

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 32 92 19.16 – Hydraulic seeding
- .2        Section 32 93 10 –Planting

**1.2                MEASUREMENT AND PAYMENT**

- .1        No measurement shall be made under this section.

**1.3                PAYMENT**

- .1        Topsoil and planting soil analysis: The Contractor will assumed topsoil and planting soil analysis fees.

**1.4                REFERENCES**

- .1        Agriculture and Agri-Food Canada
  - .1        The Canadian Soil Classification System, Third Edition, 1998
- .2        Canadian Council of Ministers of the Environment
  - .1        PN1340 – Last version, Standards for compost quality
- .3        Norme NQ 0605-100 « Aménagement paysager à l'aide de végétaux » - (Landscaping with plants).
- .4        Norme NQ 2501-025, modifiée pour les sols mixtes (organiques et inorganiques) – (Modified for mixed soils (organic and inorganic)).
- .5        U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1        EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.5                DEFINITIONS**

- .1        Compost
  - .1        Mixture of soil and decomposing organic matter used as fertilizer, mulch or soil amendment.
  - .2        Compost composition: 40% or more of treated organic matter – Percentage determined according to Walked-Black or LOI (loss on ignition)
  - .3        The product must be sufficiently stable (sufficiently decomposed) to prevent any adverse effects on plant (C/N ratio less than 25) and shall not contain toxic elements or growth inhibitors.
  - .4        Solid organic composted material shall meet the quality criteria for compost, Category (A), as set out in a document issued by the Canadian Council of Minister of the Environment (CCME)
- .2        Free soil: loam (brown earth) not too rich in clay, not too low in sand, with organic matter content between 4% and 5% of sandy loam and between 2% or 3% of clay soils, the maximum permissible humus is 20%. This soil must have a pH of 5.5 to 7.5. Soil

must be free from underground soil, roots, grass clippings, weeds, debris, toxic materials, stones over 50 mm in diameter and other foreign bodies.

- .3 Black soil (humus): decomposed earth, fairly flexible and homogeneous, free from colloidal residues, wood, sulfur and iron, containing not less than 60% organic matter by weight and having a maximum content of Water ratio of 15%. Shredded particles size shall be less than 6 mm.
- .4 Coarse sand: natural sand only, granulometry must be within the specified limits in the following table. No more than 45% of the particles must be retained between two (2) consecutives sieves of this tables. The grain size shall be determined in accordance with test method CAN / CSA-A23.2-2A.

<u>Dimension of the sieve</u>	<u>Total mass passing the sieve in%</u>
10 mm	100
5 mm	95 à 100
2,5 mm	80 à 100
1,25 mm	50 à 90
630 µm	25 à 65
315 µm	10 à 35
160 µm	2 à 10

## 1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality control submittals:
  - .1 Indicate proposed supply source(s) to Departmental Representative.
  - .2 Soil analysis: submit certified test reports showing compliance with specified performance characteristics and physical properties. See *QUALITY CONTROL AT THE SOURCE, PART 2*.
  - .3 Certificates: submit documents signed by manufacturer certifying that products and materials comply with specified physical characteristics and performance criteria.
  - .4 Provide sample (1 liter) of topsoil and planting soil to Departmental Representative for approval.
  - .5 Approval of materials will depend on soil analysis results and inspection of samples received. Do not begin work specified in this section until materials have been approved by the Departmental Representative.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Sort waste according to Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Transport unused product to an approved hazardous material collection site authorized by the Departmental Representative.
- .3 No unused product may be discharge into sewer, watercourse, lake, soil, and any other place where it may be hazardous to health or the environment.

**Part 2 Products**

**2.1 TOPSOIL AND PLANTING SOIL**

- .1 Topsoil recovered during earthworks and deposited on site (if applicable).
- .2 Topsoil for seeded areas and planting soil for planting beds. A mixture of particles, microorganisms, and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 Not containing toxic elements or growth inhibitors
  - .2 Proving a finished surface free of:
    - .1 Debris and stones greater than 50 mm diameter;
    - .2 Coarse plant material 10 mm diameter and 100 mm length, occupying more than 2% of the soil volume.
  - .3 Consistency: friable soil when moist.
- .3 **Mixture type 1, topsoil** (for seeded areas)
  - .1 Mixture composition:
    - .1 Two parts of free soil;
    - .2 One part of black soil;
    - .3 One part of coarse sand;
    - .4 Organic matter
- .4 Mixtures characteristics:
  - .1 **Mixture type 1, topsoil** (for seeding) Mixture shall have :
    - .1 4% to 8% of organic matter (dry basis);
    - .2 Acidity level (water pH) between 6 and 7;
    - .3 Cation exchange capacity (CEC) between 10 and 20 meq/100g of soil.
    - .4 Settlement and compaction: 25%
    - .5 Bulk density (wet, unsettled) more than 350 kg/m<sup>3</sup>;
    - .6 Phosphorus (P), 80ppm;
    - .7 Potassium (K), 156mm;
    - .8 Magnesium (Mg), 45 ppm;
    - .9 Calcium (Ca), 2000 ppm.
  - .2 **Mixture type 2, planting soil** (for planting beds) Mixture shall have:
    - .1 8% to 12% of organic matter (dry basis);
    - .2 Acidity level (water pH) between 6 and 7;
    - .3 Cation exchange capacity (CEC) between 10 and 20 meq/100g of soil.
    - .4 Settlement and compaction 30%
    - .5 Bulk density (wet, unsettled) more than 800 kg/m<sup>3</sup>;
    - .6 Phosphorus (P), 200ppm;
    - .7 Potassium (K), 200mm;
    - .8 Magnesium (Mg), 67 ppm;

## **2.2 SOIL AMENDMENT PRODUCTS**

- .1 Fertilizer: Industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil analysis.
  - .1 Fertility: major soil nutrients present in following amounts:
    - .1 Nitrogen (N): 20 to 40 micrograms available per gram of topsoil.
    - .2 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
    - .3 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
    - .4 Calcium, magnesium, sulfur and trace elements present in balanced proportions to support germination and/or establishment of intended vegetation.
- .2 Peatmoss
  - .1 Derived from partially decomposed species of Sphagnum Mosses.
  - .2 Elastic and homogeneous, brown in color.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particles size: 5mm minimum.
- .3 Sand: Washed silica sand, medium to coarse texture.
- .4 Organic matter: Category A compost, untreated organic matter such as decomposed manure, hay straw, bark residue or sawdust, in accordance to the organic matter, stability (maturity) of compost and the contaminant requirements.
- .5 Limestone:
  - .1 Ground agriculture limestone.
  - .2 Particles size requirements (% by weight): 90% passing 1.0mm sieve and 50% passing 0.125mm sieve.

## **2.3 SOURCE QUALITY CONTROL**

- .1 Advise Departmental Representative of sources of topsoil and planting soil.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil analysis should be execute by a recognized laboratory and should include pH, phosphorus, potassium, magnesium and organic matter. The laboratory should recommend amendments to make the soil conform to the specifications.
- .4 Analysis of soil shall be carried out by testing laboratory approved by the Departmental Representative.
  - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

**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.
- .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                STRIPPING OF TOPSOIL**

- .1      Ensure that procedures are conducted in accordance with applicable requirements/ regulations.
- .2      Remove weed and underbrush from targeted areas to be seeded or planted (shrubs, native/maritime plants, herbaceous plants) by non-chemical means and dispose of through alternative disposal by an ecological method.
- .3      Begin topsoil stripping of areas to be plant (shrubs, native/maritime plants, herbaceous plants) after area has been cleared of grasses and brush and removed from site.
- .4      In zones or areas planted with shrubs and native/maritime plants, strip topsoil to depth of approximately 150 mm or as indicated by Departmental Representative. In zones or areas planted with herbaceous plants, strip topsoil to depth of about 50mm (light stripping).
  - .1          Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .5      Stockpile in locations as indicated by Departmental Representative
  - .1          Stockpile height not to exceed 2m.
  - .2          The stripped and heaped topsoil is temporary retained for possible use in the event of restoration outside the areas to be seeded and planted (to be indicated by Departmental Representative).
- .6      Dispose of unused topsoil by alternative disposal (ecological method).
- .7      Protect stockpiles from contamination and compaction, if they are reused.

**3.3                PREPARATION OF EXISTING SUBGRADE**

- .1      Verify that grades are correct.
  - .1          If discrepancies occur, notify Departmental Representative and do not begin work until authorized by Departmental Representative.
- .2      Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3      Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials;
  - .1          Remove contaminated soil with calcium chloride, toxic materials and petroleum products.
  - .2          Remove debris which protrudes more than 75 mm above surface.

- .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
  - .1 Repeat operation perpendicular to first passes on surfaces where transport and spreading equipment has compacted soil.

### **3.4 PLACING AND SPREADING OF TOPSOIL AND PLANTING SOIL**

- .1 Place topsoil and planting soil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 Spread topsoil and planting soil as indicated to following minimum depths after settlement:
  - .1 100 mm for seeded areas;
  - .2 300 mm for native/maritime plants beds;
  - .3 500 mm for shrub beds.
- .4 Manually spread topsoil/planting soil around shrubs and obstacles.

### **3.5 SOIL AMENDMENTS**

- .1 If necessary, apply and thoroughly mix soil amendments prescribed by laboratory into full specified depth of topsoil or planting soil.

### **3.6 FINISH GRADING**

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
  - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by the Departmental Representative.
  - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

### **3.7 ACCEPTANCE**

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

### **3.8 OVERAGE MATERIALS**

- .1 Dispose overage materials outside the site, except topsoil.

### **3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment and security barriers.

**END OF SECTION**