PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 MEASUREMENT AND PAYMENT

.1 Measure granular sub-base in cubic metres measure(cmpm) of compacted material incorporated into work within the areas and thicknesses indicated on the drawings, unless otherwise specified

1.3 REFERENCES

.1 ASTM International

.1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.6 ASTM D1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).

.7 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.8 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 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.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Granular B Type I B Type II M Select Subgrade to OPSS 1010.
.1 Granular B, Type II, maximum size 150 26.5 4.75 mm.
.2 Granular M, maximum size 19.0 13.2 9.5 mm. crushed rock, crushed gravel or crushed slag. Granular 'B' and 'M' is obtained from deposits of sand, gravel, talus rock quarries, disintegrated granite, mine waste, slag or other suitable granular materials.

.2 Granular sub-base material: in accordance with following requirements:
.1 Crushed, pit run or screened stone, gravel or sand.
.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
.3 Table

Sieve Designation	% Passing
50mm	75-100
15.9mm	45-80
4.75mm	25-55
1.20mm	12-35
0.30mm	7-20
0.08mm	3-8

.4 Other properties as follows:
.1 Liquid Limit: to ASTM D4318, Maximum 25.
.2 Plasticity Index: to ASTM D4318, Maximum 6.
.3 Los Angeles degradation: to ASTM C131.
.1 Maximum loss by mass: 40 50 %.
.4 Particles smaller than 0.02 mm: to ASTM D422, Maximum 3%.
.5 Soaked CBR: to ASTM D1883, Minimum 40 when compacted to 100% of ASTM D1557.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.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 sediment and erosion control drawings sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
.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.

3.3 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.

.2 Construct granular B sub-base to depth and grade in areas indicated.

3.3 PLACING (Cont'd)

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Begin spreading sub-base material on crown line or high side of one-way slope.

.6 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.

.8 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
.1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.

.9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.10 Remove and replace portion of layer in which material has become segregated during spreading.

3.4 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 100% corrected maximum dry density maximum dry density in accordance with ASTM D698 ASTM D1557.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical

3.4 COMPACTION (Cont'd)

.5 (Cont'd)
tampers approved by Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.5 PROOF ROLLING

.1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.

.2 Obtain written approval from Departmental Representative to use non standard proof rolling equipment.

.3 Proof roll at level in sub-base as indicated.
.1 If non standard proof rolling equipment is approved, Departmental Representative will 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 sub-base and subgrade material to depth and extent as directed by Departmental Representative.
.2 Replace sub-base material and compact.

.6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

3.6 CLEANING (Cont'd)

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.8 PROTECTION

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END