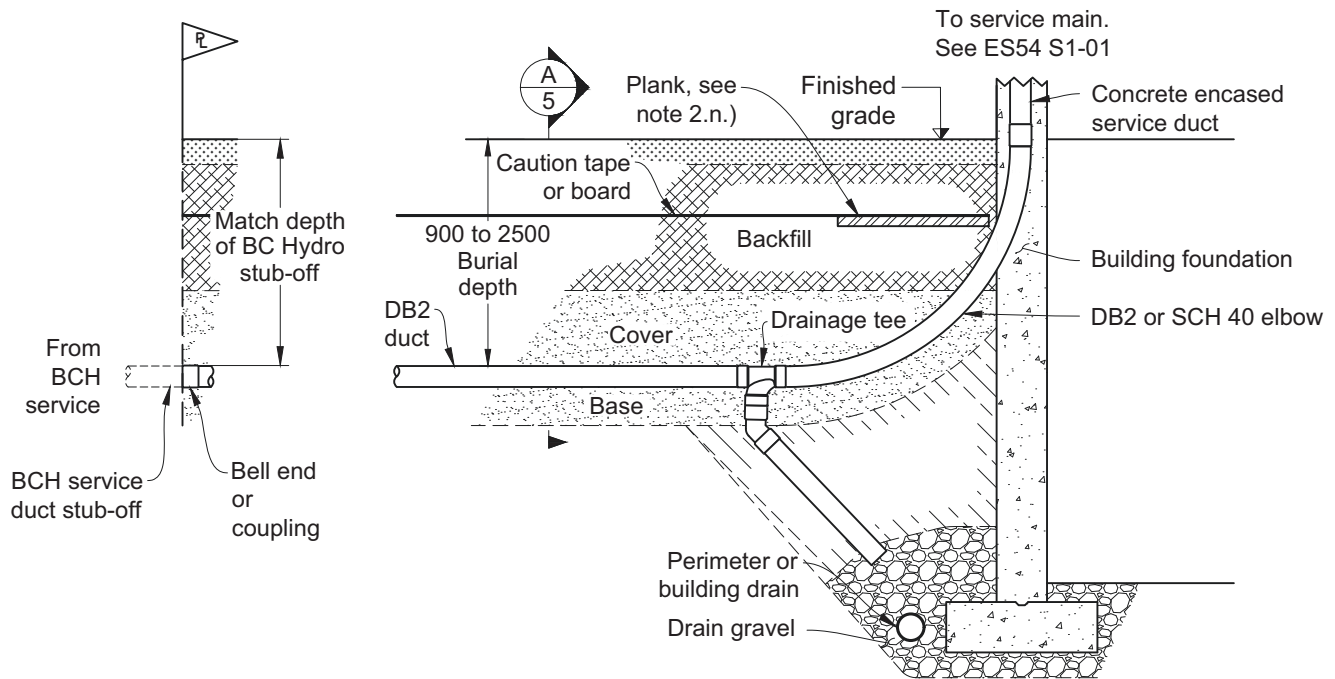
Section A – Secondary supply service trench



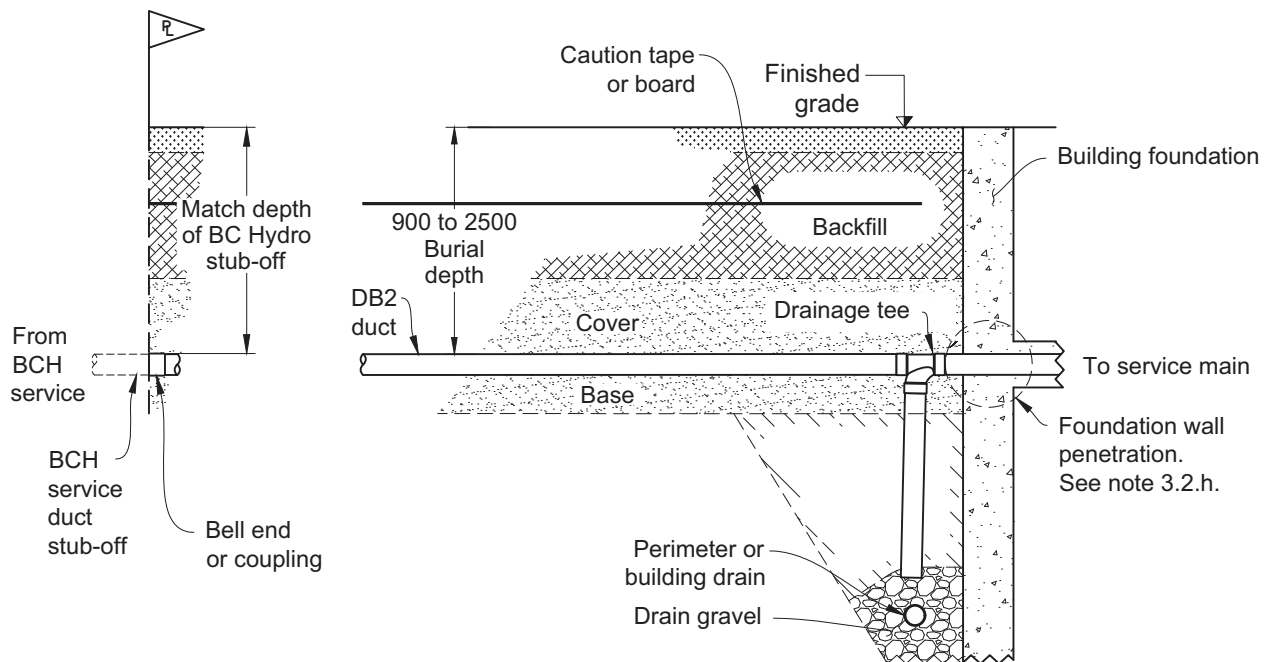
Plan 1 – Adjacent and crossing underground systems, scale 1:30



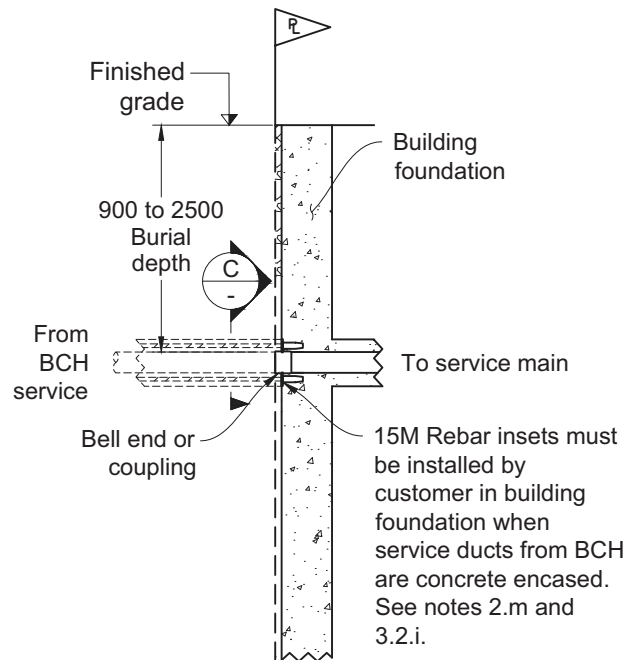
Elevation 1 – Surface mount service riser, scale 1:30



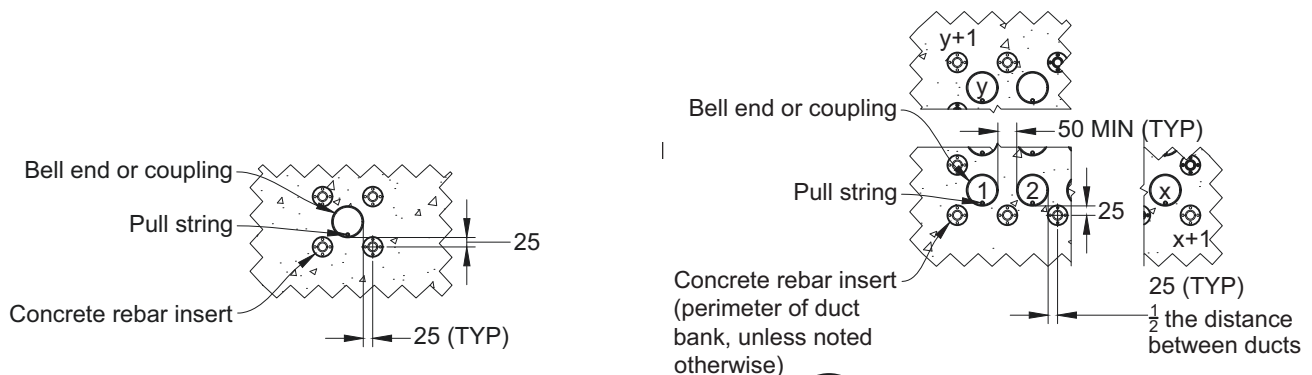
Elevation 2 – Concrete encased 400 A or less secondary service, scale 1:30



Elevation 3 – Horizontal foundation wall penetration, scale 1:30

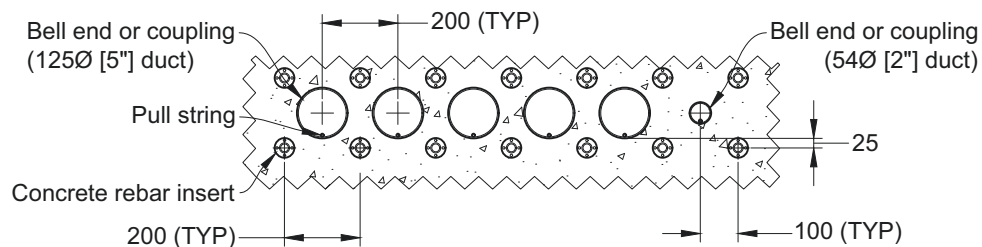


Elevation 4 – Zero lot line foundation wall penetration, scale 1:30



C1 Section C1 - Single duct service
Scale 1:20

C2 Section C2 - Multi duct service
Scale 1:20



C3 Section C3 - Six duct service to BC Hydro switchwear
Scale 1:20

Section C – Concrete rebar inserts for BC Hydro service ducts to zero lot clearance buildings

4. Drawing Notes

- a. Dimensions are in millimetres unless noted otherwise.
- b. Ducts shown are 75 mm nominal (3") unless noted otherwise.
- c. Figures show BC Hydro's minimum requirements. Alternative installations that exceed these requirements are acceptable.