PART 1 - GENERAL

1.1 Related Sections

.1 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D 698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ^{3}).

1.3 Existing Conditions

.1 Location of underground surface utility lines and buried objects are unknown. Contractor to trace lines from main building, as specified in other Sections of this Specification.

1.4 Protection

.1 Protect and/or transplant existing fencing trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

PART 2 - PRODUCTS

2.1 Materials

.1 Excavated or graded material existing on site may be suitable to use as fill for grading work if

approved by Departmental Representative.

.2 Broken down foundations not suitable for backfill. Dispose of material off site at an approved Construction and Demolition waste facility.

PART 3 - EXECUTION

3.1 Stripping of Topsoil

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Departmental Representative.

.2 Strip topsoil to depths as required. Avoid mixing topsoil with subsoil.

.3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

.4 Dispose of unused topsoil to location as indicated as directed by Departmental Representative.

3.2 Grading

.1 Grade all areas of backfill and those identified by construction operations to finished grades.

.2 Grade ditches to depth required for maximum run-off.

.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 maximum dry density of 95% to ASTM D698.

.5 Do not disturb soil within branch spread of trees

or shrubs to remain.

3.3 Testing

.1 Inspection and testing of soil compaction to be carried out by testing laboratory designated by Departmental Representative as deemed required by the Departmental Representative. Cost to be borne by the Departmental Representative.

3.4 Surplus Material

.1 Remove surplus material and material unsuitable for fill or grading as directed by Departmental Representative.

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 02 41 13 - Structure Demolition

1.2 MEASUREMENT PROCEDURES

.1 Refer to Section 01 22 00 - Measurement and Payment.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft ^{3}) (600 kN-m/m ^{3}).

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submittals:

.1 Submit erosion and sedimentation control plan.

.3 Quality Control:

.1 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.

.2 Submit to Departmental Representative written notice at least 3 days prior to excavation work.

.3 Submit to Departmental Representative written notice when bottom of excavation is reached.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 28 - Health and Safety Requirements.

1.6 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill or grading as directed by Departmental Representative.

1.7 EXISTING CONDITIONS

.1 Buried services:

.1 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures.

.2 Confirm locations of buried utilities by careful test excavations.

.3 Water Lines: locate existing service lines and remove and cap in a manner acceptable to local authority, and backfill. Comply with applicable provincial regulations. Record and photograph the location of capped lateral line, in accordance with Section 01 78 00 - Closeout Submittals.

.4 Sewer Lines: locate existing sewer lines, purge existing content, remove and dispose of lines in accordance with authority having jurisdiction and backfill. Record and photograph the location of capped lateral line, in accordance with Section 01 78 00 - Closeout Submittals.

.5 Electrical Services: Disconnect electrical supply lines at both ends. If underground, the disconnected lines are to be left in place after disconnection.

.6 Where unexpected utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing/re-routing.

.7 Record location of maintained, re-routed and abandoned underground lines.

.2 Existing buildings and surface features:

.1 Conduct, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which

may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Backfill Material: 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 materials.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated.

3.3 PREPARATION /PROTECTION

.1 Protect existing features in accordance with applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in approved by Departmental Representative.

.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.

3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Contractor will determine if at any time any of these items are required, and make arrangements, pay for the materials and equipment, submit method as per section 01 33 00.

3.6 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative review of details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.
.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.7 EXCAVATION

.1 Advise Departmental Representative at least 3 days in advance of excavation operations.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Do not disturb soil within branch spread of trees or shrubs that are to remain.
.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.6 Restrict vehicle operations directly adjacent to open trenches.

.7 Dispose of surplus and unsuitable excavated material in approved location on site 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 bottom of excavation is reached.

.11 Obtain Departmental Representative approval of completed excavation.

.12 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

3.8 FILL TYPES AND COMPACTION

.1 Use fill material as described in Clause 2.1 above.

.2 Compact filled and disturbed areas to maximum dry density of 95% to ASTM D 698.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Not Used.

3.10 BACKFILLING

.1 Vibratory compaction equipment: as required to achieve specified density.

.2 Do not proceed with backfilling operations until completion of following:
.1 Departmental Representative has inspected and approved of construction below finish grade.
.2 Recording location of underground utilities and footprint of main building.
.3 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.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 150 mm compacted thickness. Compact each layer before placing succeeding layer.

.6 Backfilling around installations:
.1 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.6 m.
.2 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
.1 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.3 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.