

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 00 10 – General Instructions.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 33 31 13 - Public Sanitary Utility Sewerage Piping.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117- 13, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136/C136M-14 01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63 (2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698- 12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D4318- 10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD).
 - .1 OPSS 1001 – November 2013, Material Specification for Aggregates – General.
 - .2 OPSS 1010 – April 2013, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material.
 - .3 OPSS 1605 – November 2010, Material Specification for Extruded Expanded Polystyrene Pavement Insulation.
 - .4 OPSS 1802 – November 2008, Material Specification for Smooth Walled Steel Pipe.
 - .5 OPSS 1860 – April 2012, Material Specification for Geotextiles.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000- 13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001- 03, Cementitious Materials for Use in Concrete.
 - .2 CAN/CSA-A23.1/A23.2- 14(August 2014), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: any solid material in excess of 1.00 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment. Frozen material is not 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.
- .3 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters (1 inch) in any dimension.
- .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 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136 : Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
 - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
 - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 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.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 00 10 – General Instructions.
- .2 Preconstruction Submittals:

- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, or location plan of relocated and abandoned services, as required.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 00 10 – General Instructions.
 - .2 Inform Departmental Representative at least 4 weeks prior to beginning 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.
 - .4 Ship samples prepaid to Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

- .1 Submit design and supporting data at least 3 weeks prior to beginning Work.
- .2 Design documents/drawings and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.
- .3 Keep design and supporting data on site.
- .4 Engage services of qualified professional Engineer (s) who are registered and licensed in Province of Ontario, Canada in which Work is to design and verify on-site the installation of any temporary work and /or excavation support system required to complete the excavation and installation of the proposed equipment's/piping, etc.. in a safe and efficient matter and in such a way to protect surroundings buildings/structures and underground services
- .5 Do not use any imported or on-site material for backfilling purposes until they are approved by Departmental Representative.
- .6 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements .

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Storage and Protection:
 - .1 Protect existing features in accordance with applicable local regulations.
 - .2 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 beginning excavation Work, notify applicable Departmental Representative and authorities having jurisdiction to establish location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
 - .3 Provide copies of all locate sheets to departmental representative prior to any excavation work.
 - .4 Confirm locations of buried utilities by careful soil hydrovac methods.

- .5 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
- .6 Record location of maintained, re-routed and abandoned underground lines.
- .7 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
 - .1 Complete a detailed site reconnaissance and take all measures required to complete the proposed work without negatively impacting the existing structures and site services;
 - .2 Conduct at your own expense with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work. Conduct survey for structures/features located east, west, and south of proposed work as indicated on the plan. Provide the condition survey report at least 2 weeks prior to start of work for review by the Departmental Representative,
 - .3 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair at your own cost as directed by Departmental Representative.
- .2 Construction/Demolition Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 00 10 – General Instructions.
 - .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Place materials defined as hazardous or toxic in designated containers.
 - .4 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
 - .5 Ensure emptied containers are sealed and stored safely.
 - .6 Divert excess materials from landfill to local recycling facility for reuse as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular 'A' Type fill: As defined in Section 32 11 23 - Aggregate Base Course.
- .2 Granular 'B' Type II fill: As defined in Section 32 11 16.01 - Granular Sub Base.
- .3 Selected Subgrade Material (SSM) fill: selected material from excavation or other sources, approved by Departmental Representation for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .4 Native Material: Excavated Sand Material with the following criteria
 - .1 Material free of Organic, debris, etc..
 - .2 Material with a moisture content within +/- 2 percent of the Optimum value as determined by ASTM 698-12e1.
- .5 Geotextile: non-woven textile as per OPSS 1860.

- .6 Insulation: As defined in Section 07 21 13 – Board Insulation.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.
- .3 Arrange and Pay for locates of all underground services in the area of the proposed work inclusive of private services that are shown on the project drawings.
- .4 Daylight identified services and utilities by hydrovac and/or hand excavation to confirm existing infrastructure elevations within all working limits prior to any major excavation operations. Expose adjacent underside of existing footing if impacted by the excavation. Immediately report any potential conflicts to the Departmental Representative.

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 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.3 EXCAVATION

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations.
- .2 Excavate to lines, grades, elevations and dimensions as indicated or as directed by Departmental Representative.
- .3 Conduct excavation work taking full consideration the prevailing subsurface and groundwater condition. Method and sequence of the excavation will be the sole responsibility of the contractor. Employ the services of qualified geotechnical engineer to assist you in the design of the method of the excavation taking into consideration the prevailing subsurface condition (soil and groundwater), water level, surrounding buildings, vibration limitation, drawdown and settlement limits, and depth to be excavated, etc..
- .4 Remove all obstructions encountered during excavation.
- .5 Excavation must not interfere with bearing capacity of adjacent foundations.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material in approved location off site.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.

- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .14 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Granular 'A' fill compacted to not less than 100 % of corrected Standard Proctor maximum dry density or lean mix concrete.
 - .2 Fill under other areas with Granular 'B' fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .15 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout.

3.4 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 -12e1
 - .1 Under bearing surfaces and structures; use OPSS 1010 Granular A or B Type II in 300 mm thickness and compact to 100 % of Maximum dry density.

3.5 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact 300mm of Granular "A" as per Section 32 11 23 Aggregate Base Course for bedding and Granular "A" to 300mm above pipe for surround of underground services. Compact to at least 95 % of the standard maximum dry density.
- .2 Place and compact 300mm of mortar sand as per Item 2.1.5 for bedding, cover and surround material. Compact to at least 95 % of the standard maximum dry density.
- .3 Place bedding and surround material in unfrozen condition.

3.6 BACKFILLING

- .1 Follow the requirement of Section 3.3
- .2 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

3.7 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 00 10 – General Instructions, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as indicated or as directed by Departmental Representative.
- .3 Reinstall lawns to elevation which existed before excavation.
- .4 Reinstall pavements in accordance with section 32 12 16 Asphalt Paving and sidewalks disturbed by excavation and as per drawing details.
- .5 Clean and reinstall areas affected by Work as directed by Departmental Representative.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

