
Excavation in the Vicinity of Underground Transmission Lines



1. Scope

This work practice covers the requirements for excavation in the vicinity of underground transmission lines within the Seattle City Light (SCL) service territory. “In the vicinity” constitutes work that is within 15 ft of SCL transmission line infrastructure.

2. Application

This work practice provides direction to SCL crews, inspectors, reviewers, and contractors (“excavators”) who are involved with excavation activities in the vicinity of underground transmission lines.

3. Requirements

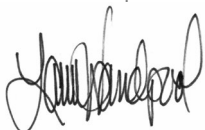
3.1 General

Excavation shall meet the requirements of the latest revision of the City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction, and all requirements listed in this standard. In cases of conflict, the most stringent requirements will prevail.

An SCL Safety Watch shall be onsite during the course of the excavation to oversee, inspect, and verify the excavator’s work.

The Safety Watch shall be either an underground Electrical Reviewer or Cable Splicer from the SCL Network Division. For details on the activities associated with the Safety Watch role, see Section 7.

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4. Permits

The excavator shall obtain Right-of-Way permits as required by the Seattle Department of Transportation (SDOT).

5. Financial Liability

The excavator shall be held financially responsible for any oil containment activities that result from excavation-related damage to SCL underground cables.

A Safety Watch shall be present for all work performed by excavator. The excavator shall be held liable for any damage found to SCL transmission line equipment in the event excavator performs any work without a Safety Watch present.

The excavator is solely responsible for avoiding SCL infrastructure, regardless of markings. As a warning to excavators, a yellow or red plastic tape with the message, "CAUTION Buried Electric Lines Below," may be present.

In some locations, a 3-in plastic communication conduit may be located 12 inches above the pipe cable transmission line and is considered part of the transmission line.

6. Construction

6.1 Prior to Start of Work

The excavator shall call the Utilities Underground Location Center (ULC) at 1-800-424-5555 to provide the location and the start date of the proposed work. Excavator shall call the ULC at least 10 working days in advance of the excavation.

The excavator shall also contact SCL directly to schedule a Safety Watch at least 10 working days in advance of the excavation at 206-684-4911 between 8 a.m. and 4 p.m. weekdays. For after-hours emergencies only, contact SCL at 206-684-4239.

The excavator shall submit a proposed plan and drawing for temporary support for the pipe cable or duct bank transmission line during excavation for review and approval by the Safety Watch. Temporary support shall:

- Provide isolation from vibration
- Be structurally adequate and provide non-conducting blocking for isolation and protection from damage
- Provide for adequate cooling and thermal expansion
- Have provisions for oil containment
- Include access for SCL along the transmission line for inspection and repair

6.2 Start of Work

The foreman for the excavator shall warn their crew of the extreme danger to themselves by flash, explosion, electrocution, or fire likely to follow rupture of either the pipe or the duct bank. The pipe contains oil at up to 250 psi.

A tailgate meeting shall take place between the SCL Safety Watch and all crew working at the job site, on the first day of work, prior to start of work, and at least every workday thereafter, prior to start of work.

6.3 Excavation Above the Transmission Line

The pavement above the pipe cable or duct bank may be opened using power-driven equipment.

6.4 Excavation Near to and Below the Transmission Line

Excavation at this point shall be performed with hydro-excavation (vactor) methods only, using a suction hose with a soft tip.

CAUTION!

When excavating near a pipe-type transmission line, care should be taken to avoid spraying the pipe directly, which can cause significant damage to the coating! If the pipe is struck, SCL will test for any coating damage using a high voltage holiday detector. This test will be done just prior to thermal backfilling. Any coating repair will be made by SCL.

6.5 Replacement of Thermal Backfill

In cases where underground marking tapes have not been encountered, the excavator shall install marking tape as part of the backfill operation, as follows: two strips, 18 inches below finish grade on opposite sides of the high-voltage line.

Two main scenarios exist for replacement of thermal backfill: backfill for pipe-type high-voltage lines and backfill for concrete-encased duct banks. Procedures for each are discussed in the following subsections.

6.5.1. Backfill for Pipe-Type Transmission Lines

Pipe-type cable is completely encased in a special sand (thermal backfill) to ensure, as far as possible, uniform dissipation of the heat generated by the cables within the pipe. After the excavator has completed work in the vicinity of the pipe that disturbs the thermal backfill, and any needed repair of the coating has been made, the thermal backfill shall be replaced in accordance with the following procedure:

- Using Controlled Density Fill (CDF) trench backfill as described in SCL 7150.30, build up a foundation to a plane 12 inches below the bottom of the pipe. Compact the foundation.
- Using washed No. 2 sand, fill the trench until the lower half of the pipe is covered. Tamp (by hand) along the pipe on both sides until the sand underneath it supports the pipe. Discontinue tamping when the sand is firm and further tamping would tend to raise the pipe.
- Fill the trench with sand to at least 12 inches above the top of the pipe, tamping again for 96% compaction. The pipe should now be surrounded with 12 inches of sand in all directions extending from the pipe.
- Continue backfilling with CDF trench backfill to sub-grade.

6.5.2. Backfill for Concrete-Encased Duct Bank-Type Transmission Lines

Backfill using low-strength fluidized thermal backfill (FTB) per SCL 7150.00.

7. Inspection

The Safety Watch will inspect the following:

- Temporary support of pipe cable or duct bank transmission line
- Backfill materials and procedures
- Use of equipment at each phase of the excavation and installation of equipment
- Protective barriers

The Safety Watch will also inspect damage in the event the excavator strikes a pipe or duct bank, oversee testing of pipe coating, and coordinate repairs as necessary.

8. References

City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction

SCL Material Standard 7150.00; “Fluidized Thermal Backfill”

SCL Material Standard 7150.30; “Controlled Density Fill”

9. Sources

Abbott, Jeremy; SCL Electrical Reviewer and subject matter expert for 1611.05

Edwards, Tommy; SCL Electrical Reviewer and subject matter expert for 1611.05

SCL Construction Standard 0222.02; “Requirements for Primary Conduit and Duct Bank Installation”

Vanderpool, Laura; SCL Technical Writer and Originator of 1611.05