Assessment of Pavement Impacts of Developments

Lessons from

the Department of Transport and Main Roads
Context

• Road authorities seek to maintain road networks to maximise whole-of-life performance;

• Increased heavy vehicle traffic adversely impacts on road pavements;

• The Mineral and Energy Resources (Common Provisions) Act 2014 and Mineral and Energy Resources (Common Provisions) Regulation 2016 requires a resource company to compensate public road authorities for costs related to their road use;

• There are also instances outside the Mineral and Energy Resources Act where this protocol may apply;

• Many local governments are not fully set up to calculate the compensation to which they are entitled.
Pavements are designed to carry a pre-determined level of traffic (measured in ESAs) over the life of the pavement.

Equivalent Standard Axles (ESAs) is a measure defining the cumulative damage effect to the pavement of the design traffic.
Guidelines for Assessment of Road Impacts of Development Proposals (GARID)

• Determine current traffic;
• List development traffic;
• Calculate development ESAs;
• Calculate ESAs with and without development;
• Predict when rehabilitation is required with and without development;
• Predict the cost of pavement rehabilitation;
• Establish if widening is required;
• Predict the total cost of maintenance;
Guidelines for Assessment of Road Impacts of Development Proposals (GARID)

Remaining pavement life (in ESAs) is the difference between the pavement design life (in ESAs) and cumulative past traffic.

Maintenance costs are the average of the previous three (3) to five (5) years of historic costs for the subject road section.
Hick’s / Fitzroy Methodology

Remaining pavement life estimated using current pavement roughness.

Maintenance costs estimated from seal width.
Hick’s / Fitzroy Methodology
EXCEL spreadsheet

Strengths
• Consistent formatting;
• Agreed starting point for negotiations;
• Improved transparency;
• Developer ownership of contributions.

Weaknesses
• Inconsistent assessment of with and without development traffic;
• Limited to scenarios where the total development impact is less than the remaining pavement life.
A new assessment methodology, i.e. the marginal cost methodology.

Standard Axle Repetitions (SARs) replace Equivalent Standard Axles (ESAs)
Guide to Traffic Impact Assessment (GTIA)

1. Determine current traffic
2. List development traffic
3. Will development generated SARs consume the remaining pavement SAR capacity?
   - Yes: Construct pavement upgrade
   - No: Contribute marginal cost

19 September 2019
Revision 1
Marginal cost methodology extended to unsealed roads.

Pavement impact assessment area defined in terms of SAR4s for sealed roads and load units (LU) for unsealed roads.

Remaining pavement SAR capacity assessment removed.
Marginal Cost Methodology

Marginal costs ($/SAR-km or $/LU-km) sourced from
• Freight Axle Mass Limits Investigation Tool (FAMLIT) for sealed roads
• Local Road Deterioration Study (LRDS) for unsealed roads.

Conceptually similar to the Hick’s / Fitzroy methodology
i.e. contributions calculated from current conditions using deterioration and intervention models.
Marginal Cost Methodology
Freight Axle Mass Limits Investigation Tool (FAMLIT)

**Strengths**
- Realistic / accurate;
- Simple for developers.

**Weaknesses**
- Data intensive;
- Complex for road authorities;
- Limited to scenarios where the development impact is less than 40% of the existing traffic load.

**Threats**
- Sensitive to current pavement strength.
# Summary of Department of Transport and Main Roads (TMR) Guidelines

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Year</th>
<th>Remaining Pavement Life estimated from</th>
<th>Maintenance Costs estimated from</th>
</tr>
</thead>
<tbody>
<tr>
<td>GARID</td>
<td>2000</td>
<td>Design pavement life</td>
<td>Historic data</td>
</tr>
<tr>
<td>Hick’s / Fitzroy Methodology</td>
<td>~2012</td>
<td>Traffic independent deterioration model</td>
<td>Traffic independent intervention model</td>
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<tr>
<td>GTIA</td>
<td>2017</td>
<td>Traffic dependent deterioration model</td>
<td>Traffic dependent intervention model</td>
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Implications for Local Government

Developers expect pavement impact assessment to be simple, realistic and accurate.

To use the TMR guidelines to assess pavement impacts, local governments must be able to provide the relevant data.
Local Governments should ask themselves...

• What data do we have available to estimate remaining pavement life?

• What data do we have to estimate maintenance costs?

• How are we going to use this data to calculate the compensation to which we are entitled?