

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 32 11 16 - Granular Sub-base.

1.2 MEASUREMENT
PROCEDURES

- .1 Measure granular base in cubic metres of place measure (cmpm) by cross section and calculated by average end area method of compacted material incorporated into Work within the areas and to the thickness indicated on the drawings unless otherwise specified and accepted by Departmental Representative.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .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 D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

- 1.3 REFERENCES (Cont'd) .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.
- 1.4 WASTE MANAGEMENT AND DISPOSAL .1 Separate and recycle waste materials in accordance with Section 01 74 21.
.2 Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Granular base: material in accordance with the following requirements:
.1 Crushed stone or gravel.
.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.
.1 Gradation Method to:
- | Sieve Designation | % Passing |
|-------------------|-----------|
| 19mm | 100 |
| 9.5mm | 55-100 |
| 4.75mm | 35-60 |
| 1.20mm | 17-35 |
| 0.30mm | 7-20 |
| 0.08mm | 3-8 |
- .2 Material to level surface depressions to meet gradation (2) limits in accordance with Method.
.3 Liquid limit: to ASTM D4318, maximum 25.
.4 Plasticity index: to ASTM D4318, maximum 6.
.5 Los Angeles degradation: to ASTM C131. Max. % loss by weight: 45.
.6 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

2.1 MATERIALS
(Cont'd)

- .1 Granular base: (Cont'd)
- .2 (Cont'd)

Passing 19.0 mm to Retained on 4.75 mm
.7 Soaked CBR: to ASTM D1883, min 80
100, when compacted to 100% of ASTM
D1557.

PART 3 - EXECUTION

3.1 SEQUENCE OF
OPERATION

- .1 Place granular base after sub-base subgrade 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 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .7 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.
 - .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
 - .2 Efficiency of equipment not specified to be proved at least as efficient as specified

3.1 SEQUENCE OF
OPERATION
(Cont'd)

- .3 (Cont'd)
 - .2 (Cont'd)
equipment at no extra cost and written approval must be received from Departmental Representative before use.
 - .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compacting
 - .1 Compact to density not less than 100% corrected maximum dry density maximum dry density in accordance with ASTM D698 ASTM D1557.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .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.
 - .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 core stone material and compact in accordance with Section 32 11 16 sub-base

- 3.1 SEQUENCE OF OPERATION (Cont'd) .5 (Cont'd)
- .5 (Cont'd)
- .2 (Cont'd)
- material and compact in accordance with Section 32 11 23.
- .3 Replace sub-base material and compact in accordance with Section 32 11 16.
- .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 and this section at no extra cost.
- 3.2 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.
- 3.3 PROTECTION .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.