

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Section 32 11 16.01 - Granular Sub-base.

### **1.2 REFERENCES**

- .1 City of St. John's Department of Engineering Specifications Book (Latest Edition).
- .2 American Society for Testing and Materials (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 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .5 ASTM D 1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
  - .6 ASTM D 1883-07e1, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .7 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

### **1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert unused granular material from landfill to local facility as approved by the Departmental Representative.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Granular "A" material in accordance with Item 323.02 of City of St. John's Department of Engineering Specifications Book (Latest Edition).

<b>TABLE 1 GRADATION REQUIREMENTS</b>				
<b>Sieve Sizes</b>	<b>Percent Passing by Dry Weight</b>			
	<b>Granular "A"</b>	<b>Granular "B"</b>	<b>Maintenance Grade No. 1</b>	<b>Quarter Minus</b>
38.1mm		100		
25.4mm		60 - 90		
19.0mm	100		100	
15.9mm		45 - 80`		
9.51mm	55 - 80		55 - 80	
6.30mm				100
4.76mm	35 - 60	25 - 55	35 - 60	55-80
2.00mm				35-55
1.20mm	17 - 35	12 - 35	17 - 35	
4.25mm				12-30
300mm	7 - 20	7 - 20	7 - 20	
075mm	3-6 (Pit Source) 3-8 (Rock Source)	3-6 (Pit Source) 3-8 (Pit Source)	6 - 12	4-10

1. The percentage of material finer than the 0.075mm sieve shall be determined by ASTM C117-80.
2. Where Granular "A" and Granular "B" materials are produced from natural gravel deposits, a maximum of six percent (6%) passing the 0.075mm sieve will be allowed.
3. Where forty percent (40%) or more of Other Material is blended to a rock source for the production of granular materials it shall then be treated as a pit source.

## **PART 3 - EXECUTION**

### **3.1 SEQUENCE OF OPERATION**

- .1 Place granular base after sub-base surface is inspected and approved by Departmental Representative.
- .2 Placing
  - .1 Construct granular base to depth and grade in areas indicated.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on clean unfrozen surface, free from snow and ice.
  - .4 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
  - .5 Shape each layer to smooth contour and compact to specified density

- before succeeding layer is placed.
  - .6 Remove and replace that portion of layer in which material becomes segregated during spreading.
  - .3 Compacting
    - .1 Compaction equipment to be capable of obtaining required material densities.
    - .2 Compact to density not less than 100% of Corrected Maximum Dry Density.
    - .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
    - .4 Apply water as necessary during compacting to obtain specified density.
    - .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
    - .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
  - .4 Proof rolling
    - .1 For proof rolling, use minimum 10 tonne vibratory roller.
    - .2 Obtain approval from Departmental Representative to use non standard proof rolling equipment.
    - .3 Proof roll at level in granular base as indicated. If use of non standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.
    - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
    - .5 Where proof rolling reveals areas of defective subgrade:
      - .1 Remove base, sub-base and subgrade material to depth and extent as directed by Departmental Representative.
      - .2 Backfill excavated subgrade with sub-base material and compact in accordance with Section 32 11 16.01 - Granular Sub-Base.
      - .3 Replace sub-base material and compact in accordance with Section 32 11 16.01 - Granular Sub-base.
      - .4 Replace base material and compact in accordance with this Section.
    - .6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with Section 32 11 16.01 - Granular Sub-base and this section at no extra cost.
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### **3.2 QUALITY CONTROL TESTING**

- .1 Inspection and testing shall be carried out by the Contractor.
  - .1 Minimum Test Frequency: 1 test per 250 m<sup>2</sup>/Lift.
- .2 Submit compaction test results to Departmental Representative for review and approval.
- .3 Contractor shall conduct and submit satisfactory compaction test results to Departmental Representative prior to placement of subsequent materials.

### **3.3 SITE TOLERANCES**

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

### **3.4 PROTECTION**

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.