

Backfill Operations, General Requirements



1. Scope

This standard covers the general requirements related to backfill operations.

2. Application

This standard is directed at Seattle City Light (SCL) crews performing backfill operations on or at SCL facilities, property or equipment. Backfill operations include placement of Fluidized Thermal Backfill (FTB), Controlled Density Fill (CDF), rock, sand, select backfill material, native material, and borrow (material imported from sources other than the project site).

3. Industry Standards

Backfill shall meet the applicable requirements of the latest revisions of the following industry standards:

ACI 304; "Measuring, Mixing, Transporting, and Placing Concrete"

ASTM D6913-04; "Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis"

Kathy Tilley

John Shipek

Darnell Cola

4. Backfill Types

Commonly used backfill material types include:

Material	Reference
High Strength FTB (HSFTB)	SCL 7150.00
Low Strength FTB (LSFTB)	SCL 7150.00
Controlled Density Fill (CDF)	City of Seattle Standard 2-10.2(3)A2
Type 2 (1-1/4 in minus crushed rock)	City of Seattle Standard 9-06.16
Type 6 (washed sand)	City of Seattle Standard 9-06.16
Type 17 (select backfill)	City of Seattle Standard 9-06.16
Thermal sand	None
1-1/2 in washed rock	Supplier: Iron Mountain, Lynnwood, WA
Native material	None
Borrow	City of Seattle Standard 2-10.2(2)

Other materials may be used as directed by the engineer.

5. Operation Requirements

5.1 HSFTB and LSFTB

HSFTB and LSFTB shall be placed in accordance with SCL 0226.06. Refer to SCL 7150.00 for a list of approved FTB suppliers.

LSFTB should not be used for backfill around vaults.

5.2 CDF

CDF shall be placed in a manner similar to that of FTB. Refer to City of Seattle Standard 6-02.3(6) for specific placement requirements.

General placement requirements include:

- Cement content shall be 30 lb/yd³ (1/3 sack) unless directed by the engineer.
- Slump shall not exceed 7 in unless approved admixtures are included in the mix.
- For a drop of greater than 5 ft, use of a chute, tremie, pump, or other approved method is required.
- Use of concrete admixtures is permitted with prior approval from the engineer.

5.3 Other Backfill

This section applies to rock, sand, select backfill material, native material, and borrow.

The engineer shall determine the type of backfill used in each application.

Lift (the layers in which soil is placed in a backfill operation) thickness and compaction effort shall be based upon the equipment and material being used. At no time should the lift thickness be greater than 12 in.

Should on site testing be required, backfill materials shall be compacted to a minimum of 95% of the maximum density as determined by the compaction control tests as described in Section 2-11.3(2) ("Compaction Control Tests") of the 2014 Standard Specifications. The determination of which test procedure to use will be made solely by the engineer.

Tractors, excavators or other heavy equipment shall not be used within 2 ft of a structure or utility to avoid potential damage. Where compaction is required within 2 ft of a structure or utility, or is inaccessible by large equipment (such as a vibratory roller), smaller, lighter equipment (such as a jumping jack or hoe pack) and smaller lifts shall be used to achieve the required compaction.

If native or borrow material is used, all rock or other materials larger than 3 inches in diameter shall be removed. In addition, any organic material such as wood shall be removed.

5.4 Disposal of Excavated Materials

Excavated materials which is in excess of the needs of the project shall be recycled or disposed of in accordance with all local, state and federal regulations

6. References

SCL Construction Standard 0222.02; "Requirements for Duct Banks on the Right of Way"

SCL Construction Standard 0226.06; "Installation of Fluidized Thermal Backfill"

SCL Construction Standard 7150.30; "Controlled Density Fill (CDF)"

SCL Design Standard 9262.50; "Backfill Selection"

City of Seattle Standard Specifications for Road, Bridge and Municipal Construction 2014 ("2014 Standard Specifications"); Section 2-10, "Backfilling"

City of Seattle Standard Specifications for Road, Bridge and Municipal Construction 2014 ("2014 Standard Specifications"); Section 2-11, "Compaction"

City of Seattle Standard Specifications for Road, Bridge and Municipal Construction 2014 ("2014 Standard Specifications"); Section 6-02.3(6), "Placing Concrete"

City of Seattle Standard Specifications for Road, Bridge and Municipal Construction 2014 ("2014 Standard Specifications"); Section 9-03.16, "Mineral Aggregate Chart"

7. Sources

Hamlin, Pam; SCL Civil Engineer and subject matter expert for 0226.11, (pam.hamlin@seattle.gov)

Stewart, Bob; SCL Inspector and subject matter expert for 0226.11, (bob.stewart@seattle.gov)