8401 Bitumen Treated Base (BTB)

8401.1 General
This supplementary specification refers to the supply and construction of bitumen treated base (BTB) material. Unless otherwise stated herein, the BTB shall be supplied, laid and compacted wholly in accordance with MRTS30. Wherever MRTS30 refers to “asphalt” this shall be taken to be Bitumen Treated Base.

8401.2 Referenced Documents
This supplementary specification shall be read in conjunction with the following:

- MRS01 “Introduction to Specifications”;
- MRTS01 “Introduction to Technical Specifications”;
- MRS30 “Dense Graded and Open Graded Asphalt”;
- MRTS30 “Dense Graded and Open Graded Asphalt”; and
- Clause 7.2 of MRTS05 “Unbound Pavements”.

8401.3 Description of Work Items
The following work items are covered by this supplementary specification:

<table>
<thead>
<tr>
<th>Task Item No.</th>
<th>Description</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>8401</td>
<td>Bitumen treated base, using virgin base material, [description/location]</td>
<td>m3</td>
</tr>
<tr>
<td>8402</td>
<td>Bitumen treated base, using recycled base material, [description/location]</td>
<td>m3</td>
</tr>
</tbody>
</table>

8401.4 Measurement and Payment
The scheduled unit rate for these work items includes provision for all works specified in this Supplementary Specification. No separate payments will be made.

8401.4 Standard Test Methods
In addition to the standard test methods stated in Clause 4 of MRTS30 the CBR of the BTB shall be determined as follows:

8401.4.1 CBR of BTB
In the CBR test 5 kg of BTB is compacted in one layer in a CBR mould at a temperature of 150°C using a large (150mm diameter) Marshall hammer and applying 28 blows to the top face. This compactive effort corresponds closely to a standard compaction (596 kJ/m3) for a granular base material and also represents approximately 15% of a full Marshall compaction. This level of compaction is considered to be similar to that applied by rollers in the field.
8401.5 Material Properties

8401.5.1 Base Material
The required unbound pavement shall be a Type 2, Subtype 2.3 in accordance with Clause 7.2 of MRTS05.

In addition to Table 7.2.4-A of MRTS05, the Grading Index (GI) shall be 90 – 110 where GI is given by:

\[
GI = 30.13 + 0.05808 p_{37.5} + 0.09552 p_{19} + 0.1226 p_{9.5} + 0.1562 p_{4.75} + 0.3418 p_{2.36} + 0.9344 p_{0.425} + 1.427 p_{0.075}
\]

where \( p_x \) = percent passing sieve size \( x \) mm

8401.5.2 Clause 8 of MRTS30 – Mix Design Assessment and Approval
The following clauses shall modify or be an addition to the specified clauses in MRTS30.

Clause 10.2.2 – Course Aggregate

Clause 10.2.2 shall not apply. The requirements for coarse aggregate shall be in accordance with Clause 7.2.2 of MRTS05.

Clause 10.2.3 – Fine Aggregate

Clause 10.2.3 shall not apply. The requirements for fine aggregate shall be in accordance with Clause 7.2.3 of MRTS05.

Clause 10.3.2 – Binder Content

The required Marshall properties are shown in Table 1.1.

Table 1.1 Bitumen Treated Base Design Requirements

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Max/Min</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of blows</td>
<td>-</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>Stability</td>
<td>kN</td>
<td>min</td>
<td>12</td>
</tr>
<tr>
<td>Flow</td>
<td>mm</td>
<td>min</td>
<td>2</td>
</tr>
<tr>
<td>Stiffness</td>
<td>kN/mm</td>
<td>min</td>
<td>2.5</td>
</tr>
<tr>
<td>Voids in mineral aggregate (VMA)</td>
<td>%</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Voids filled with binder (VFB)</td>
<td>%</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Air voids</td>
<td>%</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Compacted density</td>
<td>t/m3</td>
<td>-</td>
<td>**</td>
</tr>
</tbody>
</table>
In addition to Clause 8.3.2 of MRTS30, the Marshall Bitumen Content (MBC) and Target Bitumen Content (TBC) can be estimated by:

\[ \text{MBCest} = 0.05 \, \text{GI} \]
\[ \text{TBC} = 0.03 \, 
\text{GI} + 1.7 \]

Minimum CBR

In addition to the requirements of Clause 10 of MRTS30, the minimum CBR value for the BTB shall be 80.

Period of Currency of Mix Design Approval

The mix design approval will remain current, and the manufacturer will be recognised by the superintendent for supply of bitumen treated base for all work for this project, subject to the following conditions:

- the properties of the constituent materials remain unchanged from that approved
- the proportions of the constituent materials in the mix remain unchanged from the approved mix design
- the in service performance of the pavement incorporating production Bitumen Treated Base manufactured using the approved Mix Design has proven acceptable to the Principal

8401.5.3 Clause 12 of MRTS30 – Construction

The following clauses shall replace the specified clause in MRTS30.

Clause 10.2.6.4 – Layer Thickness Limits

The thickness of each compacted bitumen treated base course shall be as shown in Table 1.2.

<table>
<thead>
<tr>
<th>Compacted Layer Thickness (mm)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>80</td>
</tr>
</tbody>
</table>

Clause 12.2.10 – Surface Correction

Minor surface irregularities shall be corrected using the appropriate nominal size asphalt.
Clause 12.3.1 – Compaction Standard

The characteristic value minimum for relative compaction shall be 95%.

Clause 12.3.3.2 – Primary Tolerances

The thickness of each layer at any point shall lie within ±10mm.

8401.6 Measurement and Payment

No separate payment will be made for the works specified in this Supplementary Specification. Provision for these works shall be deemed to be included in the scheduled unit rates.