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**EXCAVATION, TRENCHING & BACKFILLING**

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**PART 1 GENERAL****1.1 Description of Work**

- .1 The section refers to excavation, trenching, backfilling and all Work pertaining thereto.

**1.2 Related Work**

- .1 All Division 1 Specification Sections  
.2 Section [01561](#) ..... Environmental Protection  
.3 Section [02233](#) ..... Granular Base  
.4 Section [02311](#) ..... Site Grading  
.5 Section [02901](#) ..... Tree & Shrub Preservation  
.6 Section [02911](#) ..... Site Topsoil & Finish Grading

**1.3 Definitions**

- .1 Common excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment.
- .2 Rock excavation: Excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m<sup>3</sup>. Frozen material not classified as rock.
- .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.

**1.4 Coordination**

- .1 Coordinate Work specified in this Section with pipe, bedding and other related Work specified in other Sections.

**1.5 Samples**

- .1 Inform the Consultant of proposed source of fill materials and provide access for sampling.
- .2 Reviewed and accepted samples will be standards for Workmanship and materials against which installed Work will be verified.

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- .3 Reviewed and accepted samples will be standards for workmanship and materials against which installed work will be verified.

**1.6 Protection of Existing Features**

- .1 Existing buried utilities and structures:
  - .1 Prior to commencing any excavation Work, notify owner or authorities; establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.
  - .2 Confirm locations of buried utilities by careful test excavations.
  - .3 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .4 Obtain direction of Consultant before moving or otherwise disturbing utilities or structures.
  - .5 Advise utility company to reroute existing lines in area of excavation. Costs for such Work will be paid by contractor.
  - .6 Record location of maintained, re-routed, and abandoned underground lines.
- .2 Existing buildings and surface features:
  - .1 Conduct, with Consultant, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage which may be affected by Work while Work is in progress and repair damage resulting from Work.
  - .3 Where excavation necessitates root or branch cutting, do so only in accordance with Section [02901](#) - **Shrub & Tree Preservation**.

**1.7 Imported Fill Supply & Testing**

- .1 Prior to commencing Work, Contractor is to inform the Consultant of

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the proposed source of fill materials and provide a Geotechnical Engineers assurance letter indicating that all imported material meets current Ministry of the Environment (MOE) standards.

- .2 Material Tests: Include with the list of material sources three (3) copies of gradation analysis and a moisture density relation analysis for granular backfill materials.

### **PART 2 PRODUCTS**

#### **1.8 Materials**

- .1 Refer to the Contract Document drawings and details for required backfill materials. Only crusher run limestone will be used for walkway and concrete base.
- .2 Type 1 (19 mm 'Crusher Run' limestone) fill: clean, hard, durable crushed limestone, free from shale clay, organic matter and other deleterious substances and graded as follows:

<u>Sieve designation</u>	<u>% Passing</u>
25 mm	100
16 mm	75-95
#4	35-55
#16	15-35
#50	7-20
#200	3-10

- .3 Type 2 (50mm crushed limestone) fill: clean, hard, durable, crushed limestone, free from shale, clay, friable materials, organic matter and other deleterious substances in accordance with the following graduations:

<u>Sieve designation</u>	<u>% Passing</u>
63mm	100
50mm	85-100
33mm	70-90
25mm	55-75
16mm	40-50
#4	20-35
#16	10-23
#50	5-12
#200	2-6

- .4 Type 3 (Granular A) fill: clean granular material conforming to OPSS

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1010 - Granular A.

- .5 Type 4 (Granular B) fill: clean granular material conforming to OPSS 1010 - Granular B.
- .6 Type 5 fill: selected compactable material from excavation or other sources, approved by Consultant for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

**PART 3 EXECUTION****3.1 Site Preparation**

- .1 Remove all brush, weeds, grasses, ice, snow and accumulated obstructions from surfaces to be excavated within limits indicated.
- .2 Saw-cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly. Concrete curbs and sidewalks shall be sawn at existing joints.
- .3 For trench work in landscaped statutory right-of-way, carefully remove fences, shrubs, small trees and other items for replacement after backfilling is completed.

**3.2 Surface Conditions**

- .1 Inspection: Inspect the existing Work of all other trades on which the Work of this Section is dependant, and verify that all such Work is complete to the extent that the excavation and backfill may commence.
- .2 Site Preparation: Remove obstructions, ice and snow from surfaces to be excavated within limits indicated.

**3.3 Stripping of Topsoil**

- .1 See Section [02234](#) – **Topsoil Preservation** and Section [02311](#) - **Site Grading**.

**3.4 Stockpiling**

- .1 Stockpile materials where designated by the Consultant. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

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**3.5 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 under construction.
- .4 Submit details of proposed Dewatering methods, such as well points or filter socks for Consultant Approval.

**3.6 Excavation**

- .1 Excavate to lines, grades, elevations, and dimensions indicated or as directed by the Consultant.
- .2 Remove and dispose off site any obstructions encountered during excavation.
- .3 Excavation must not interfere with normal 45 degree splay of bearing from bottom of any footing.
- .4 For trench excavation, do not excavate more than 30m of trench in advance of installation operations and do not leave open more than 5 m at end of day's operation unless otherwise authorized by the Consultant in writing. Provide appropriate hoarding to protect public from injuries.
- .5 Dispose of surplus and unsuitable excavated material off site.
- .6 Do not obstruct flow of surface drainage or natural watercourses.
- .7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .8 Notify the Consultant when soil at bottom of excavation appears unsuitable and proceed as directed by the Consultant.
- .9 Obtain approval of completed excavation from the Consultant prior to backfilling.
- .10 Remove unsuitable material from trench bottom to extent and depth directed by the Consultant.

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- .11 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 4 fill compacted to minimum of 98% standard proctor maximum dry density to ASTM D698-78, method D.
  - .3 Hand trim, make firm and remove loose material and debris from excavations. Compact disturbed foundation soil to a density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of the Consultant.
- .12 Dewatering: keep excavations free of water while backfilling walls. Protect open excavations against flooding and damage due to surface run-off. Dispose of water in a manner not detrimental to public and private property, or any portion of Work completed or under construction.

**3.7 Cofferdams, Shoring, Bracing and Underpinning**

- .1 Codes and Regulations: Comply with the Building Code and applicable local regulations.
- .2 Conflicting Requirements: The more stringent requirements shall govern conflicts with Building Codes and Requirements, the reference standards or these specifications.
- .3 Construct temporary Works to depths, heights and locations as necessary.
- .4 During backfill operation:
  - .1 Unless otherwise indicated or directed by the Consultant, remove shoring from excavations.
  - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.

**3.8 Fill types and Compaction**

- .1 Use fill of types as indicated or specified, compact to following densities: 98% maximum dry density to ASTM D698-78, Method D.

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- .2 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 98% S.P.D.
- .3 Retaining walls: use Type 1 fill to subgrade level on high side and compact to 98% maximum density to ASTM D698-78, method D.

**3.9 Backfilling**

- .1 Do not proceed with backfilling operations until the Consultant has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Install drainage system in backfill as indicated or directed by the Consultant.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Other Materials: Excavated materials approved for re-use by the Consultants shall be compacted to 100% Standard Proctor Density.
- .7 Granular Backfill:
  - .1 Ensure the placement of sub-drains clear stone trenches and filter fabric are correct prior to placing backfill behind and under retaining walls.
  - .2 Proof roll subgrade where applicable, with vibratory roller to the Consultants approval prior to placement of granular backfill.
  - .3 Place fill material in 150mm loose layers, bring to proper moisture content and compact.
  - .4 Compact all granular backfills to min. 98% Standard Proctor Density.

**3.10 Backfilling Around Installations**

- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within twenty-four (24) hours after placing of concrete.

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- .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 600 mm.
- .4 Do not backfill where temporary unbalanced earth pressures are liable to develop on walls or other structures.
- .5 Permit concrete to cure for minimum fourteen (14) days or until it has sufficient strength to withstand earth and compaction pressure, and approval obtained from the Consultant.
- .6 Erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by the Consultant.
- .7 Do not place, spread or compact any fill or backfill materials during unfavourable weather.
- .8 Do not commence any fill or backfill operation without adequate compaction equipment on site.
- .9 Do not proceed with backfilling operations until the Consultant has inspected and approved installations.

**3.11 Restoration**

- .1 Upon completion of Work, the Contractor is to remove surplus materials and debris; trim slopes, and correct defects as directed by the Consultant.
- .2 Replace topsoil as indicated in Section [02911 Site Topsoil & Finish Grading](#).
- .3 Reinstate asphalt pavement and concrete sidewalks and all sodded areas to condition and elevations indicated on the Contract Document drawings.
- .4 Clean and reinstate areas affected by Work as directed by the Consultant.

**3.12 Disposal of Excavated Material**

- .1 Surplus or waste excavated material shall be removed during the excavation or backfilling operations and shall not be left along the trench following the completion of backfilling the trench.
- .2 Surplus excavated material which is not required as shown on the drawings or specified elsewhere herein shall be disposed of at sites



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obtained by the contractor. Waste material is not permitted to be dumped on private property without written permission and a fill permit obtained by the Owner.

**END OF SECTION - 02315**