Lean roads and Greenroads®

Environment and Urban Design Team, NZ Transport Agency
An interesting journey...

SH73, Arthurs Pass
Resource efficiency

Achieving the best possible output for the least volume of materials and energy consumed while providing relevant levels of service.
We seek to responsibly manage our interactions with New Zealand's people, places and environment.

Emissions from road transport are estimated to comprise approximately 77% of New Zealand's greenhouse gas emissions.

There are over 2,000 kilometres of state highways located in urban areas, which can affect the connectivity, character, biodiversity, social and cultural aspects of our communities.

Over 200 kilometres of the state highway network is located within ecologically sensitive conservation areas managed by the Department of Conservation.

The Transport Agency operates and maintains over 3,000 bridges and 10,000 culverts, which can change the quality and character of our harbours, estuaries, rivers, streams and watercourses.

New Zealand's themed highway system traverses more than 4,000 kilometres of our unique scenic landscapes and natural areas.

The state highway network can affect our public, commercial, residential and recreational places.

The Transport Agency is developing a capital programme to improve the resilience of the state highway network against natural and man-made hazards.

The state highway network can change local access and movement patterns.

There are more than 300 registered heritage sites within 200 metres of the roads of national significance.

State highway operation and improvement can change natural habitats and affect native flora and fauna.

The state highway network can change people's mode of travel, including cycling, walking and public transport.

In 2015 over 40 billion kilometres were travelled on New Zealand roads.

In 2015 the Transport Agency held over 2,000 resource consent and other environmental permits related to operating and improving the state highway network, including for discharges to air, water, and land.

Every year the Transport Agency receives more than 100 complaints related to road traffic, noise and vibration.

In 2016 the Transport Agency maintained 694 hectares of vegetation along the state highway network.

Approximately 22% of the total health and social costs associated with man-made air pollution is attributable to motor vehicle emissions.

Every year there are spills of potentially hazardous substances on the state highway network.

In 2015 there were over 50 plans in place to manage potential environmental and social effects of the construction and maintenance of the state highway network.

In 2015 the Transport Agency held 90 archaeological authorities for capital projects across New Zealand.

In 2016 the Transport Agency held 90 archaeological authorities for capital projects across New Zealand.

Nearly 724 million litres of water are used by the state highway network each year.

The forecast growth of freight by 2031.

For state highways it means...
The reality...
The story so far
Wellington’s Ngauranga to Aotea Quay upgrade

RESOURCE EFFICIENCY CASE STUDY

Repurposing unused bridge structure
Recycled and alternative materials currently allowed on Transport Agency projects

The list below outlines the recycled materials currently allowed on Transport Agency projects. The list also provides limitations by volume of mass and relevant comments with regards to the material use.

Overview of recycled materials allowed by the NZ Transport Agency

M4 - Basecourse aggregate

<table>
<thead>
<tr>
<th>Material type</th>
<th>Allowed</th>
<th>% by mass</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycled crushed concrete (RCC)</td>
<td>Yes</td>
<td>No restriction</td>
<td>RCC use must be approved by the appropriate regional council.</td>
</tr>
<tr>
<td>Glenbrook melter slag</td>
<td>Yes</td>
<td>No restriction</td>
<td>Slag use must be approved by the appropriate regional council.</td>
</tr>
<tr>
<td>Reclaimed glass</td>
<td>Yes</td>
<td>5%</td>
<td>Proportions of cullet in excess of 5% may be used at the discretion of the NZ Transport Agency National Pavements Manager, provided that the requirements of the T/15 specification have been satisfied.</td>
</tr>
</tbody>
</table>

Consider resource efficiency opportunities for each pavement layer and project section individually.

1. Have you considered any of the resource efficiency options below for your project?
   - In-situ stabilization of subgrade materials
   - Use of recycled materials

2. Is it technically feasible to use these materials?
   - Do structures on the project site need to be given higher loadings?
   - Are recycled materials available or obtainable with no or minimal extra cost?

3. Would the longevity of the project benefit from long-life pavement materials?
   - Would the longevity of the project benefit from using recycled materials?
   - Would the longevity of the project benefit from using green materials?

4. Are recycled materials available or obtainable with no or minimal extra cost?
   - Can recycled materials be supplied in sufficient quantities?
   - Can recycled materials be used in the project?

5. Specify recycled/alternative materials used in the project.
# Greenroads Categories: Version 2

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Requirements</td>
<td>12 minimum requirements for a Greenroad</td>
<td>0</td>
</tr>
<tr>
<td><strong>Core Credits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment &amp; Water</td>
<td>Habitat, vegetation, soil, water, stormwater</td>
<td>30</td>
</tr>
<tr>
<td>Construction Activities</td>
<td>Construction equipment, processes, quality</td>
<td>20</td>
</tr>
<tr>
<td>Materials &amp; Design</td>
<td>Material processing, transport, design</td>
<td>24</td>
</tr>
<tr>
<td>Utilities &amp; Controls</td>
<td>Operational systems, mobility, maintenance</td>
<td>20</td>
</tr>
<tr>
<td>Access &amp; Livability</td>
<td>Modal access, culture, aesthetics, safety</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td><strong>Total Voluntary Credit Points</strong></td>
<td>115</td>
</tr>
<tr>
<td>Creativity &amp; Effort</td>
<td>Local values, integrated teams, write your own</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td><strong>Total Points</strong></td>
<td>130</td>
</tr>
</tbody>
</table>
40-49 points

50-59 points

60-79 points

80+ points
# Materials and Design Credits

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD-1</td>
<td>Preservation and Reuse</td>
<td>Encourage practices that preserve and reuse existing materials within the Project boundary.</td>
<td>1-5</td>
</tr>
<tr>
<td>MD-2</td>
<td>Recycled and Recovered Content</td>
<td>Reduce or eliminate the Project’s needs for the extraction and production of virgin materials.</td>
<td>1-5</td>
</tr>
<tr>
<td>MD-3</td>
<td>Environmental Product Declarations</td>
<td>Improve supply chain transparency of environmental impacts due to Project products and materials.</td>
<td>2</td>
</tr>
<tr>
<td>MD-4</td>
<td>Health Product Declarations</td>
<td>Improve supply chain transparency of human health impacts due to Project products and materials.</td>
<td>2</td>
</tr>
<tr>
<td>MD-5</td>
<td>Local Materials</td>
<td>Reduce impacts from transport of materials to the Project and stimulate local economies.</td>
<td>1-5</td>
</tr>
<tr>
<td>MD-6</td>
<td>Long Life Design</td>
<td>Encourage development of long-lasting Projects that reduce maintenance needs and lifecycle costs.</td>
<td>1-5</td>
</tr>
</tbody>
</table>
Rubber in roads

The Transport Sector Research Fund has approved and is funding a research project to identify the barriers to using tyre-derived crumb rubber in bitumen binder in NZ roads. This project also aims to understand the mechanisms to remove these barriers to create market demand for NZ waste tyre-derived products.

Internationally tyre-derived crumb rubber has become a common alternative additive to bituminous binders since the 1970s, addressing pavement performance issues as well as tackling the disposal problem of end-of-life tyres. While early trials of crumb rubber in both hot mixed asphalt (HMA) and chip seal pavements have resulted in mixed performances, technological advances and ongoing research and practices internationally have demonstrated that crumb rubber can be effectively incorporated into road surfacing.

In New Zealand, rubber has only been used in the form of natural rubber latex or styrene-butadiene-styrene block copolymer (SBS) from around the 1970s. Crumb rubber from waste tyres has not been used to any extent in normal road pavement maintenance or construction.

Recycled aggregate waste research

Together with local government, academia and industry partners, the Transport Agency is co-funding a research project into the use of recycled aggregate at the Centre for Infrastructure Research at the University of Auckland. The aim of this project is to determine the size of the Auckland recycled aggregate market, the type of materials available, and what recycled materials might be suitable for use as aggregates in roadworks.

There are two work streams associated with the project. The first stream is to understand the nature and engineering performance of current recycled aggregate within the Auckland market. The second stream focussed on guiding roadworks providers, consultants, contractors and suppliers to increase their uptake of recycled aggregate materials.

This research will help to create a better understanding of what recycled materials the market can actually supply. This will ultimately reduce the need for virgin use, transport of quarried materials and landfill disposal costs for recyclable materials.
What’s next?
What might this mean for you?

• What is your view?
• What are the opportunities on your project?
• What is your experience ($, risks, contexts)?
• Can we promote your outcomes?
• Are you prepared?
Thank you

Environment and Urban Design Team