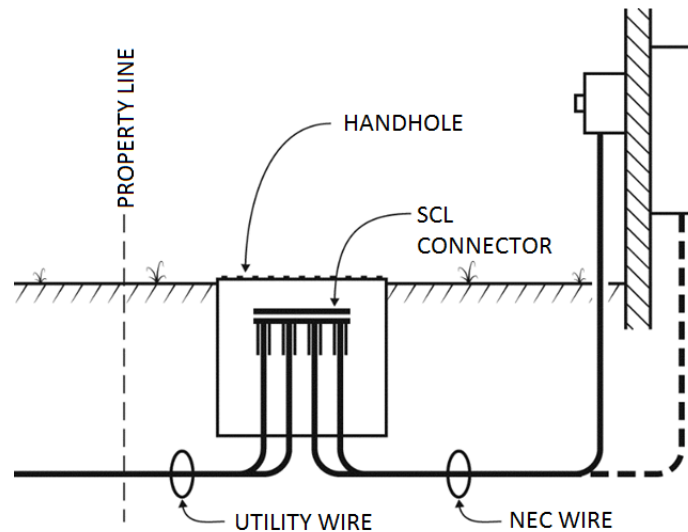


Customer Requirements for Underground Secondary Service Termination Facilities



1. Scope

This standard outlines Seattle City Light (SCL) requirements for the permanent installation of underground secondary service termination facilities, including:

- Service enclosures
- Current transformers (CT) enclosures
- Handholes

Underground secondary service termination points are only applicable to services located on private property, and where the SCL service point is located in the public right-of-way or SCL easement area.

For underground residential service entrances, see SCL 1561.05.

Meter installations are outside the scope of this standard. See SCL 1554.33 for outdoor meter installations, and SCL 1554.42 for indoor meter installations.

Services where the customer provides a facility on private property to house SCL transformers are outside the scope of this standard.

2. Application

This standard is intended for use by customers and SCL engineering, electric service representatives (ESRs), and operations personnel.

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3. Conflict

Where conflict exists between SCL requirements, the following order of precedence shall apply:

1. Project-specific Customer Requirements Package, including the Service Construction Drawing
2. SCL 1561.07
3. SCL Requirements for Electric Service Connection (RESC)

4. Requirements

All customer-installed equipment shall meet SCL requirements.

The service termination facility shall be provided and installed by the customer per the Customer Requirements Package and the RESC.

Customer-owned cable shall comply with the National Electrical Code (NEC) and shall be visibly marked at the point of termination (service point) to indicate phase and service being fed.

The service termination facility shall not be placed in depressions or low areas that tend to fill with water or silt. SCL strongly suggests that the service termination facility is located at an elevation above the elevation of the right-of-way in order to avoid water flowing into the building through service conduit(s). It is the customer's responsibility to install conduits and equipment at elevations that prevent water from entering the building.

Conduit entering the building shall be rigid galvanized steel (RGS) conforming to SCL 7050.05 beginning from one foot outside the building. Conduit shall be isolated from building steel.

The conduit riser shall be securely fastened to a wall by a minimum of two conduit straps.

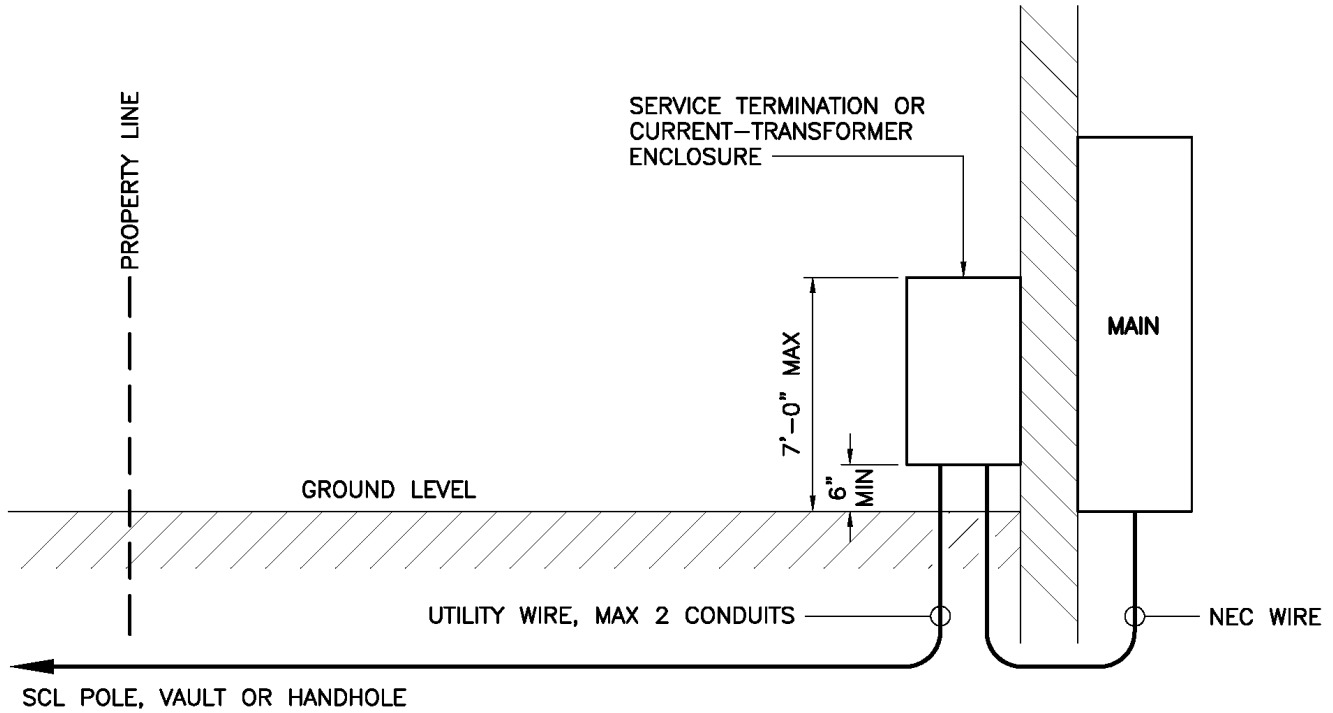
All meters, sockets, enclosures, and conduit shall be bonded and effectively grounded in accordance with NEC Article 250 and WAC 296-46B-250.

See the RESC for additional metering requirements.

5. Service Termination Requirements

Wall-mounted service termination facilities shall meet the requirements shown in Figure 5.

Figure 5. Wall-Mounted Service Entrance Requirements



5.1 Multi-Unit Meter Bank

A multi-unit meter bank is defined as three or more meters. These installations require a combination terminating enclosure and multi-meter panel for residential services per EUSERC 342. A service enclosure or handhole per sections 5.2 and 5.4 may be used with engineering approval prior to application.

5.2 Service Enclosure

The minimum interior dimensions of a service enclosure are based upon the number of cables entering the enclosure. Tables 5.2a and 5.2b show required dimensions for service enclosures.

The enclosure shall have a hinged cover.

Table 5.2a. Service Enclosure Sizing for Bottom or Side Entry (Option A or B)

Maximum Amps	Maximum NEC Wires from Customer			Termination Options
	# of Sets	AWG/kcmil	Size (W x H x D) (in)	
400	2	4/0	24 x 32 x 11	A or B
400	2	250	30 x 36 x 11	A or B
600	3	350	36 x 36 x 11	A
600	3	350	40 x 36 x 11	B
600	2	500	36 x 36 x 11	A or B
1000	4	500	48 x 48 x 11	A or B

Figure 5.2a. Service Enclosure Termination Option A

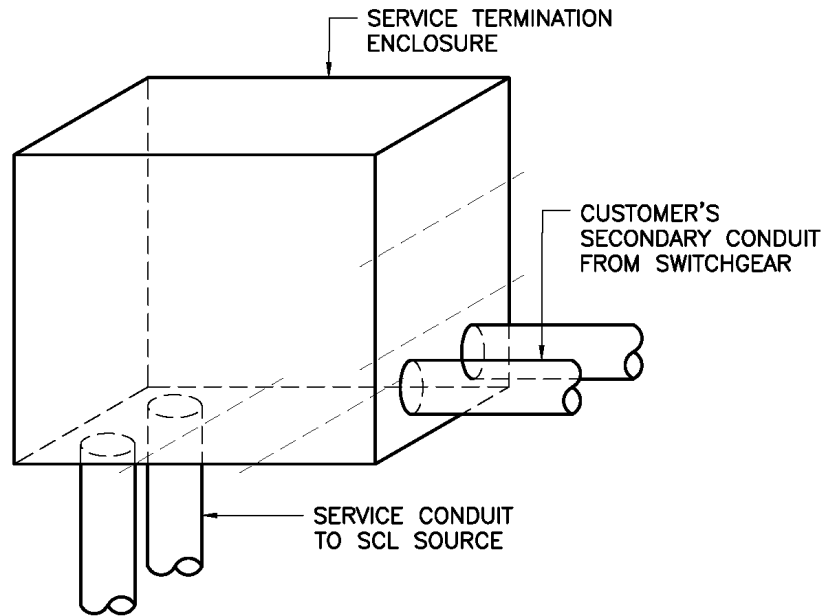


Figure 5.2b. Service Enclosure Termination Option B

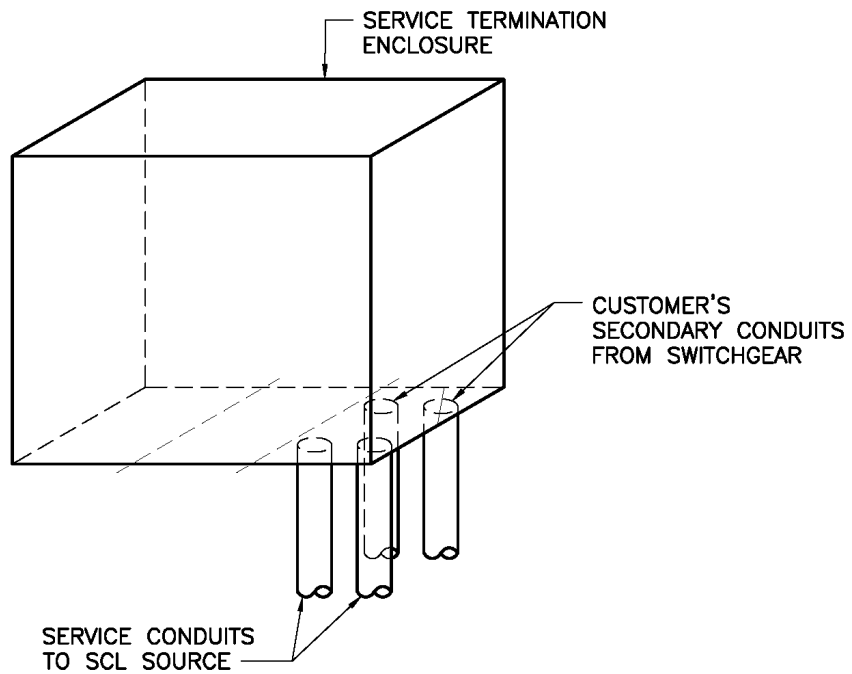


Table 5.2b. Service Enclosure Sizing for Back Entry (Option C or D)

Maximum Amps	Maximum NEC Wires from Customer		Size (W x H x D) (in)	Termination Options
	# of Sets	AWG/kcmil		
400	2	4/0	24 x 32 x 22	C or D
400	2	250	30 x 36 x 22	"
600	3	350	36 x 36 x 22	"
600	3	350	40 x 36 x 22	"
600	2	500	36 x 36 x 22	"
1000	4	500	48 x 48 x 22	"

Figure 5.2c. Service Enclosure Termination Option C

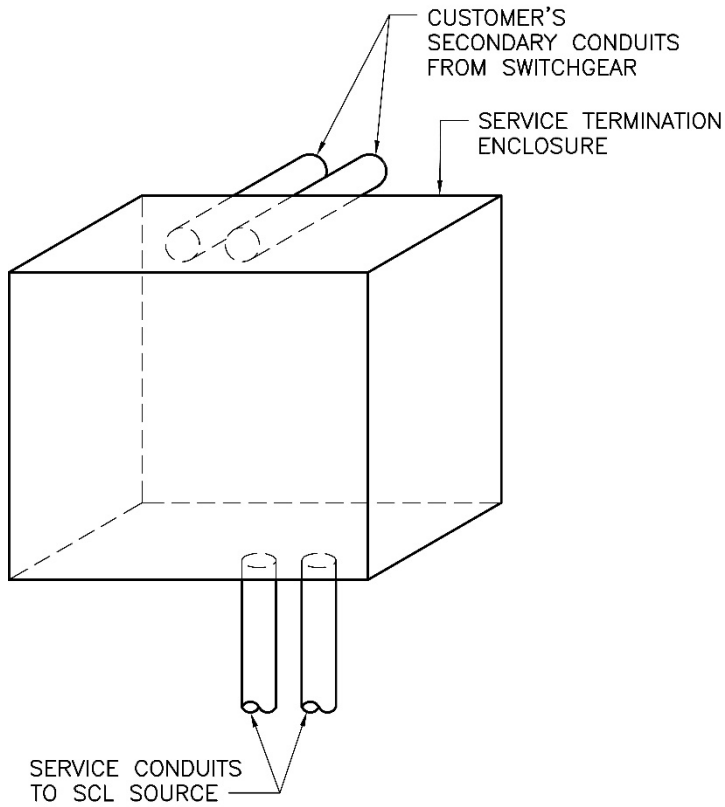
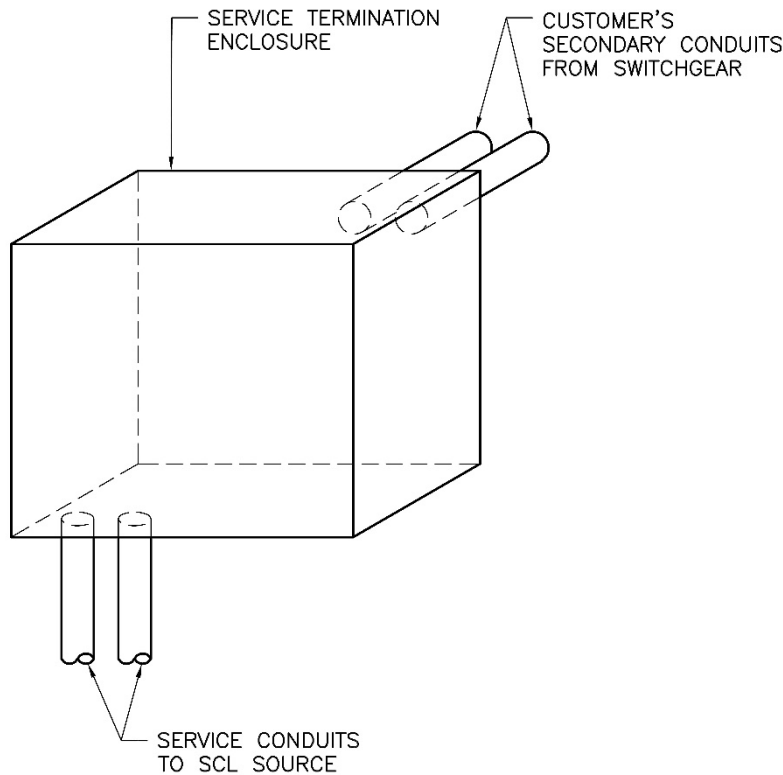


Figure 5.2d. Service Enclosure Termination Option D



Conduits shall enter near the corners of the service enclosure. Conduits shall not enter the same corner of the enclosure from two directions. Conduits shall be terminated no more than one third of the width away from the adjacent wall.

Service enclosures installed inside a building shall be located so the service conduits from the SCL source do not enter the building more than 18 inches.

5.3 Current Transformer Enclosure

Install a CT enclosure that meets the requirements found in the RESC.

The minimum interior dimensions are based on the service size. Table 5.3 shows required dimensions for current transformer enclosures.

The enclosure shall have a hinged cover.

Table 5.3. Current Transformer Enclosure Sizing

Maximum Service	Size (W x H x D) (in)
Single-phase, 400 A	24 x 48 x 11
Single-phase, 600 A	36 x 48 x 11
Three-phase, 800 A	36 x 48 x 11

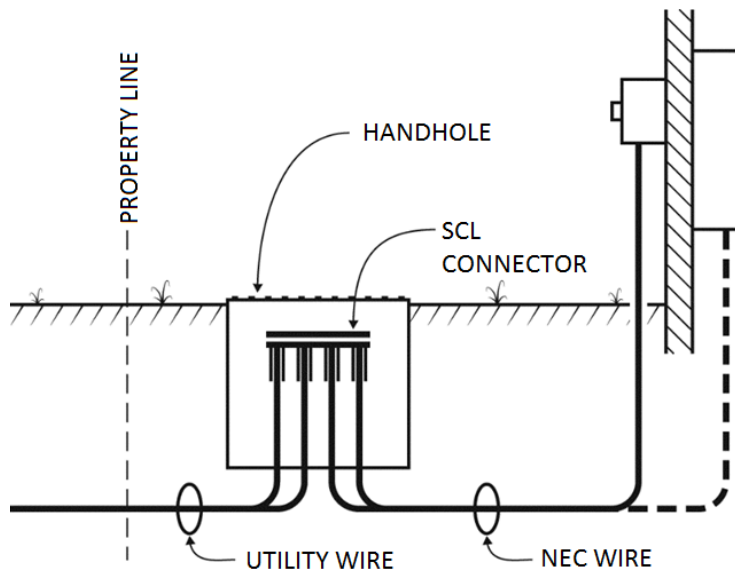
A switchboard termination is required for current transformers rated above 800 amperes.

5.4 Handhole

A handhole used as a service termination facility shall be installed at the location shown on the SCL Site Plan of the Customer Requirements Package.

The handhole type shall be provided, installed, and grounded by the customer per SCL 0224.01.

Figure 5.4. Handhole



The minimum interior dimensions are based upon the number of cables entering the handhole. Table 5.4 shows required dimensions for service termination handholes.

Table 5.4. Handhole Sizing

Maximum Service	Maximum Conduit Size (in)	Maximum NEC Wires from Customer			Size (W x L x D) (in)	Material	Material Std.
		# of Sets	AWG/kcmil				
Single-phase, 600 A	3	3	4/0	17 x 28 x 24	Concrete	7203.10	
Single-phase, 600 A	3	3	4/0	17 x 30 x 24	Fiberglass	7203.12	
Single-phase, 600 A	3	4	4/0	30 x 30 x 24	Concrete	7203.04	
Single-phase, 600 A	4	4	4/0	24 x 36 x 36	Concrete	7203.08	
Three-phase, 1000 A	4	4	350	24 x 36 x 36	Concrete	7203.08	
Three-phase, 1000 A	4	4	500	48 x 48 x 48	Concrete	7203.26	

Precast concrete handholes are allowed in walkways, sidewalks, and areas subject to minor, incidental vehicular traffic.

Composite fiberglass handholes shall only be located in landscaped areas.

6. Conduits

Conduits shall be installed from the service termination point to an SCL distribution facility per SCL 0224.01. See the project-specific requirements package for the location of the distribution facility.

If the SCL distribution facility is located across the street, two conduits shall be required.

Customer shall provide conduits per Table 6.

Table 6. Conduit Quantity and Size

Maximum Service	No. of Conduits	Size (in)
Single-phase, 400 A	1	3
Single-phase, 600 A	1	4
Three-phase, 600 A	1	4
Three-phase, 1000 A	2	4

7. Service Conduits and Cables

Customers are responsible for providing National Electrical Code (NEC)-sized service conduits and cables from the service termination point to the customer’s switchgear. Table 7 shows allowable conductor sizes.

Table 7. Allowable Conductors for Electric Service Connection

Conductor Size	Copper		Aluminum
	Concentric Round Stranded	Concentric Round and Compressed Stranded	Compact Stranded
#2 AWG	OK	OK	–
#1 AWG	–	OK	OK
1/0	OK	OK	OK
2/0	OK	OK	OK
3/0	OK	OK	OK
4/0	OK	OK	OK
250 kcmil	OK	OK	OK
300 kcmil	OK	OK	OK
350 kcmil	OK	OK	OK
400 kcmil	–	OK	OK
500 kcmil	OK	OK	OK

The customer shall provide sufficient excess cable per conductor entering into the service enclosure or handhole to allow for SCL to work on the connections safely outside of the facility. The rule of thumb is a length that measures double the length of the longest side of the enclosure or handhole plus the depth.

8. References

EUSERC Electric Utility Service Equipment Requirement Committee (EUSERC); “EUSERC Drawing 342”, www.euserc.com

NFPA-70; National Electric Code (NEC); National Fire Protection Association, Quincy, MA, 2017

Requirements for Electric Service Connection (RESC); Seattle City Light

SCL Construction Standard 0224.01; “Customer Requirements for Underground Secondary Service, Looped Radial System”

SCL Construction Standard 1554.33; Meter Mounting Configurations, Height, Working Space, and Clearances, Exterior (Outdoor)”

SCL Construction Standard 1554.42; Meter Height, Dedicated Equipment Space, Working Space, and Clearances, Equipment Rooms”

SCL Construction Standard 1561.05; “Underground Residential Service Entrances”

SCL Material Standard 7203.04; “3030 Handhole, Precast, Secondary”

SCL Material Standard 7203.08; “231 and 233 Handholes, Precast, Secondary and Streetlight, Detailed”

SCL Material Standard 7203.10; “Type 1 and Type 2 Open Bottom Handhole, Precast, Secondary and Streetlight”

SCL Material Standard 7203.12; “Handhole, Secondary, Composite Fiberglass, Polymer Concrete”

SCL Material Standard 7203.26; “444 Electric Vault, Primary Service”

Washington Administrative Code (WAC) 296-46B-250

9. Sources

Abbott, Jeremy; SCL Electrical Reviewer and subject matter expert for 1561.07

Edwards, Tommy; SCL Electrical Reviewer and subject matter expert for 1561.07

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Hanowell, Manny; SCL North Distribution Engineer and subject matter expert for 1561.07

Panomvana, Tanya; SCL North Distribution Engineer and subject matter expert for 1561.07