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**SECTION 811 - PROCESSED GRAVEL, ~~SAND AND SOFT OR RIPPED ROCK FOR PAVEMENT~~  
~~BASE AND SUBBASE~~ LOWER SUBBASE OR SUBGRADE IMPROVEMENT****811.01 DESCRIPTION**

This section covers the requirements for naturally occurring or partly processed gravel, ~~scoria tuff, sand and soft~~ or ripped rock, including mixtures thereof and materials to be broken to size on the roadbed.

**811.02 DEFINITIONS****Gravel**

Gravel is a naturally occurring mixture of angular or rounded rock fragments substantially retained on a 4.75 mm AS sieve, with or without some finer material, and all passing a 75 mm AS sieve.

**~~Scoria and Tuff~~**

~~Scoria and tuff are pyroclastic materials which generally form unconsolidated deposits which are rippable and require minimal processing.~~

**~~Sand~~**

~~Sand is a product of rock weathering substantially passing a 4.75 mm AS sieve, and is generally siliceous and free from appreciable quantities of clay and silt.~~

**~~Soft or Ripped Rock~~**

~~Soft or Ripped rock is rock extracted from a deposit without blasting and not requiring processing through a crushing plant for reduction of size.~~

**811.03 MATERIAL SOURCE**

Prior to the commencement of work, the Contractor shall confirm the source from which the material will be obtained.

**811.04 PHYSICAL PROPERTIES AND GRADINGS**

The material shall meet the relevant requirements of Tables 811.041 and 811.042 and shall be free from vegetable matter and lumps or balls of clay or other deleterious matter.

**Where specified by means of a cross (+) in Table 811.042 the Contractor shall supply to the Superintendent for approval, grading figures to indicate the average grading of the material proposed for supply.**

The approved average grading shall become the target grading for material to be supplied. The permitted range of grading about the target is specified in Table 811.043.

All material supplied shall comply with the grading limits.

Table 811.041 - Physical Properties

Type of Material and Use (Base or Subbase)	All Passing Sieve Size AS (mm)	Liquid Limit (%/max)	Plasticity Index		Texas Ball Mill (max)	Plasticity Index % passing 0.425 mm (max)	California Bearing Ratio * (%/min)	Swell (max) %	Permeability (max) m/sec
			(min)	(max)					
Processed Gravel / Ripped Rock			6	30		1000	10	2.5	5x10 <sup>-9</sup>
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\* Value applicable to material passing 19.0 mm sieve: initially at optimum moisture content and 98% of maximum dry density as determined by test using Modified compactive effort, but then soaked for 4 days prior to the CBR test.

Table 811.042 - Grading Requirements (percentage passing by mass)

Type of Material And Use (Base or Subbase)	Sieve Size - AS Sieve (mm)										
	150	75	37.5	26.5	19.0	13.2	9.50	4.75	2.36	0.425	0.075
Ripped Rock	100	90 to 100	65 to 90					35 to 70		20 to 45	10 to 30

+ Contractor shall supply to the Superintendent for approval, grading figures to indicate the average grading of material proposed for supply.

Table 811.043 - Permitted Range of Grading

Sieve Size AS (mm)	Permitted Range of Grading ± (% by mass)
150, 75, 37.5	20
26.5, 19.0, 13.2, 9.50, 4.75, 2.36	15
0.425	10
0.075	5

If the Contractor proposes to use scoria or scoria blends, the source of the scoria shall have an assigned Los Angeles Value not exceeding that specified in Table 811.044.

**Table 811.044 — Scoria Source Rocks, Hardness Requirements**

<b>Pavement Course/Layer</b>	<b>Assigned Los Angeles Value (maximum)</b>
Base	40
Upper Subbase	45
Lower Subbase	50

If at any time the contractor proposes to obtain scoria from another source without an assigned LA value the Superintendent shall be notified in sufficient time to allow a quarry investigation to be completed prior to the commencement of delivery.

#### **811.05 ADDITION OF WATER**

Water added to the product shall be clean and substantially free from detrimental impurities such as oils, salts, acids, alkalis and vegetable substances. Water supplied from sources where dissolved salts are known or likely to be present shall be tested for electrical conductivity prior to use. The electrical conductivity shall not be more than 3500  $\mu\text{S}/\text{cm}$ . Water sources classified by the relevant Water Authority as potable water shall be exempt from this requirement.

#### **811.06 MATERIAL SUPPLIED TO STOCKPILE**

If the Contractor elects or is required to supply the material to stockpile prior to delivery to the roadbed the following requirements shall be met:

- (a) the product, after recovery from the stockpile, complies with this specification;
- (b) the stockpile site is clean, adequately paved, and well drained;
- (c) if a stockpile is constructed in more than one layer, each layer is fully contained within the area occupied by the upper surface of the preceding layer;
- (d) the surface of the stockpile shall be kept damp to prevent a net loss of moisture and to minimise the generation of airborne dust.

#### **811.07 MINIMUM TESTING REQUIREMENTS**

The Contractor shall test the material at a frequency which is sufficient to ensure that all material supplied under the contract complies with the specified requirements. The frequency shall not be less than that shown in Table 811.071, except that the Superintendent may agree to a lower frequency where the Contractor has implemented a system of statistical process control and can demonstrate that such lower frequency is adequate to assure the quality of the product.

**Table 811.071 - Minimum Frequency of Testing**

<b>Test</b>	<b>Minimum Frequency of Testing</b>
Grading	One per 1,000 tonne or part thereof
Plasticity Index	One each month – one per 10,000 tonne or part thereof
Texas Ball Mill	-
Swell	Prior to the commencement of work and when in the opinion of the superintendent/relevant authority the nature of the material has changed significantly
Permeability	Prior to the commencement of work and when in the opinion of the superintendent/relevant authority the nature of the material has changed significantly
California Bearing Ratio	Prior to the commencement of work and when in the opinion of the superintendent/relevant authority the nature of the material has changed significantly