

Part 1 - General

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| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 01 10 10 - General Instructions   |
|                                 | .2 | Section 01 35 29.06 - Health and Safety Requirements  |
| <u>1.2 REFERENCES</u>           | .1 | American Society for Testing and Materials International (ASTM)   |
|                                 | .1 | ASTM C117, Standard Test Method for Material Finer Than 0.080 mm Sieve in Mineral Aggregates by Washing.  |
|                                 | .2 | ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.   |
|                                 | .3 | ASTM D422 63, Standard Test Method for Particle Size Analysis of Soils.   |
|                                 | .4 | ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft <sup>3</sup> (2,700 kN-m/m <sup>3</sup> )) |
|                                 | .5 | ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.   |
|                                 | .2 | Latest edition of Canadian General Standards Board (CGSB)   |
|                                 | .1 | CAN/CGSB 8.1, Sieves, Testing, Woven Wire, Inch Series.   |
|                                 | .2 | CAN/CGSB 8.2, Sieves, Testing, Woven Wire, Metric.  |
|                                 | .3 | Latest edition of New Brunswick Department of Transportation (NBDTI) Standard Specifications  |
| <u>1.3 DEFINITIONS</u>          | .1 | Excavation class: one class of excavation will be recognized: common excavation.  |
|                                 | .2 | Common excavation: excavation of materials of whatever nature   |
|                                 | .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 25mm 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.

1.4 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Preconstruction Submittals:
  - .1 Submit records of underground utility locates, indicating: location plan of relocated and abandoned services to Departmental Representative, as required.
- .3 Samples:
  - .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.
  - .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
  - .3 Ship samples to Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.
- .4 Make submittals in accordance with Section

01 33 00 - Submittal Procedures.

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| <u>1.5 QUALITY ASSURANCE</u>             | .1 | Qualification Statement: submit proof of insurance coverage for professional liability.   |
|  | .2 | Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.                          |
|  | .3 | Health and Safety Requirements:   |
|  | .1 | Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.                               |
| <u>1.6 WASTE MANAGEMENT AND DISPOSAL</u> | .1 | Separate waste materials for recycling where appropriate.   |
| <u>1.7 EXISTING CONDITIONS</u>           | .1 | Buried services:  |
|  | .1 | Before commencing work establish location of buried services on and adjacent to site. Clearly mark such locations to prevent disturbance during Work. |
|  | .2 | Arrange with appropriate authority for relocation of buried services that interfere with execution of work.   |
|  | .3 | Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.       |
|  | .4 | Confirm locations of buried utilities by careful test excavations or soil hydrovac methods where appropriate.   |
|  | .5 | Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.                              |
|  | .6 | 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.
- .7 Record location of maintained, re-routed and abandoned underground lines.
- .8 Confirm locations of recent excavations adjacent to area of excavation.
- .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, 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.

## Part 2 - Products

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| <u>2.1 MATERIALS</u> | .1 All materials shall be supplied by the Contractor.   |
|                      | .2 Approved Backfill <ul style="list-style-type: none"><li>.1 Unsuitable construction material/debris (non-contaminated) must be completely removed from the excavation until a suitable material is encountered. Soil review will be conducted with Departmental Representative.</li><li>.2 Unsuitable construction materials/debris (non-contaminated) must be stockpiled on-site as directed by Department Representative.</li><li>.3 Following removal of unsuitable material from the excavation, the unsuitable material must be removed from site. Unsuitable material may be left on site if Department</li></ul> |

- Representative reviews the material and deems it useful. Permission must be granted by Department Representative.
- .4 Following completion of unsuitable material removal, exposed sub-grade shall be proof rolled.
  - .5 Soft spots or loose areas defined by the proof rolling process will be excavated and refilled with 100mm Crushed Gravel fill and compacted to 95% of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor).
  - .6 Excavation to be backfilled with approved 100mm Crushed Gravel. The top 300mm below finished surface grade is to be 31.5mm Crushed Gravel material (see herein);
  - .7 Fill shall be placed in lifts not exceeding 300mm in loose thickness, and be compacted throughout the lift thickness to a maximum of 95% the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Depending on the compaction equipment, thinner lifts may be necessary in order to achieve the specified compaction criteria.
  - .8 In the event of winter construction, fill shall be placed and compacted in an unfrozen condition.

**31.5mm Crushed Gravel**

Shall meet the requirements of NBDTI 31.5mm Crushed Gravel Aggregate Base.

**100mm Crushed Gravel**

Shall meet the requirements of NBDTI 100mm Crushed Gravel Aggregate Subbase.

**Sand**

Where required, shall meet the requirements of Concrete Sand CSA A23.1

Part 3 - Execution

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| <u>3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL</u> | .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.  |
| <u>3.2 SITE PREPARATION</u>                            | .1 | Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.  |
|  | .2 | Cut pavement neatly along limits of proposed excavation  |
| <u>3.3 PREPARATION / PROTECTION</u>                    | .1 | Keep excavations clean, free of standing water, snow, and loose soil.  |
|  | .2 | 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.   |
|  | .3 | Protect buried services that are required to remain undisturbed.   |
| <u>3.4 STOCKPILING</u>                                 | .1 | Stockpile fill materials in areas designated by Departmental Representative.   |
|  | .1 | Stockpile granular materials in manner to prevent segregation.   |
|  | .2 | Protect fill materials from contamination.   |
| <u>3.5 DEWATERING AND HEAVE PREVENTION</u>             | .1 | Keep excavations free of water while Work is in progress.  |
|  | .2 | Excavate to lines, grades, elevations and dimensions as indicated.   |
|  | .3 | For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30m of trench in advance of installation operations and do not leave open more than 15m at end of day's operation. |
|  | .4 | Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.   |
|  | .5 | Restrict vehicle operations directly adjacent to open trenches.  |
|  | .6 | Dispose of surplus and unsuitable excavated material off site.   |
|  | .7 | Do not obstruct flow of surface drainage   |

- or natural watercourses.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .9 Notify Departmental Representative when bottom of excavation is reached.
- .10 Obtain Departmental Representative approval of completed excavation.
- .11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .12 Correct unauthorized over excavation as follows:
  - .1 Backfill material compacted to not less than 95% of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor).
- .13 Hand trim, make firm and remove loose material and debris from excavations.
- .14 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

### 3.6 EXCAVATION

- .1 Excavation must not interfere with bearing capacity of adjacent foundations.
- .2 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.
- .3 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .4 Restrict vehicle operations directly adjacent to open trenches.
- .5 Dispose of surplus and unsuitable excavated material as directed by Departmental Representative.
- .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.

3.7 FILL TYPES AND  
COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.

.1 Compact to 95% of corrected maximum dry density.

.2 Under concrete slabs: provide 300 mm compacted thickness base course material to underside of slab. Compact base course to 95 %.

.3 Place unshrinkable fill in areas as indicated.

3.8 COLD WEATHER WORK .1

Earthworks conducted during freezing conditions are suspect. Special procedures and precautions must be exercised to minimize the risk of future problems.

.1 The rootmat/topsoil layer and any overlying snow will reduce frost penetration. Conducting only the excavation work required each day of work is recommended to minimize freezing of the soil in foundation areas.

.2 Excavated material to be used as structural fill should not be stockpiled, but should be placed and compacted immediately after excavation.

.2 It is generally impractical to place well-graded gravel, sand, or fine-grained soils in temperatures lower than -5°C. On very cold days, loose material starts to freeze within 15 minutes. At temperatures below -5°C, clear gravel or clear rockfill is recommended.

.1 Structural fill placement should be conducted in small areas. Depending on the temperature, this may allow



for continuous placement of fill lifts during the work day without the requirement for excavation of frozen material prior to placement of the next lift.

- .2 For immediate fill lifts, frost protection (e.g.: straw, insulated tarp, etc.) should be provided at the end of the work day, or alternatively, fill that freezes overnight should be removed in the morning. Snow and ice is considered unsuitable for construction (see Section 2.1.2.1) and should be completely removed from the excavation. Fill surfaces should be sloped to prevent ponding of water during milder weather.
- .3 The final fill surface, the base of slab subgrade should be protected from freezing. If the final fill surface is exposed to freezing temperatures, heat will be required to thaw the soil. Test pits and temperature readings should be completed to determine if the soil is above freezing. Consideration should also be given to the installation of thermocouples in the fill during placement, as a means of reading temperatures at depth
- .4 Loose edges of the structural fill lifts should be avoided to reduce frost penetration. Edges of fill lifts should be tapered and compacted.
- .5 Regular checks of the temperature of the fill should be made. The soil temperature should be greater than +2°C to allow for compaction to the

specified degree.

### 3.9 BACKFILLING

- .1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .2 Do not use backfill material which is frozen or contains ice, snow or debris.
- .3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .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 hours after placing of concrete.
  - .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 7 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative:
- .5 Place unshrinkable fill in areas as indicated.
- .6 Consolidate and level unshrinkable fill with internal vibrators.

### 3.10 RESTORATION

- .1 Reinstate lawns to elevation which existed before excavation.
- .2 Reinstate pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .3 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .4 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

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

**END OF SECTION**