

1. General

1.1 Section Includes

- 1.1.1 This Section specifies the requirements for the scarifying and reshaping of granular roadbed with addition of new granular sub-base and base course materials.

1.2 Related Sections

- 1.2.1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- 1.2.2 Section 31 05 10 – Corrected Maximum Dry Density for Fill.
- 1.2.3 Section 31 05 16 – Aggregate Materials.
- 1.2.4 Section 32 11 23 – Aggregate Base Courses.
- 1.2.5 Section 32 11 16 – Granular Sub-Base.

1.3 References

- 1.3.1 American Society for Testing and Materials International (ASTM).
- ASTM C117-03 Test Method for Materials Finer than 75µm (No. 200) Sieve in Mineral Aggregates by Washing.
- ASTM C131-03 Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- ASTM 136-01 Method for Sieve Analysis of Fine and Coarse Aggregates.
- ASTM D698-00a Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN m/m³).
- ASTM D4318-00 Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- 1.3.2 Canadian General Standards Board (CGSB)
- CAN/CGSB-8.1-M88 – Sieves Testing, Woven Wire, Inch Series.
- CAN/CGSB-8.2-M88 – Sieves Testing, Woven Wire, Metric.
- 1.3.3 Environmental Protection Plan for Construction, (69-131-010-LRT-0002).
- 1.3.4 Quality Management Procurement/Contracts, (69-010-010-GSS-0007).

1.4 Submittals

- 1.4.1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- 1.4.2 Submit to Departmental Representative complete records as per submittal schedule, complete with Inspection and Testing Plans (ITP) for pre-approval prior to construction.

2. Products

2.1 Materials

- 2.1.1 The granular materials shall be composed of clean, hard, uncoated particles and shall be free from organic matter, clay lumps and deleterious materials such as shale, slate, orchre and schists.
- 2.1.2 Materials from deposits acceptable as to the quality of the particles, but deficient in sizes to provide the required gradation, may be accepted if the Contractor furnishes and satisfactorily incorporates into the product supplementary sizes from other sources to produce the required grading. If the deficiencies occur in Class “A” materials, corrections may be attempted by crushing to a smaller maximum particle size. In that event, the Departmental Representative will furnish special grading limits on the actual maximum particle size.
- 2.1.3 Materials shall be considered unsuitable even though particle sizes are within the specified gradation limits if particle shape or any other characteristic precludes satisfactory compaction or fails to provide a roadway suitable for traffic. If, in the opinion of the Departmental Representative, an improved particle shape can be achieved by using a different crushing unit from that proposed by the Contractor, then the Contractor shall supply and use a crushing unit of the type directed by the Departmental Representative.
- 2.1.4 Class “A” shall be processed by crushing and, when necessary, to eliminate surplus fines passing the 4.76 mm sieve, shall be screened and washed.
- 2.1.5 Granular base material (Class “A”) to following requirements:
 - 2.1.5.1 Gradation to be within following limits when tested to ASTM C136-84a and ASTM C117-87. The grading shall not show marked fluctuations from opposite extremes of the limiting sizes, having a smooth curve without sharp breaks when plotted on a semi-log grading chart to ASTM E11-87.

ASTM Sieve Designation	% Passing
19.0 mm	100
9.51 mm	55-80
4.76 mm	35-60
1.20 mm	17-35
0.300 mm	7-20
0.075 mm	3-6 (Pit Source)
0.075 mm	3-8 (Rock Source)

- 2.1.5.2 Liquid Limit ASTM D423-66 (1972) Maximum 25
- 2.1.5.3 Plasticity Index ASTM D424-59 (1971) Maximum 0
- 2.1.5.4 Los Angeles Abrasion ASTM C131-81 Maximum % loss by weight: 35
- 2.1.5.5 Crushed Fragments: 50%. The percent of crushed particles will be determined by examining the fraction retained on the 4.76 mm sieve and dividing the weight of the crushed particles by the total weight retained on the 4.76 mm sieve.

3. Execution

3.1 Scarifying and Reshaping

- 3.1.1 Scarify and reshape all roadways, both new and existing, as well as all parking areas prior to the application of Selected Granular Base Course or Sub-Base.
- 3.1.2 Where the existing road structure consists of granular base course material then the scarifying shall be to the full depth of that material or to a depth of 300 mm, whichever is less.
- 3.1.3 Where the road surface consists of sub-grade material only, the scarifying shall be to a depth of not less than 300 mm.
- 3.1.4 Blade and trim material to elevations and cross sectional dimensions indicated on the Contract Documents.
- 3.1.5 Where a deficiency of granular base material exists, add sufficient approved granular base material to attain lines and grades as outlined on the Contract Documents.
- 3.1.6 Re-use excess materials from one location in other locations where there is a material deficiency.

3.2 Compaction

- 3.2.1 All road material disturbed by scarifying and reshaping operations shall be compacted.
- 3.2.2 Where the sub-grade has been scarified and reshaped the disturbed material shall be compacted to 100% Maximum Standard Proctor Dry Density.
- 3.2.3 Where a select granular base course has been scarified and reshaped the disturbed granular base material shall be compacted to 100% Maximum Standard Proctor Dry Density.
- 3.2.4 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-grade surface.
- 3.2.5 Apply water as necessary during compaction to obtain optimum moisture content of material. If material exceeds optimum moisture content aerate by scarifying with suitable equipment until moisture content is corrected.
- 3.2.6 In areas not accessible to vibratory roller/compactor equipment, compact to specified density using approved mechanical tampers.

3.3 Repair to Soft Areas

- 3.3.1 Where a roadbed material is encountered that has been deemed unsuitable by the Engineer it shall be removed and disposed of to the limits and depths as directed by the Engineer.
- 3.3.2 Remediate soft areas by removing defective material to depth and extent directed by Engineer. Replace with approved backfill material and compact to 100% Maximum Standard Proctor Dry Density.

3.4 Tolerance

- 3.4.1 The maximum variation from the specified profile and cross section of the compacted scarified and reshaped road surface shall be 30 mm.

3.5 Protection

- 3.5.1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied.
- 3.5.2 Where, due to traffic use, or for whatever reason, the scarified and reshaped road surface does not conform to the required tolerances, prior to placement of the next material the Contractor shall scarify and reshape the affected areas, at his own expense.

4. Measurement and Basis for Payment**4.1 Measurement for Payment**

- 4.1.1 Scarifying and Reshaping of an existing roadbed including compaction will be measured in m² and payment will be made as per the unit or lump sum price in the Schedule of Quantities and Prices.
- 4.1.2 Excavation of soft areas within the existing roadbed will be measured for volume (m³) in situ, directly with a tape or for larger areas cross sections and quantity calculations will be required. The backfill including compaction of these areas will be represented by the same volume as the excavation quantity. Both of these items will be paid as per the unit prices as per Specification Section 31 00 00 – Earthwork and Related Work in the Schedule of Quantities and Prices.
- 4.1.3 Boulder excavation and removal deemed applicable for payment as per Specification Section 31 23 16 – Rock Removal. Measurement for Payment will be considered as solid rock and will be paid as per the unit price in the Schedule of Quantities and Prices.
- 4.1.4 Granular Sub-Base and Base materials will be measured in tonnes of material incorporated into the work within the areas and to the thicknesses indicated on the Contract Drawings and as per Specification Section 32 11 16 and 32 11 23, respectively.

4.2 Basis for Payment

- 4.2.1 Unless otherwise noted, all costs associated with scarifying and re-shaping work specified in this section shall be deemed to be included in the appropriate unit and lump sum price quoted in the Schedule of Quantities and Prices.