

## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 ASTM C117-04, Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 136-06, Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D 422-63(2007), Method for Particle-Size Analysis of Soils.
- .4 ASTM D698-12, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
- .5 ASTM D 1557-12, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2,700 kN-m/m<sup>3</sup>).
- .6 ASTM D4318-10, Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .7 CAN/CGSB-8.1-09 Sieves, Testing, Woven Wire, Metric.
- .8 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction

### 1.2 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
  - .1 Rock excavation: any solid material in excess of 0.50 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavation equipment having a 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material will not be classified as rock.
  - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in work.

## 1.2 DEFINITIONS (Cont'd)

- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
  - .4 Waste material: excavated material unsuitable for use in work or surplus to requirements.
  - .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
  - .6 Unsuitable materials:
    - .1 Weak and compressible materials under excavated areas.
    - .2 Frost susceptible materials.
      - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318-00, and gradation within limits specified when tested to ASTM D 422-63(2002) and ASTM C 136-01: Sieve sizes to CAN/CGSB-8.1-88.
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|-------------------|----------|
| Sieve Designation | %Passing |
| 2.00 mm           | 100      |
| 0.10 mm           | 45-100   |
| 0.02 mm           | 10-80    |
| 0.005 mm          | 0-45     |
- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
  - .7 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

## 1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 -Submittal Procedure.
- .2 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.
- .3 Submit 70 kg samples of type of fill specified including representative samples of excavated material if applicable.

1.4 PROTECTION OF  
EXISTING FEATURES

- .1 Existing buried utilities and structures:
- .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .2 Prior to commencing excavation work, notify applicable owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
  - .3 Confirm locations of buried utilities by careful test excavations.
  - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and any structures encountered as may be indicated on drawings.
  - .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such work to be paid by. Departmental Representative.
  - .6 Record location of maintained, re-routed and abandoned underground lines.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 to Type 5 fill: properties and the following requirements:
- .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C 136-01 and ASTM C 117-95. Sieve sizes to CAN/CGSB-8.1-88.
  - .3 Durability requirement: max 40% loss in the LA Abrasion test - ASTM C 131-01 or C535 for fill types 1, 2 and 3.
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Designation

	Type 1	Type 2	Type 3	Type 4
75 mm	-	100	-	-
50 mm	-	-	-	-
37.5 mm	-	-	100	-
31.5 mm	-	-	90-100	-
25 mm	-	60-84	-	-
19 mm	100	35-69	75-100	-
12.5 mm	40-80	-	-	-
9.5 mm	20-62	25-54	55-85	-
4.75 mm	0-20	17-43	35-65	100
2.36 mm	0-10	12-35	-	30-100
1.18 mm	-	8-28	-	-
0.300 mm	-	4-16	5-20	10-50
0.075 mm	0-3	0-7	0-7	0-10

- .2 Construction barrier:  
.1 High density polyethylene fence 1200 mm high, complete with steel "T" posts at 1200 mm OC.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- .1 Remove obstructions from surfaces to be excavated within limits indicated.  
.2 Install temporary backfill material in areas required to accommodate access to the building.

3.2 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.  
.2 Protect open excavations against flooding and damage due to surface run-off.

3.3 EXCAVATION

- .1 Advise Departmental Representative at least 3 days in advance of excavation operations for initial cross sections to be taken.  
.2 Excavate to lines, grades, elevations and dimensions required for removal of existing building components.

3.3 EXCAVATION  
(Cont'd)

- .3 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .4 Dispose of surplus and unsuitable excavated material in approved location off site.
- .5 Do not obstruct flow of surface drainage or natural watercourses.
- .6 Correct unauthorized over-excavation as follows:
  - .1 Fill site with Type 2 fill compacted to not less than 98% of corrected maximum dry density, or selected crushed site material approved by the Departmental Representative.

3.4 FILL TYPES AND  
COMPACTION

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.
  - .1 Within excavated area: use Type 2 to existing grade line, or selected site crushed material approved by the Departmental Representative. Compact to 98%.

3.5 BACKFILLING

- .1 Vibratory compaction equipment: suitable to produce the compaction densities as specified.
  - .2 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
  - .3 Areas to be backfilled to be free from debris, water and frozen ground.
  - .4 Do not use backfill material which contains debris.
  - .5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
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3.6 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects to satisfaction of Departmental Representative.
- .2 Remove any temporary backfill material used for building access.
- .3 Clean and reinstate areas affected by work to satisfaction of Departmental Representative.
- .4 All new fill to be rough graded to existing grade lines. Slope fill to facilitate positive drainage, and prevent ponding.