

PART 1 - GENERAL

1.1 Related Work

- .1 Section 01 35 43 - Environmental Procedures
- .2 Section 31 23 33.01 - Excavating Trenching and Backfilling

1.2 Site Conditions

- .1 Known underground and surface utility lines and buried objects are indicated on site plan.

1.3 Protection

- .1 Prevent damage to any landscaping, existing trees, existing pavement, and surface or underground utility lines which are to remain. Make good any damage.

PART 2 - PRODUCTS

2.1 Materials

- .1 Fill material: Type 4 in accordance with Part 2 of Section 31 23 33.01 - Excavating Trenching and Backfilling
- .2 Obtain approval of excavated or graded material used as fill for grading work. Protect approved material from contamination and freezing.

PART 3 - EXECUTION

3.1 Removal of Topsoil

- .1 Refer to Section 32 91 19.13 - Topsoil Placement and Grading.

3.2 Grading

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
  - .2 Slope rough grade away from building 1:50 minimum.
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- .3 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .4 Compact filled and disturbed areas to corrected maximum dry density. maximum dry density to ASTM D698-78, method C D, as follows:
  - .1 85% under landscaped areas.
  - .2 100% under Paved and walk areas.

### 3.3 Testing

- .1 Inspection and testing of soil compaction will be carried out by designated testing laboratory.
- .2 Costs of tests will be paid by Departmental Representative

### 3.4 Surplus Material

- .1 Remove surplus material from site.
- .2 Remove material unsuitable for fill, grading or landscaping from site.

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END

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PART 1 - GENERAL

1.1 Work Included

- .1 This section specifies requirements for furnishing all materials, labour, tools and equipment and performing all operations necessary to complete excavation of all types of material encountered, placing of excavated material as backfill in trenches and embankments, disposal of unsuitable and surplus material and furnishing backfill material as specified below, all as shown on the drawings and as specified; see also Section 31 22 13 - Rough Grading.
- .2 The work generally includes, but is not necessarily limited to the following items:
  - .1 Trench excavation and backfilling for pipelines and appurtenances.
  - .2 Structure excavation and backfilling.
  - .3 Control of water by dewatering.
  - .4 Providing borrow material when required.
  - .5 Removal and disposal of surplus and/or unsuitable material.
  - .6 Sheet piling, shoring, trench box and bracing to support trench walls, sides of excavations, existing structures or utilities.
  - .7 Stripping, stockpiling and replacing topsoil.

1.2 Protection of Existing Features

- .1 Existing buried utilities and structures:
  - .1 Size, depth and location of existing utilities and structures as indicated on the drawings are for guidance only. Completeness and accuracy are not guaranteed.
  - .2 Prior to commencing any excavation work, notify applicable Departmental Representative or authorities, establish location and state of use of buried utilities and structures. 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 structures encountered as indicated. Obtain direction of Departmental Representative before moving or otherwise disturbing utilities or structures.
  - .5 Advise Departmental Representative to remove or re-route existing lines in area of excavation not otherwise on drawings. Pay costs for such work.
- .2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, and paving, survey bench marks and monuments which may be affected by work at no additional cost.

.2 Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.

.3 Where excavation necessitates root or branch cutting, do so only as approved by Departmental Representative.

### 1.3 Support of Excavation

- .1 Suitably slope or properly shore sides of excavations according to site conditions, all in accordance with the Provincial Safety Act. Provide use of support as considered necessary.
- .2 The choice of any method of support shall be the responsibility of the Contractor. However, drawings and calculations for the method of support selected, including trench boxes, designed by a qualified professional engineer in accordance with the Provincial safety requirements, are to be submitted to the Departmental Representative for information prior to its use.
- .3 If it is desirable that any support, other than that which may be shown on the drawings, be left in the excavations, then the Departmental Representative will issue instructions accordingly.
- .4 Take every precaution against slips or falls, but if any should occur, at once make good the same. If any such slip or fall affects or may affect the stability of the permanent work, execute such remedial work as necessary, including filling up of any space left by the slip or fall with approved granular material.

### 1.4 Samples

- .1 At least 1 week prior to commencing work, inform Departmental Representative of proposed source of fill materials and provide access for sampling.
- .2 Submit samples in accordance with Section 01 33 00 Submittal Procedures.

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PART 2 - PRODUCTS

2.1 Materials

- .1 Type 1 fill: Granular Class A as per Department of Transportation, Infrastructure & Energy, Division 401 (Imported).
- .2 Type 2 fill: Select Borrow: Select Borrow shall be non-plastic and composed of clean, uncoated particles free from lumps of clay or other deleterious material with a maximum particle size of 100mm and a maximum of 30% of the material passing the 4.75mm sieve shall pass the 75mm sieve.
- .3 Type 3 fill: clean, washed, coarse sand free from clay shale and organic matter.

Clean Sand Gradation

<u>Sieve size</u>	<u>Percent Passing</u>
10 mm	100
2.5 mm	80-90
0.630 mm	25-75
0.315 mm	10-35
0.160 mm	10-17
0.075 mm	0-5

- .4 Type 4 fill: Common Fill: Selected material from excavation or other sources, approved by the Departmental Representative for use intended, unfrozen and free from rocks larger than 75mm, cinders, ashes, sods, refuse or other deleterious material.

PART 3 - EXECUTION

3.1 Site Preparation

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Strip topsoil from within limits of excavation and stockpile as directed by Departmental Representative, for respreading after backfilling.
- .3 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

### 3.2 Stockpiling

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

### 3.3 Dewatering

- .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 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

### 3.4 Excavation

- .1 Excavate to lines, grades, elevations and dimensions indicated or as directed by Departmental Representative.
- .2 Excavate in all kinds of materials encountered and make own computations of amounts and nature of excavation required.
- .3 Remove concrete masonry paving walks demolished foundations and rubble and other obstructions encountered during excavation.
- .4 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .5 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Seal cuts with approved tree wound dressing.
- .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m(60ft) of trench in advance of installation operations and do not leave open more than 15 m(30ft) at end of day's operation.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.

- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Notify Departmental Representative when soil at bottom of excavation appears unsuitable and proceed as directed by Departmental Representative.
- .11 Remove unsuitable material from trench bottom to extent and depth directed by Departmental Representative.
- .12 Where required due to unauthorized over-excavation, correct as follows:
  - .1 Fill under bearing surfaces and footings with concrete specified for footings.
  - .2 Fill under other areas with Type 3 fill compacted to minimum of 98% corrected maximum dry density. (SPMDD)
- .13 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- .14 Obtain Departmental Representative's approval of completed excavation.

### 3.5 Excavation and Backfilling Required For Other Trades

- .1 Excavate trenches to lines and grades shown to a minimum of 150 mm(6") below underside of pipe, conduit, cable, or duct.  
  
Provide recesses for bell and spigot pipe to ensure bearing will occur along barrel of pipe.
- .2 Cut trenches 600 mm(24") wide (or wider where indicated) than maximum pipe width. Trim and shape trench bottoms and leave free of irregularities, lumps, or projections.

### 3.6 Fill Types and Compaction

- .1 Use fill of types as indicated or specified below. Unless otherwise specified, compact to following densities:
  - .1 Type 1: 100% corrected maximum dry density.
  - .2 Type 2: 100% corrected maximum dry density.
  - .3 Type 3: 100% corrected maximum dry density.
  - .4 Type 4: 95% corrected maximum dry density.

- .2 Exterior side of perimeter walls: Use Type 3 fill to subgrade level.
- .3 Within building area: Use Type 2 to underside of base course for floor slabs.
- .4 Under Light Duty Asphalt Paving:
  - .1 Provide minimum 150mm Type 1 fill to underside of asphalt.
  - .2 Provide minimum 300mm Type 2 fill from compacted subgrade to underside of Type 1 fill specified above and as indicated.
- .5 Under Interior Concrete Slab-on-grade:
  - .1 Provide minimum 100mm base course of Type 1 fill to underside of concrete.
- .6 Underground services within building area:
  - .1 Cradle half diameter of pipe or conduit using Type 3 fill. After pipe or conduit is in place cover with Type 2 fill to underside of sand base course for floor slabs.
    - .1 Compact bedding and cover to 98% density
    - .2 Notify Departmental Representative prior to backfilling of trenches.
- .7 Underground services outside building area:
  - .1 Trench preparation:
    - .1 Trench shall be true to the alignment and depth required and only so far in advance of the pipe laying as directed.
    - .2 The minimum width of trench shall be 600mm greater than the normal diameter of pipe.
    - .3 Pipe trench shall be shaped to give even bearing for length of pipe.
    - .4 Boulders and rock shall be removed or excavated to provide a clearance of at least 150mm below pipe.
  - .2 Trench Bottom Preparation:
    - .1 Where required due to removal of unsuitable material or unauthorized over-excavation, bring bottom of excavation to design grade with approved material.
    - .2 Compact trench bottom to density at least equal to density of adjacent surrounding soil.
  - .3 Pre-Installation Inspection:
    - .1 Excavations require inspection and approval prior to commencement of installation operations.
  - .4 Pipe / Conduit Bedding:
    - .1 Bedding for sanitary sewer to be Type 3 fill compacted to 95% standard proctor from 150 mm below pipe invert to 300 mm above the top of pipe.
  - .5 Use Type 4 fill to rough grade for pipe or conduit



cover:

- .1 In non-pavement areas: to a density of 95% standard proctor density.
  - .2 In Pavement areas: compact to 100% standard proctor density and provide 600mm of Type 2 fill and 150mm of Type 1 fill under asphalt surface.
- .8 Site backfill under seeded and sodded areas:
- .1 Use Type 4 fill material to bring exterior site up to rough grades required or as indicated.

### 3.7 Backfilling

- .1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Backfilling around installations.
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in- place concrete within 24 h after placing.
  - .3 Place layers simultaneously on both sides of installed work to equalize loading.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative or:
    - .2 If approved by Departmental Representative erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
  - .5 Place material by hand under, around and over installations until 600 mm of cover is provided. Dumping material directly on installations will not be permitted.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

### 3.8 Backfilling Trenches

- .1 Backfill trench from top of bedding to top of grades indicated using materials shown on drawings.
- .2 Place backfill in 300 mm horizontal layers and compact to 95% Standard Proctor density except to 100% Standard Proctor density under existing or proposed asphalt. Thoroughly compact each layer before placing next layer. Carry out compaction tests to demonstrate the effectiveness of backfill thickness per lift versus the number of passes with the selected equipment to achieve the specified compaction.
- .3 During backfilling keep trenches free of water at all times and controlled so as to prevent surface water running into excavated areas. Remove silty materials which become wetted and subsequently liquid or extremely plastic

### 3.9 Restoration

- .1 Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Departmental Representative.
- .2 Replace topsoil as indicated or directed by Departmental Representative. Reseed grass or sod as indicated.
- .3 Clean and reinstate areas affected by work as directed by Departmental Representative.

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END

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