

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- .1 This section specifies requirements for supplying, transporting and placing granular base and subbase material to lines, grades and typical cross-sections indicated on the Drawings or as indicated by the Departmental Representative.

**1.2 REFERENCE STANDARDS**

- .1 ASTM D698-07ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2 New Brunswick Department of Transportation and Infrastructure (NBDTI formally NBDOT) Standard Specifications, latest edition.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- .1 Aggregate base materials: Departmental Representative approved, off-site material that meets the requirements of NBDTI Standard Specification for 31.5mm Crushed Rock Aggregate Base, Item 201.2.4.1 and Item 201.2.2 or 31.5mm Crushed Gravel Aggregate Base, Item 201.2.4.2 and Item 201.2.2.
- .2 Aggregate subbase materials: Departmental Representative approved, off-site material that meets the requirements of NBDTI Standard Specification for 75mm Crushed Rock Aggregate Subbase, Item 201.2.4.1 and Item 201.2.2 or 75mm Crushed Gravel Aggregate Subbase, Item 201.2.4.2 and Item 201.2.2.

**PART 3 - EXECUTION**

**3.1 INSPECTION OF UNDERLYING SUBGRADE**

- .1 Do not place granular base until finished subgrade surface is inspected and approved by Departmental Representative.

**3.2 PLACING**

- .1 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
- .2 Place using methods which do not lead to segregation or degradation of aggregates.
- .3 Place base and subbase gravel in uniform layers not exceeding 150mm and 225mm, respectively, to compacted depth shown on Drawings. Grade intermediate gravel courses to within 25mm of elevations and cross-sections indicated, but not uniformly high or low. Compact to 98% maximum dry density.
- .4 Shape each layer to a smooth contour and compact to specified density before succeeding layer is placed.
- .5 Remove and replace that portion of a layer in which material becomes segregated during spreading.

**3.3 COMPACTING**

- .1 Compact to density not less than 98% maximum dry density, corrected for oversized particles.
- .2 Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base.
- .3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

**3.4 FINISH TOLERANCES**

- .1 Finished base surface shall be within plus or minus 12mm of established grade but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.5 MAINTENANCE**

- .1 Maintain finished base in a condition conforming to this section until succeeding material is applied.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 REFERENCES**

- .1 New Brunswick Department of Transportation and Infrastructure (NBDTI formally NBDOT) Standard Specifications, latest edition.
- .2 ASTM D3203-2011, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

**1.2 SAMPLES**

- .1 At least two (2) weeks prior to commencing work inform Departmental Representative of proposed source of aggregates, liquid asphalt and asphalt cement and provide access for sampling.
- .2 Preliminary approval of any sample or samples of any material shall not constitute a final approval of the material or its source of supply.
- .3 All materials to be incorporated into the work shall be continuously and regularly sampled and tested in the field and in the laboratory and shall comply with the requirements of the material specification.

**1.3 MATERIAL CERTIFICATION**

- .1 At least four (4) weeks prior to commencing work submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 C.
- .2 Upon request, submit manufacturer's test data and certification that asphalt cement meets requirements of this section.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- .1 Asphalt concrete: hot mixed, hot-laid combination of mineral aggregates, uniformly coated and mixed with an asphaltic binder in a suitable mixing plant. Asphalt materials and aggregates shall meet the requirements of Item 260 of the New Brunswick Department of Transportation and Infrastructure Standard Specifications, latest edition, mix type "B" and type "D" for all paving surfaces.
- .2 Bituminous tack coat: shall meet the requirements of Item 259 of the New Brunswick Department of Transportation and Infrastructure Standard Specifications, latest edition.

**PART 3 - EXECUTION**

**3.1 EQUIPMENT**

- .1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

- .1 Boxes with tight metal bottoms.
- .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
- .3 In cool weather or for long hauls, insulate entire contact area of each truck box.

**3.2 PLACING**

- .1 Obtain Departmental Representative's approval of aggregate base prior to placing asphalt.
- .2 Before placing asphalt, clean surface of loose and foreign material. Apply bituminous tack coat to meet the requirements of Item 259 of the New Brunswick Department of Transportation and Infrastructure Standard Specifications, latest edition. Application rate: 1.0 l/m<sup>2</sup>.
- .3 Place asphalt concrete to thicknesses, grades and lines as indicated or as directed by Departmental Representative.
- .4 Placing conditions:
  - .1 Place asphalt mixtures only when air temperature is above 5°C.
  - .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
  - .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .5 Place asphalt concrete in compacted lifts of thickness as indicated.
- .6 Place, roll and compact asphalt concrete in accordance with Item 260 of the New Brunswick Department of Transportation and Infrastructure Standard Specifications, latest edition.
- .7 The minimum density acceptable shall be 93% of the theoretical Maximum Relative Density determined according to ASTM D3203.

**3.3 FINISH TOLERANCES**

- .1 Finished asphalt surface to be within 12mm of design elevation but not uniformly high or low.
- .2 Finished asphalt surface not to have irregularities exceeding 12mm when checked with a 3m straight edge placed in any direction.

**3.4 PROTECTION**

- .1 Restrict traffic during setting period to prevent damage as directed by the Departmental Representative.

**3.5 DEFECTIVE WORK**

- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.
- .2 Repair areas showing checking or rippling.

- .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.
- .4 If, at any time before the work is finally accepted, any raveling, shoving or other fault develops in the pavement as laid, remove all mixed materials in such places, cut edges of joints square and paint with tack coat. Place fresh asphalt mixture and compact. All such removal and replacement of unsatisfactory material shall be done at the expense of the Contractor.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C 117-04, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D 698-00ae1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-3.3-99(March 2004), Kerosene, Amend. No. 1, National Standard of Canada.
  - .2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS in accordance with Section 01 47 15 - Sustainable Requirements: Construction and 02 81 01 - Hazardous Materials.
- .3 Inform Departmental Representative of proposed source of materials and provide access for sampling at least 2 weeks prior to commencing work.
- .4 If materials have been tested by accredited testing laboratory approved by Departmental Representative within previous 2 months and have passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

**PART 2 - PRODUCTS**

**2.1 SUSTAINABLE REQUIREMENTS**

- .1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.
- .2 Do verification requirements in accordance with Section 01 47 17 - Sustainable Requirements: Contractor's Verification.

**2.2 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 Joint filler or Curing Compound: in accordance with Section 03 30 00 -

Cast-in-Place Concrete.

- .4 Granular base: material to Section 31 11 19 - Granular Materials.
- .5 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.
- .6 Fill material: to Section 31 22 13 - Site Grading.

### **PART 3 - EXECUTION**

#### **3.1 GRADE PREPARATION**

- .1 Do grade preparation work in accordance with Section 31 23 11 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
  - .1 Dispose of surplus and unsuitable excavated material in approved location on site off site.
- .3 Place fill in maximum 300 mm layers and compact to at least 95% of maximum dry density to ASTM D 698.

#### **3.2 GRANULAR BASE**

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base in maximum 150 mm layers to at least 95% of maximum density to ASTM D 698.

#### **3.3 CONCRETE**

- .1 Obtain Departmental Representative approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
- .4 Provide edging as indicated with 6 mm radius edging tool.
- .5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Departmental Representative can be demonstrated. Hand finish surfaces when directed by Departmental Representative.

**3.4 TOLERANCES**

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

**3.5 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of equal to the width of the walk.
- .2 Install expansion joints as indicated.
- .3 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

**3.6 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, asphalt driveways, buildings, or permanent structure.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 00 - Cast-in-Place Concrete as indicated.

**3.7 CURING**

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound.
- .2 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

**3.8 BACKFILL**

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Departmental Representative.
  - .1 Compact and shape to required contours as indicated.

**3.9 LINSEED OIL TREATMENT**

- .1 Apply two coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters, after concrete has cured for specified curing time and when surface of concrete is clean and dry.
- .2 Linseed oil mixture to consist of 50% boiled linseed oil and 50% mineral spirits by volume.
- .3 Apply treatment when air temperature above 10 degrees C.
- .4 Apply first coat at 135 mL/m<sup>2</sup>.
- .5 Apply second coat at 90 mL/m<sup>2</sup> when first coat has dried.

**3.10 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.

**1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- .1 Paint:
  - .1 To MPI -EXT 2.1B, Alkyd zone/traffic marking.
  - .2 Paints: in accordance with MPI recommendation for surface conditions.
    - .1 Paints: maximum VOC limit 100 g/L.
  - .3 Colour: to MPI listed, yellow black and white.
  - .4 Upon request, Departmental Representative will supply qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to MPI listed manufacturer.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

**3.2 EQUIPMENT REQUIREMENTS**

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

**3.3 APPLICATION**

- .1 Lay out pavement markings and get Departmental Representative approval of layout prior to proceeding.
- .2 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m<sup>2</sup> /L.
- .4 Do not thin paint unless approved by Departmental Representative.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.

**3.4 TOLERANCE**

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings in accordance with Section 32 01 11.01 - Pavement Cleaning and Marking Removal.

**3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Do not dispose of unused material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

**3.6 PROTECTION OF COMPLETED WORK**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A 53/A 53M-02, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A 90/A 90M-01, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
  - .3 A653/A653M-03, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
  - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.
  - .3 CAN/CGSB-138.3-96, Installation of Chain Link Fence.
  - .4 CAN/CGSB-138.4-96, Gates for Chain Link Fence.
  - .5 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-A23.1/A23.2-00(August 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
  - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-A3000-98(R2002), Cementitious Materials Compendium. Includes:
    - .1 CAN/CSA-A23.5-98, Supplementary Cementing Materials
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).

### **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

### **1.3 HEALTH AND SAFETY**

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Store and manage hazardous materials in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .3 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .4 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete CAN/CSA-A23.1.
  - .1 Nominal coarse aggregate size: 20-5.
  - .2 Compressive strength: 32 MPa minimum at 28 days.
- .2 Chain-link fence fabric: to CAN/CGSB-138.1.
  - .1 Height of fabric: as indicated
- .3 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe. Dimensions as indicated.
- .4 Top and bottom tension wire: to CAN/CGSB-138.2, single strand, galvanized steel wire.
- .5 Tie wire fasteners: steel wire.
- .6 Tension bar: to ASTM A 653/A 653M, 5 x 20 mm minimum galvanized steel.
- .7 Gates: to CAN/CGSB-138.4.
- .8 Gate frames: to ASTM A 53/A 53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35mm outside diameter pipe for interior bracing.
  - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
  - .2 Fasten fence fabric to gate with twisted selvage at top.
  - .3 Furnish gates with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate.
- .9 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
  - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel.
  - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.

### **2.2 FINISHES**

- .1 Galvanizing:
  - .1 For chain link fabric: to CAN/CGSB-138.1 Grade2.
  - .2 For pipe: 550 g/m<sup>2</sup> minimum to ASTM A 90.
  - .3 For other fittings: to CAN/CSA-G164.

### **PART 3 - EXECUTION**

#### **3.1 GRADING**

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
  - .1 Provide clearance between bottom of fence and ground surface of 30 mm to 50mm.

#### **3.2 ERECTION OF FENCE**

- .1 Erect fence along lines as indicated.
- .2 Drive line posts holes 1000 mm deep. Excavate end, corner and gate post foundations to 1200 mm deep.
- .3 Space line posts 3 m apart, measured parallel to ground surface.
- .4 Install additional straining posts at sharp changes in grade and where directed by Departmental Representative.
- .5 Install corner post where change in alignment exceeds 10degrees.
- .6 Install end posts at end of fence and at buildings.
  - .1 Install gate posts on both sides of gate openings.
- .7 Place concrete in post holes then embed posts into concrete 1070 mm.
  - .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
  - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .8 Do not install fence fabric until concrete has cured minimum of 3 days.
- .9 Install caps.
- .10 Install top and bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .11 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
  - .1 Knuckled selvedge at bottom.
  - .2 Twisted selvedge at top.
- .12 Secure fabric to line posts and top and bottom tension wire with tie wires at 450 mm intervals.
  - .1 Give tie wires minimum two twists.

#### **3.3 INSTALLATION OF GATES**

- .1 Install gates in locations as indicated.
- .2 Level ground between gate posts and set gate bottom approximately 100 mm above ground surface.

**3.4 CLEANING**

- .1 Clean and trim areas disturbed by operations.
- .1 Dispose of surplus material and replace damaged turf with sod as directed by Departmental Representative.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 REFERENCES**

- .1 Agriculture and Agri-Food Canada
  - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
  - .1 PN1340-2005, Guidelines for Compost Quality.

### **1.2 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
- .2 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL**

- .1 Topsoil for seeded areas and planting beds: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
  - .2 Contain no toxic elements or growth inhibiting materials.
  - .3 Finished surface free from:
    - .1 Debris and stones over 50 mm diameter.
    - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  - .4 Consistence: friable when moist.

### **2.2 SOIL AMENDMENTS**

- .1 Fertilizer:
  - .1 Fertility: major soil nutrients present in following amounts:
  - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
  - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
  - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
  - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  - .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses.
  - .2 Elastic and homogeneous, brown in colour.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particle minimum size: 5 mm.

- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Organic matter: compost Category A, B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.
- .6 Limestone:
  - .1 Ground agricultural limestone.
  - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

### **2.3 SOURCE QUALITY CONTROL**

- .1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
  - .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
- .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 Begin topsoil stripping of areas as indicated after area has been cleared of trees, brush, weeds, and grasses.
- .2 Stockpile in locations as directed by Departmental Representative.
  - .1 Stockpile height not to exceed 2 m.
- .3 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by Departmental Representative.

- .4 Protect stockpiles from contamination and compaction.

**3.3 PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct.
  - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed 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 soil contaminated 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 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

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

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil as indicated to following minimum depths after settlement.
  - .1 150 mm for seeded areas.
  - .2 135 mm for sodded areas.
  - .3 300 mm for flower beds.
  - .4 500 mm for shrub beds.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

**3.5 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 Departmental Representative.
  - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

**3.6 ACCEPTANCE**

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

**3.7 SURPLUS MATERIAL**

- .1 Dispose of materials except topsoil not required where directed by Departmental Representative.

**3.8 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data.
  - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Provide product data for:
    - .1 Seed.
    - .2 Mulch.
    - .3 Tackifier.
    - .4 Fertilizer.

**1.2 QUALITY ASSURANCE**

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

**1.3 SCHEDULING**

- .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
- .2 Schedule hydraulic seeding using grass mixtures between dates recommended by the Provincial Agricultural Department.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And
- .2 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No. 1 or 2 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
    - .1 Mixture composition:
      - .1 60% by weight - Kentucky bluegrass (minimum 3 varieties).
      - .2 20 % by weight - Fescues (80% creeping red, 20% tall).
      - .3 20 % by weight - perennial rye.
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:

- .1 Type I mulch:
  - .1 Made from wood cellulose fibre.
  - .2 Organic matter content: 95% plus or minus 0.5%.
  - .3 Value of pH: 6.0.
  - .4 Potential water absorption: 900%.
- .2 Type II mulch:
  - .1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.
- .3 Tackifier: water dilutable, liquid dispersion water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
  - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
  - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

### PART 3 - EXECUTION

#### 3.1 WORKMANSHIP

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until plants are established.

#### 3.2 PREPARATION OF SURFACES

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .3 Obtain Departmental Representative approval of grade and topsoil depth before starting to seed.

#### 3.3 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.

- .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture applied per hectare.
  - .1 Seed: Grass Legume mixture 81.65 kg or as recommended by seed supplier.
  - .2 Mulch: Type I or II 1000 kg.
  - .3 Tackifier: 300 kg or as recommended by supplier.
  - .4 Water: Minimum ,1000 L.
  - .5 Fertilizer: 50 kg of nitrogen.
  - .6 Lime as determined by soil analysis.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
  - .1 Using correct nozzle for application.
  - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent grass areas or sodded areas previous applications to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
- .8 Remove protection devices as directed by Departmental Representative.

### 3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative.
- .2 Grass Mixture:
  - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
  - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
  - .3 Fertilize seeded areas after first cutting.
  - .4 Control weeds by mechanical means utilizing acceptable practices.
  - .5 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

### 3.5 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
  - .1 Plants are uniformly established. Seeded areas are free of rutted,

- eroded, bare or dead spots.
- .2 Areas have been mown.
- .3 Areas have been fertilized.

- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

**3.6 MAINTENANCE DURING WARRANTY PERIOD**

- .1 Perform following operations from time of acceptance until end of warranty period:
  - .1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.
  - .2 Mow areas seeded, remove clippings, as directed by Departmental Representative.

**3.7 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- .1 The Work to be done under this Section consists of furnishing all materials, labour, tools and equipment and performing all operations necessary for the complete reinstatement of surfaces and structures disturbed by work of this Contract.
- .2 Repair damage or disturbance to surfaces, properties and structures, within limits of the Site or elsewhere on other properties occupied, traversed or otherwise used by the Contractor during the Contract period to a condition equal to or better than that before work began, at no additional cost to the Contract.

**1.2 REFERENCE STANDARDS**

- .1 New Brunswick Department of Transportation and Infrastructure (NB DTI formally NBDOT) Standard Specifications, latest edition.

**1.3 MAINTENANCE**

- .1 Contractor shall take care and maintain all reinstated areas until final acceptance of the work.
- .2 Repair damaged areas to the approval of the Departmental Representative.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- .1 Granular material: as specified in Section 32 11 19.
- .2 Asphalt material: as specified in Section 32 12 16.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- .1 Reinstatement all surfaces to lines, elevations and dimensions which existed prior to construction.

**3.2 GRAVEL SURFACES**

- .1 Reinstatement gravel surfaces by placing 200mm compacted thickness of gravel at an elevation such that gravel surface is smooth and even with adjacent surfaces.
- .2 Place and compact gravel for surfaces in accordance with the requirements of Section 32 11 19.

**3.3 ASPHALT SURFACES**

- .1 Keep surface of asphalt paved roads and surfaces in good condition by repairing settlement of trench backfilling as described in Section 31 23 10.
- .2 Carry out final reinstatement of asphalt surfaces as follows:
  - .1 Cut back broken edges of original pavement to full depth, in straight lines. Cut back 300mm minimum from edge of excavation to eliminate tension cracks. Clean contact surfaces and apply tack

- coat before placing asphalt concrete.
- .2 Before placing final surface material, remove existing gravel to a depth indicated over disturbed area, grade and re- compact. Add gravel to compacted depths indicated. Compact to not less than 98% maximum dry density.
- .3 Supply, place, roll and compact asphalt mixture in accordance with NBDTI Standard Specifications.
- .4 Compact asphalt concrete in lifts not exceeding 50mm in thickness.
- .5 Ensure finished surface is even, dense and matches grade of existing road or surface, as approved by the Departmental Representative.

**END OF SECTION**