

## Local Roads Grants Model – Cost Modifiers

### 1 Freight Intensive Industries

<b>Objective</b>	The freight intensive industries cost modifier recognises local roads in some municipalities carry relatively high volumes of heavy vehicles compared to others, which impacts on the cost of asset preservation.
<b>Applied to</b>	The freight intensive industries cost modifier is applied to the average annual preservation costs for each traffic volume range for each council to reflect the level of need of the council relative to others. The freight cost modifier is combined with the other four cost modifiers by being multiplied together in the roads model to produce an overall cost modifier.
<b>Source data</b>	<ul style="list-style-type: none"><li>Australian Bureau of Statistics, Census 2016 of Population and Housing, Local Government Area, (Place of Work) Employment by Industry, downloaded by ABS TableBuilder October 2017.</li></ul> <p>Industry categories used:</p> <ul style="list-style-type: none"><li>Agriculture, Forestry and Fishing</li><li>Electricity, Gas, Water and Waste Services</li><li>Mining</li><li>Manufacturing</li><li>Transport Postal and Warehousing</li><li>Wholesale Trade</li></ul>
<b>Index Construction</b>	<p>The freight intensive industries index has been constructed by identifying, of the 17 ABS industry classifications, those six that are assessed as being more freight-intensive.</p> <p>For each municipality, an index of total employment in the above industries relative to the total resident population within the municipality is derived.</p> <p>These values are spread across a range from 0.95 to 1.10.</p> <p>The index infers that those municipalities with greater levels of employment in the freight-intensive industries will see relatively higher levels of freight carriage on their local roads network, leading to more rapid road surface deterioration and relatively higher road maintenance costs.</p>

## Local Roads Grants Model – Cost Modifiers

### 2

## Climate

**Objective** The climate cost modifier recognises that certain climatic conditions have an adverse impact on road durability and increase the costs of asset preservation to affected councils.

**Applied to** The climate cost modifier is applied to the average annual preservation costs for each traffic volume range for each council to reflect the level of need of the council relative to others. The climate cost modifier is combined with the other four cost modifiers by being multiplied together in the roads model to produce an overall cost modifier.

**Source data**

- GHD Pty Ltd, “Report for GIS Mapping of Local Roads and Cost Modifiers, Methodology of Determining Road Management Authorities and Cost Modifiers”, August 2011.

GHD has provided summaries of road types, maps and datasets for all councils, based on Soil Rating, Climate Zones, quarry distances and road owners.

Data sources used by GHD:

- VicRoads Roads and VicMap – LGA Boundaries and roads

Maps source:

- VicMap (2010), DSE; VicMap Roads dataset modified by GHD.

**Index Construction** The climate index has been constructed by identifying the lengths of urban and rural roads that fall within the five climatic zones utilised by Standards Australia, to produce an average climate rating for both rural and urban roads each municipality.

Urban roads index values are spread across a range from 0.95 to 1.10. Rural roads index values are spread across a range from 0.75 to 1.25, reflecting the relatively greater influence of climate conditions on rural roads.

The road lengths of municipalities with the highest proportion of adverse climate conditions are allocated the maximum value of 1.10 (urban) or 1.25 (rural).

The road lengths with the most favourable climate conditions are allocated the minimum value of 0.95 (urban) or 0.75 (rural).

## Local Roads Grants Model – Cost Modifiers

### 3 Materials Availability

**Objective** The materials availability cost modifier recognises that the cost of maintaining local roads can be impacted by the local availability of suitable pavement materials.

**Applied to** The materials availability cost modifier is applied to the average annual preservation costs for each traffic volume range for each council to reflect the level of need of the council relative to others. The materials availability cost modifier is combined with the other four cost modifiers by being multiplied together in the roads model to produce an overall cost modifier.

**Source data**

- GHD Pty Ltd, “Report for GIS Mapping of Local Roads and Cost Modifiers, Methodology of Determining Road Management Authorities and Cost Modifiers”, August 2011.

GHD has provided summaries of road types, maps and datasets for all councils, based on Soil Rating, Climate Zones, quarry distances and road owners.

Data sources used by GHD:

- VicRoads Roads and VicMap – LGA Boundaries and roads

Maps source:

- VicMap (2010), DSE; VicMap Roads dataset modified by GHD

**Index Construction** The materials availability index is constructed by determining the distance between the nearest quarry location and the council headquarters.

These distances are spread across a range from 0.95 to 1.05, with the council with the least accessibility to hard rock quarries being allocated the maximum value of 1.05, and councils with the greatest access 0.95.

All metropolitan councils (excluding interface councils) have had their index set at the minimum 0.95, reflecting the availability of materials from a variety of sources.

## Local Roads Grants Model – Cost Modifiers

### 4 Sub-Grade

<b>Objective</b>	The sub-grades cost modifier recognises that the performance life of road pavements is affected by seasonal swelling and shrinkage of the sub-grade, which accelerates the deterioration of the pavement and adds to asset preservation costs. In Victoria, this is a particular issue in areas with expansive clay sub-grades, which occur predominantly in the western suburbs of Melbourne and western Victoria.																					
<b>Applied to</b>	The sub-grades cost modifier is applied to the average annual preservation costs for each traffic volume range for each council to reflect the level of need of the council relative to others. The sub-grades cost modifier is combined with the other four cost modifiers by being multiplied together to produce an overall cost modifier.																					
<b>Source data</b>	<ul style="list-style-type: none"> <li>• GHD Pty Ltd, “Report for GIS Mapping of Local Roads and Cost Modifiers, Methodology of Determining Road Management Authorities and Cost Modifiers”, August 2011.</li> </ul> <p>GHD has provided summaries of road types, maps and datasets for all councils, based on Soil Rating, Climate Zones, quarry distances and road owners.</p> <p>Data sources used by GHD:</p> <ul style="list-style-type: none"> <li>• VicRoads Roads and VicMap – LGA Boundaries and roads</li> </ul> <p>Maps source:</p> <ul style="list-style-type: none"> <li>• VicMap (2010), DSE; VicMap Roads dataset modified by GHD</li> </ul>																					
<b>Index Construction</b>	<p>The sub-grade index has been constructed by calculating the total number of kilometres of urban and rural local roads in each municipality in each of the eight sub-grade categories (based on GHD mapping).</p> <p>From this information, an average sub-grade rating has been produced for each municipality for both urban roads and rural roads, and an index is produced ranging from 0.0 to 5.0 for each road type, which is then converted into an index range from 0.95 to 1.10.</p> <p>Soil reactivity is a measure of how much the soil expands or contracts due to changes in the soil moisture content. Reactive soils expand upon increases in moisture content and contract as they dry out. The greater the volume change of the soil, the higher the reactivity of the soil is. It is theorised that for higher reactivity soils, associated road maintenance costs will be higher due to the damage caused to the paved surface due to movement.</p> <table border="0" style="margin-left: 20px;"> <tr> <td style="padding-right: 20px;">E</td> <td style="padding-right: 20px;">(x5.0)</td> <td>Extreme reactive clay or silt sites, which can experience extreme ground movement from moisture changes</td> </tr> <tr> <td>H-E</td> <td>(x5.0)</td> <td></td> </tr> <tr> <td>M-E</td> <td>(x4.0)</td> <td></td> </tr> <tr> <td>H</td> <td>(x3.3)</td> <td>High reactive clay or silt sites, which can experience high ground movement from moisture changes</td> </tr> <tr> <td>M-H</td> <td>(x2.5)</td> <td></td> </tr> <tr> <td>M</td> <td>(x2.0)</td> <td>Moderately reactive clay or silt sites, which can experience moderate round movement from moisture changes</td> </tr> <tr> <td>S-M</td> <td>(x1.7)</td> <td></td> </tr> </table>	E	(x5.0)	Extreme reactive clay or silt sites, which can experience extreme ground movement from moisture changes	H-E	(x5.0)		M-E	(x4.0)		H	(x3.3)	High reactive clay or silt sites, which can experience high ground movement from moisture changes	M-H	(x2.5)		M	(x2.0)	Moderately reactive clay or silt sites, which can experience moderate round movement from moisture changes	S-M	(x1.7)	
E	(x5.0)	Extreme reactive clay or silt sites, which can experience extreme ground movement from moisture changes																				
H-E	(x5.0)																					
M-E	(x4.0)																					
H	(x3.3)	High reactive clay or silt sites, which can experience high ground movement from moisture changes																				
M-H	(x2.5)																					
M	(x2.0)	Moderately reactive clay or silt sites, which can experience moderate round movement from moisture changes																				
S-M	(x1.7)																					

## Local Roads Grants Model – Cost Modifiers

### 5 Strategic Routes

<b>Objective</b>	<p>The strategic routes cost modifier recognises that certain local roads must be maintained to a higher standard than would be normally be the case because of certain characteristics or functions they perform.</p>
<b>Applied to</b>	<p>The strategic routes cost modifier is applied to all road categories.</p> <p>Local roads that are tram or bus routes are considered to be strategic routes.</p> <p>Bus routes include both normal scheduled public transport routes and special school-only routes on local roads in both urban and rural areas.</p> <p>For rural roads carrying less than 100 vehicles a day (other than natural surface roads), the following roads are also deemed to be strategic routes:</p> <ul style="list-style-type: none"><li>• roads carrying at least 10 trucks a day (on average);</li><li>• roads with average grades exceeding 6 per cent, carrying at least 50 vehicles a day on average; and</li><li>• roads carrying at least 50 vehicles a day on average in a drip or flood irrigated horticultural or agricultural areas.</li></ul> <p>The strategic routes cost modifier is applied to the average annual preservation costs for each traffic volume range for each council to reflect the level of need of the council relative to others. The strategic routes cost modifier is combined with the other four cost modifiers by being multiplied together to produce an overall cost modifier.</p>
<b>Source data</b>	<ul style="list-style-type: none"><li>• Victorian Local Government Grants Commission – Accounting &amp; General Information Questionnaire completed by councils annually.</li></ul>
<b>Index Construction</b>	<p>For each traffic volume category in the annual data return, councils report on the number of kilometres of strategic routes within their municipalities, which is converted into proportions of the total local road lengths for the purposes of the local roads grants model.</p> <p>A cost modifier for the strategic routes cost modifier is calculated using the equations in Table B.4 of the final report on the “Review of Distribution Arrangements for Local Roads Funding in Victoria (July 1999)” and the cost modifier in Table 3 (a revised version of Table 7.1 in the July 1999 report) of a report prepared by ARRB Transport Research Ltd during its review of the asset preservation costs in early 2003. The Asset Preservation Costs were reviewed in 2014.</p>