NATSPEC// Construction Information

Project report
Phase 2 - VIC

Use of recycled materials for local roads in Victoria

This Project report is a summary of the identifying barriers for adoption of recycled materials for local roads based on the Council responses received to date from Victoria.

CONTENTS

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

1 INTRODUCTION

1.1 Use of recycled materials for roadworks

Road authorities are responsible for improving the sustainability of road asset management. They can improve their sustainability targets by applying the principles of waste hierarchy and by reducing the waste going to the landfill. Road authorities require a continuous supply of materials for road construction and maintenance of their large network. With depleting natural resources and virgin materials, the road authorities are looking for other alternatives and are utilising recycled materials which would otherwise end up in the landfill. Road authorities are also investigating to integrate circular economy principles and waste minimisation to their day to day operations in general.

1.2 Background

The State wide Waste and Resource Recovery Infrastructure Plan (the SWRRIP) developed by Sustainability Victoria (SV), provides a roadmap for the waste and resource recovery sector over the next 30 years. It highlights the need to reduce reliance on landfills and make better more sustainable use of our waste and resources. Our waste contains valuable materials, which can be used in roads, buildings and in the manufacturing of new products and packaging.

2 OBJECTIVE

2.1 Aim of the project

'The 2018 National Waste Policy, Strategy 8 highlights sustainable procurement by all levels of government and promote demand for recycled materials and products containing recycled content.'

The focus of sustainable procurement is not only on asset delivery but to include sustainable practices integrated into the life cycle of an asset. Keeping these principles in mind, Sustainability Victoria, (SV) Office of Projects Victoria (OPV), NATSPEC, Institute of Public Works Engineering Australasia (IPWEA) and the Civil Contractors Federation (CCF), have formed a Sustainable Asset Futures (SAF) Committee. The committee aims to create more opportunities to use recycled content in roads construction and achieve the circular economy objectives set out by the state government.

2.2 Phase 1 – Using recycled content in roads construction - Sustainability Survey

The Phase 1 of the project was to understand where the Councils are in their journey of using recycled materials, NATSPEC sent letters to all 537 Australian Councils in March 2019 to gather information regarding their current policies, specifications for utilising recycled materials in roads. Over 74 Councils responded to our enquiry in gathering information, for utilising recycled material for new roads, road maintenance and replacement. The responses received from Councils have now been compiled, and the following documents were developed:

- Project report: Use of recycled materials for roadworks in local government.
- *TECHnote GEN 028 Specifying recycled materials for roadworks using AUS-SPEC*. (See **Appendix 5**).

The Project report is complete and is available at https://www.natspec.com.au/resources/aus-spec-projects.

2.3 Phase 2 – Recovered resources and recycled content in road construction

Phase 2 of the survey was conducted in July/August 2019, which surveyed Victorian Councils to gain more detailed information about the barriers and opportunities of using recycled content for new roads, road maintenance and replacement. Letters and emails with the survey link where sent out to all Victorian councils by Sustainability Victoria, NATSPEC and members of the SAF Committee to seek responses from the Councils' Engineering and Infrastructure Development Sections about the current use, procurement methods, barriers to the greater use of recovered or recycled content in road construction, available information resources to develop a library of information available to the industry and the role state government on the initiatives relating to the use of sustainable construction materials.

2.4 Overview summary

Out of the 79 Councils in Victoria, 53 Councils responded to the survey. The major barriers identified by the Councils for the use of recycled materials were:

- Lack of availability of materials, this was identified more by rural councils than urban councils.
- Uncertain quality, performance and costs related more to the quality of available recycled materials and its performance on their road network.
- Lack of available specifications.

To enable further use, the majority of the Councils' want better availability of materials and development of specifications. The detailed summary of responses for Phase 2 are available in the attached Appendices.

2.5 Next steps

The SAF Committee have determined the next steps and will consider the following:

- The role of government to encourage the use of recycled materials in local roads. This aligns with the statutory objectives and goals of the SAF Committee members and will further facilitate and promote environmental sustainability in the use of resources now and in the future.
- Draft a sustainable statement/policy which can be adopted by the Councils. NATSPEC will assist in developing the draft sustainable policy template for Councils to include the use of recycled materials in roadworks as part of their procurement process.
- Draft a performance-based specification for the use of recycled materials for pavements. NATSPEC will draft a performance-based specification with input and support from the SAF Committee members. The SAF members will share the research and trial results of various projects that they are currently underway using new recycled materials for civil works. This will assist in including the recycled materials with proven performance in the specifications.
  A performance-based specification will provide consistency and harmonisation of documentation for the use of recycled materials in local roads in Victoria.

3 APPENDIX 1 - PHASE 2 - SUMMARY OF RESPONSES

3.1 Council responses

We received 59 responses overall. Out of 79 Councils in Victoria 53 Councils, 2 consultants, 1 contractor and 2 manufacturers responded to the survey. For the purpose of this report, we have collated the responses from 53 Victorian Councils and the responses received from consultant, contractor and the manufacturers have been summarized in **3.7 Other responses**.

3.2 Current Status

3.2.1 Sustainable policy

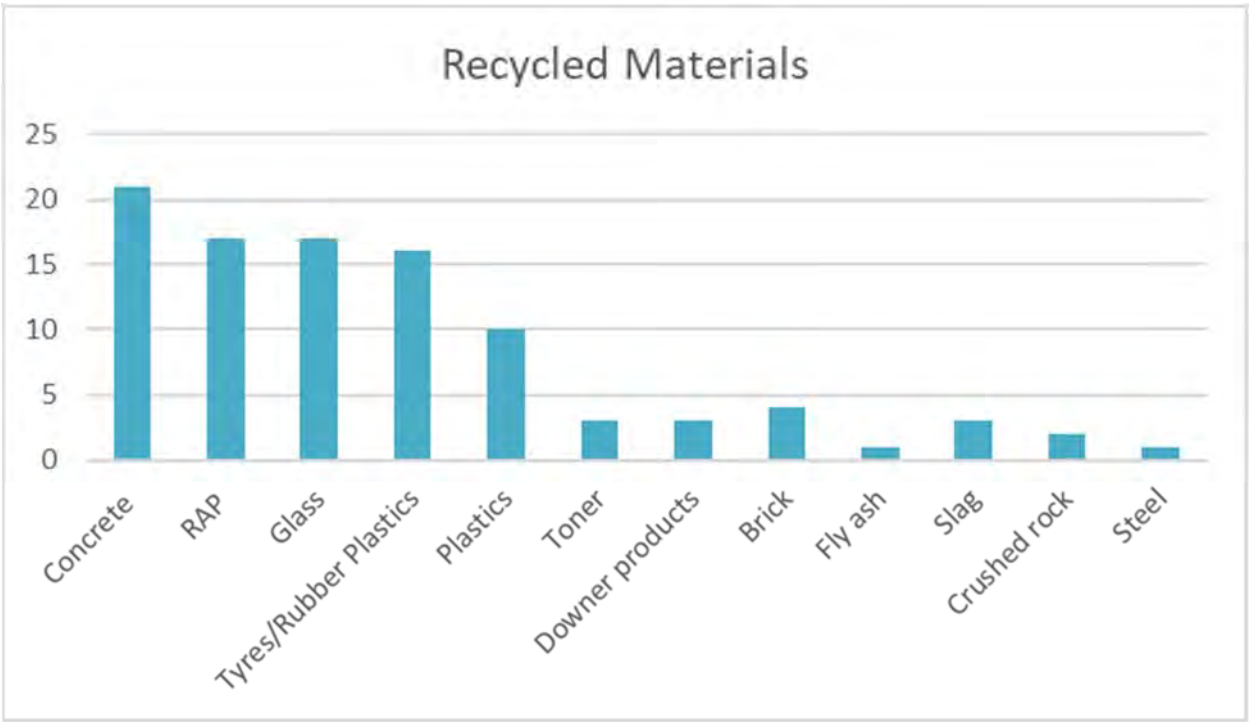
12 Councils responded that they either had a climate change strategy or an environmental sustainability policy. 4 Councils also have a sustainable procurement policy. These councils also shared the links to their policies. Additional information provided in **Appendix 4.**

3.2.2 Councils using specifications for recycled materials

33 Councils use specifications for specifying recycled materials. 19 Councils use VicRoads specifications, 7 Councils use specifications but did not mention which specifications they are using to specify the use of recycled materials. Additional information provided in **Appendix 4.**

3.2.3 Types of recycled materials being used by councils for roadworks

The types of recycled materials used for road construction varied from the use of RAP, crushed concrete, crushed glass, crumb rubber, products provided by Downer like Reconophalt, Toner pave, plastiphalt, printer toner, road profiling, construction and demolition waste including bricks and steel etc., slag and plastics etc.



3.2.4 Reasons for choosing recycled materials

The majority of respondents chose to use recycled materials for the following reasons:

Reasons for selecting recycled materials	Number of respondents
Sustainability	19
Cost saving	13
Better performance compared to using virgin materials	10
Availability	8
Own supply	3
Support market	2
Recycled materials included in specifications	2
Design requirements	1
Community requirements	1
Reduce transport	1

3.3 Procurement methods

3.3.1 Management of roads and footpath procurement

40 Councils responded that they have either a Procurement and Contracts Manager, Coordinator of Civil Works, Coordinator Project Delivery or a Coordinator Infrastructure Delivery at their Council who are responsible for procurement of materials and services for their infrastructure works.

40 Councils responded to ready access to suppliers of recycled materials. 20 Councils had ready access to suppliers whereas 20 Councils indicated they did not. The Councils have mentioned the names of different suppliers like Alex Fraser, Fulton Hogan, Downer, SKM, Gippsland Concrete recycled Traralgon, R&C Asphalt, Circle P. Many councils have indicated that they use various suppliers.

3.4 Barriers of use of recovered or recycled materials

3.4.1 Barriers of using recycled materials

The main barriers to local councils' use of recycled materials in road works were the following

Barriers	Number of respondents
Lack of availability	15
Uncertain quality	14
Cost	13
Unsure of performance	11
Lack of specifications	8
Lack of knowledge of recycled materials	7

Barriers	Number of respondents
Distance/transport	4
Consistent use of quarry materials	4
Risk	3
Market underdeveloped	3
Limitations due to contractor	3
Habitual use of current specifications	2
Trials too lengthy	2
Reliance on state authorities for innovation	1

Lack of availability response was more from rural councils than urban councils. Some other responses included:

'Councils too reliant on state road authorities to lead the way with adopting recycled products in road construction without realizing that fact that most new materials/mixes are better suited for the local road network.'

'Quality of the recycled material is a barrier'.

'Contractor preferences and perceptions, supplier competition and lack of competitive tendering'.

'Lack of understanding the advantages of using recycled materials'.

3.4.2 Enable further use of recycled materials

To some extent, councils' ideas about how to enable further use of recycled materials reflected their responses to barriers. Again, availability was the most common response. A number of councils felt that knowledge, specifications and standards incorporating recycled content and a lower cost of these materials would help councils to use them more in their road infrastructure. Six councils suggested government funding as a way to lower the cost. Many respondents are uncertain about quality, with trials and research, guaranteed high performance of recycled materials and better quality were some of the ways to enable further recycled content use. Regulations such as mandatory use and certification of materials were also named as factors that would enable councils to use more recycled materials. Some typical responses were:

'Increased external funding and mobile recycling facilities will enable further use'

'Markets for receiving, separating and processing would enable further use'.

'Specification document relevant to council scale project will enable further use'

'Reduced construction cost and proven increase in asset life will enable further use'.

'Research into lifespan of recycled materials to prove comparability with non-recycled materials will help'.

Enable further use of recycled materials	Number of respondents
Availability	14
Specifications and standards	13
Lower cost	12
Trials and research	8
Guarantee of performance	7
Government and other funding	7
Improved knowledge	5
Better quality materials	5
Mandatory use	3
Certification of materials	3
Material able to be profiled and recycled again	1
Industry partnerships	1
Removal of excessive restrictions	1
Wider markets	1
Quarries running out	1

To enable further use of recycled materials the specifications and standards required was identified by 13 Councils. The responses received were a mix from urban and rural councils, but availability was an issue more for rural councils than urban councils. This highlights the need for an independent specification which can respond quickly to the council needs, is regularly updated, reflects the current industry requirements and permits innovation. AUS-SPEC is currently updated regularly to address the needs of the councils and permits the use of recycled materials in various specifications as summarized in the NATSPEC TECHnote GEN 028 *Specifying recycled materials for roadworks using AUS-SPEC* (See **Appendix 5**).

3.5 Information resources

3.5.1 Research and development

Many respondents are conducting or planning to conduct trials with different recycled materials, mainly crushed concrete, crumb rubber and RAP. Research and development involving increasing the percentages of recycled materials in pavements was among the more common issues identified. Councils are generally in the testing phase to establish the performance and characteristics of different materials. Some are collaborating with external organisations. 19 Councils have suggested that the following for research and development currently is being done or planned:

- Increasing percentage of recycled content including crumb rubber, RAP and glass in asphalt mixes.

- Use of recycled glass as a substitute to sand and crushed concrete in road base material. Effects of crumb rubber on mechanical properties of crushed rock.
- Use of high recycled content in rehabilitation project trial and trials with ARRB.
- Road surfacing R&D laboratories and test performance of recycled materials in road pavements.
- Crushed concrete in gravel road maintenance, trial of recycled materials in unsealed roads and use of additives in existing pavement instead of re-sheeting to increase longevity of unsealed roads.
- 'Procurement for innovation' contract for road construction products using kerb side recycling and waste recovery.
- Monitor long-term performance of different recycled materials.

3.6 Role of government

3.6.1 Actions for state government suggested by Councils

Actions required	Number of respondents
Funding	25
Tests, research and trials	11
Specifications and documentation	9
Policy	9
Market	7
Education	5

The state government actions suggested by survey respondents came in six major categories. A significant number suggested greater funding, grants and other financial incentives from the government. More tests, research and trials to ensure the high performance of recycled materials was the next most common suggestion. Respondents also suggested government policy covering recycled materials and sustainability and specifications and documentation. Seven respondents want state government assistance in expanding and strengthening the market for recycled materials. A further five councils suggested the government take a greater role in educating the industry about recycled materials and their properties.

3.7 Other responses

3.7.1 Consultants

The barrier mentioned by the consultant was that the regionally recovered glass was not clean and a pre-cleaner before crushing would provide confidence in integrity. Barriers include lack of trust in quality of the product, unknown fatigue performance, cost of recycled materials as compared to virgin materials. Guarantees of performance, specifications and funding would enable further use. The consultants' suggestion for R&D was looking at the waste recovery and suggested action by the State government was directing waste collection and recovery. More funding for R&D to advance innovative ideas.

3.7.2 Contractor

The barriers mentioned by the contractor (Downer) were that specifications often take a long time to allow innovative new products introduced or trialled. Competing pressures do not want to provide unnecessary risk to the public. There should be focus on 'performance quality assurance' rather than outdated material specifications focusing on input products themselves (as opposed to output product performance). Governments, road authorities and asset owners should encourage innovative new materials to reduce reliance on quarried products. To enable further use investment in trials with approval from VicRoads and others, incentives from government and road authorities will benefit. We have leading laboratories in the country for road surfacing research and development. The State government should provide investment to allow industry to drive change through its own R&D.

3.7.3 Manufacturer

The barriers mentioned by 2 manufacturers were existing commonly used specifications. There is a need for specifications that they can rely on to give them confidence in the quality of the products. Barriers also included civil engineers' knowledge of their products and the specification of the use of recycled products. Minimum content requirements, knowledge, specification and accreditation will enable further use. The suggestions made for R&D were continuously looking to increase the number of recycled materials in their products and specifying the total percentage content while ensuring end quality and whole of life cost and new product development in stormwater pipes. Suggested actions for State government were to drive specifiers agree to suitable specifications as a matter of urgency and mandate minimum recycled content use.

4 APPENDIX 2 – RECYCLED CONTENT IN ROAD CONSTRUCTION SURVEY

Welcome to the survey on Recovered Resources and Recycled Content in Roads Construction.

This survey is part of Phase 2 of the research project on recycled materials in local roads, conducted by NATSPEC, the Institute of Public Works Engineering Australasia, the Civil Contractors Federation, Sustainability Victoria and the Office of Projects Victoria.

It will take approximately 10-12 minutes to complete.

Your responses will help the project partners to develop new specifications and encourage the use of recycled content in local government roads.

To begin the survey, please answer the question below:

1. Respondent Details

Name	
Job Title	
Organisation	
Email Address	
State	

2. Organisation Type:

- ◯ Local Council
- ◯ Contractor
- ◯ Engineering Consultant
- ◯ Other Consultant
- ◯ Manufacturer

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

Current Status

3. Does your Council have a sustainability policy that encourages the sustainable use of materials?

If yes, please insert/attach here

Choose File No file chosen

4. Does your Council have a formal policy regarding the use of recycled materials for Council asset development and/or maintenance?

If yes, please insert/attach here

Choose File No file chosen

5. Are you currently using specifications or standards for construction of roads and footpaths which incorporate recovered or recycled content (i.e. non-virgin materials)?

- ◯ Yes
- ◯ No

6. Can you detail which recycled content your council uses for construction of roads and footpaths (e.g. recycled concrete, brick, glass, tyres, plastic, or other)?

7. Why are you choosing to use these recycled materials?

8. For the scope that integrates recycled content (i.e. non-virgin sources), can you detail which specifications your council uses?

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

Procurement Methods

9. Who manages road and footpath procurement within your organisation?

Role

Name

10. Do you have ready access to suppliers of recycled materials for roads construction?

- ◯ Yes
- ◯ No

11. If yes to Q10, what are the supplier's contact details?

Role

Name

Barriers to the greater use of recovered or recycled content in roads construction

12. What barriers restrict more use of recovered or recycled content in roads construction?

13. What would enable Councils to use recycled content in roads construction?

Information Resources (to develop a library of information available to the industry)

14. What information on recovered resources or recycled content in roads construction are you currently aware of? (Please provide descriptions/or links)

Case Studies

Specfications

R&D grants

Research

Other

15. To support your answer to Q14 please attach relevant documents below

Choose File No file chosen

16. What current R&D activities are currently being done or are being planned?

Role of Government

17. What should the state government be doing from a sustainable materials point of view?

18. Would you be interested in working with Sustainability Victoria, IPWEA Victoria, NATSPEC, Civil Contractors Federation and Office of Projects Victoria on initiatives relating to sustainable construction materials?

- ◯ Yes
- ◯ No

5 APPENDIX 3 RESPONDING COUNCILS

5.1 Responses received from Victorian Councils

From some of the councils we received multiple responses from the same council but they were from different divisions e.g. from a Sustainability Coordinator and from a Roads Asset Coordinator. They had different responses to the survey questions and have been considered as individual responses.

Adelaide Hills Council	Bass Coast Shire Council	Baw Baw Shire
Bayside City Council	Bayside City Council	Benalla Rural City
Brimbank City Council	Brimbank City Council	Buloke Shire Council
City of Ballarat	City of Casey	City of Casey
City of Casey	City of Greater Bendigo	City of Greater Dandenong
City of Greater Geelong	City of Kingston	City of Melbourne
City of Monash	City of Whitehorse	City of Whittlesea
City of Wodonga	Colac Otway Shire Council	Colac Otway Shire Council
Corangamite Shire	Frankston City Council	Frankston City Council
Gannawarra Shire Council	Hepburn Shire Council	Hobsons Bay City Council
Horsham Rural City Council	Hume City Council	Latrobe City Council
Loddon Shire Council	Macedon Ranges Shire Council	Moira Shire Council
Moorabool Shire Council	Moreland City Council	Mount Alexander Shire Council
Murrindindi Shire Council	Murrindindi Shire Council	Northern Grampians Shire Council
Pyrenees Shire Council	Rural City of Wangaratta	South Gippsland Shire Council
Strathbogie Shire Council	Surf Coast Shire Council	Towong Shire Council
Wellington Shire Council	Wellington Shire Council	Wyndham City Council
Wyndham City Council	Yarra Ranges Council	

6 APPENDIX 4 SURVEY DATA

6.1 Additional survey responses

Organisation		Sustainability Policy	Other Policy	Specs Y/N	Suppliers	Info resources	Participation
Adelaide Hills Council	Council			N	Y	Y	Yes
Anonymous	Council			Y	Y		Yes
Bass Coast Shire Council	Council			Y	N		n/a
Baw Baw Shire	Council						n/a
Bayside City Council	Council			Y	Y		Yes
Bayside City Council	Council	Y		Y	Y	Y	No
Benalla Rural City Council	Council			N	N		No
Brimbank City Council	Council	Y		Y	Y	Y	No
Brimbank City Council	Council	Y		Y	Y	Y	Yes
Buloke Shire Council	Council			N	N		No
Charles Sturt University	Engineering Consultant					Y	Yes
Circle P	Manufacturer						Yes
City of Ballarat	Council			N	Y	Y	Yes
City of Casey	Council			Y	Y	Y	Yes
City of Casey	Council			Y	Y	Y	Yes
City of Greater Bendigo	Council			Y	N	Y	Yes
City of Greater Dandenong	Council	Y	Y	Y	Y		Yes
City of Greater Geelong	Council	Y	Y	Y	Y	Y	Yes
City of Kingston	Council	Y		Y	Y	Y	Yes
City of Melbourne	Council			N	N		Yes
City of Monash	Council		Y	Y	Y	Y	Yes
City of Whitehorse	Council			Y	N		No
City of Whittlesea	Council			Y	Y	Y	Yes
City of Wodonga	Council						n/a
Colac Otway Shire Council	Council			Y	N		Yes
Corangamite Shire	Council						n/a
Downer	Manufacturer						Yes
Downer	Contractor					Y	Yes
Frankston City Council	Council	Y		Y	Y	Y	Yes
Gannawarra Shire Council	Council			N	N	Y	No
Hepburn Shire Council	Council			Y	Y		Yes
Hobsons Bay City Council	Council	Y		N	N		Yes
Horsham Rural City Council	Council						n/a
Hume City Council	Council			Y	Y	Y	Yes
Latrobe City Council	Council			Y	Y	Y	Yes
Loddon Shire Council	Council						n/a
Macedon Ranges Shire	Council	Y		N	N	Y	Yes
Moira Shire Council	Council	Y		N	Y		Yes
Moorabool Shire Council	Council			N	N	Y	Yes
Moreland City Council	Council	Y		Y	Y	Y	Yes
Mount Alexander Shire	Council			N	N	Y	No
Murrindindi Shire Council	Council	Y		Y	N	Y	Yes
Murrindindi Shire Council	Council		Y	Y	N		Yes
Northern Grampians Shire	Council			N	N	Y	Yes
Pyrenees Shire Council	Council			N	N		Yes
Rural City of Wangaratta	Council			N	N		Yes
South Gippsland Shire	Council						Yes
Strathbogie Shire Council	Council			Y	N		No
Surf Coast Shire Council	Council						n/a
VicRoads	Other Consultant					Y	Yes
Wellington Shire Council	Council	Y		N	N		Yes
Wyndham City Council	Council			Y			n/a
Yarra Ranges Council	Council						n/a

7 APPENDIX 5 TECHNOTE GEN 028

7.1 Guidance for specifying recycled materials for local roads

NATSPEC TECHnote guidance for consideration GEN 028

SPECIFYING RECYCLED MATERIALS FOR ROAD WORKS USING AUS-SPEC

INTRODUCTION

The objective of this TECHnote is to assist local road authorities implement the use of recycled materials by including it in their policies, construction specifications and approval processes.

Why the use of recycled materials?

The 2018 National Waste Policy sets a roadmap for collective action by governments, businesses and communities to improve waste management, recycling and resource recovery in Australia. It also highlights sustainable procurement by all levels of government, as one of the important strategies to better manage waste in Australia.

Use of recycled materials in road/civil construction

With the shortage and rising cost associated with the sourcing of traditional natural aggregates and sand from quarries and increased haulage distances for the placement of these materials, the road authorities are seeking alternative solutions. The best ways to prevent valuable waste going to landfill is to consider the waste hierarchy, to reduce, recover, reuse and recycle materials for use in road construction for the following:

- Road base and subbase for flexible and rigid pavements.
- Select fill for use on road subgrades or raising site levels for road or building construction.
- Bedding material for paving blocks in pedestrian areas, car parks, etc.
- Drainage medium for drainage lines and drainage structures.

Recycled materials such as crushed concrete, bricks, reclaimed asphalt, crushed glass, plastics, printer toner cartridges, asphalt millings, slag and crumb rubber can be used for new construction or rehabilitation and reconstruction to improve the performance of existing pavements.

To jointly develop appropriate specification for the industry NATSPEC is currently working with SSROC, Sustainability Victoria, the Office of Projects Victoria, the Institute of Public Works Australasia, and the Civil Contractors Federation to determine opportunities for utilising recycled material for the construction of new roads, road maintenance and replacement to further reduce our landfill.

Use of recycled materials in AUS-SPEC

Currently AUS-SPEC includes the use of various recycled materials in design, construction and maintenance worksections for the benefit of the designers and specifiers.

Design worksections

AUS-SPEC Design worksections include the use of recycled materials in *Template* to encourage the designers to recommend these materials at the design stage in *0042 Pavement design*, *0043 Subsurface drainage*, *0044 Pathways and cycleways*, *0053 Rural pavement design – sealed*, *0054 Rural pavement design - unsealed roads* and *0074 Stormwater drainage* and in *Guidance* text in *0012 Waterfront development* and *0022 Control of erosion and sedimentation*.

Construction worksections

AUS-SPEC Construction worksections permit and promote the use of recycled materials in road construction in *Template* and *Guidance* text in the following worksections:

- *General worksections: 0173 Environmental management* includes the use of recycled materials in the Waste Management Plan and includes the methods of disposal of construction waste that can be reused and recycled.
- *Site urban and open spaces:* The use of mulch is specified in all landscaping worksections. The use of recycled materials is recommended in the base and subbase construction of *0282 Pathways and cycleways*.
- *Structure:* Suggests specifying recycled concrete aggregate, reinforcement with recycled steel and recycled plastic in fibre reinforced concrete in 0319 *Auxiliary concrete works*.
- *Construction – road reserve*
  - *Stabilisation:* Specifies materials including ground granulated blast furnace slag, fly ash, cementitious blend proportion in mix design, in situ stabilisation, pre-pulverisation of existing pavement and foamed bitumen stabilisation in *1113 Stabilisation*.

Waste hierarchy

Relevant publications

2018 National Waste Policy

Austroads

AGPT Guide to pavement technology

AGPT04E Unsealed pavements

IPWEA NSW

Greenspec – Specification for Supply of Recycled material for pavements, Earthworks and drainage.

Relevant worksections

Design worksections

0042 Pavement design

0043 Subsurface drainage design

0044 Pathways and cycleways

0053 Rural pavement design – sealed

0054 Rural pavement design – unsealed

Construction worksections

0173 Environmental management

0257 Landscape and street trees

0319 Auxiliary concrete works

1113 Stabilisation

113 Rigid pavements

114 Flexible pavements

Maintenance worksections

1601 General requirements – road reserve (Maintenance)

1602 Maintenance schedules- road reserve

1603 Road reserve maintenance plan (RMP)

1616 Grading unsealed roads

1617 Resheeting unsealed roads

1632 Grading unsealed shoulders

1633 Resheeting unsealed shoulders

TECHreport

TR08 Management of council gravel pits in country areas – A case study

TECHnote

GEN 023 Using AUS-SPEC for management of unsealed roads

GEN 027 Otta seal – A different approach to road sealing

DES 034 Pavement stabilisation for unsealed roads

DES 035 Improvement and stabilisation of unsealed roads

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NATSPEC TECHnote guidance for consideration GEN 028

SPECIFYING RECYCLED MATERIALS FOR ROAD WORKS USING AUS-SPEC

- *Rigid pavement base and subbase*: Specifies recycled concrete aggregate, geopolymer cement, percentage of crushed glass content for fine aggregates and refers to the IPWEA Greenspec and Austroads AGPT04E in *1131 Roller compacted subbase, 1132 Lean mix concrete subbase, 1133 Plain and reinforced concrete base, 1134 Steel fibre reinforced concrete* and *1135 Continuously reinforced concrete base.*
- *Flexible pavements*: Specifies different classes of crushed rock, crushed concrete and recycled materials for base and subbase construction manufactured from crushed concrete, bricks, terracotta tiles, glass or reclaimed asphalt profilings. Includes properties of recycled materials and specifies limits for iron and steel slag, crushed concrete, bricks, recycled asphalt, fly ash and crushed glass fines. Includes percentage of undesirable material e.g. metal, glass, stone and slag, plaster, clay lumps, rubber, plastic, paper, cloth, paint, wood and other vegetable matter. Recommends blending of locally available materials to enhance material properties as discussed in the *TECHreport TR08.*
- *Asphalt pavements*: Specifies the use of Reclaimed Asphalt Pavement (RAP) in RAP Management plan and asphalt mixes in *1144 Asphalt.* The use of crumb rubber, granulated glass aggregate and clauses on the use of RAP for wearing course and base course have been updated.
- *Road openings and restorations*: Recommends waste disposal and recycling and specifies the use of recycled concrete and crushed rock for backfill material for pathways and carriageways.
- *Pavement marking*: Specifies the use of crushed quartz and crushed glass for increased retro reflectivity.
- *Guide posts*: Specifies the use of plastic, rubber or similar for flexible guide posts and semi flexible guide posts and metal for rigid guide posts. Recommends to recycle existing guide posts.
- *Boundary fencing for road reserves*: Recommends to recycle and re-use any surplus material after completion.

• *Construction -Public utilities*: Specifies the use of approved recycled material for bedding embedment and backfill material in water supply, stormwater drainage and sewerage reticulation.

Maintenance worksections

AUS-SPEC Maintenance worksections recommends sorting and sending waste materials for recycling from litter collection, cleaning and sweeping operations to the recycling centre for recycling back into roads. *1601 General requirements - road reserve (maintenance)* recommends including waste minimisation management techniques in the Environmental Management Plan.*1633 Resheeting unsealed shoulders* recommends improving unsealed shoulders by stabilisation, by blending of gravel to enhance the properties of natural materials and the use of Recycled Asphalt Profilings. *1674 Carriageway delineators* recommends resleeving and using recycled rubber posts. Most of the maintenance worksections for pavement repairs, maintenance, rehabilitation and reconstruction refer to the construction worksections for the use of recycled materials for road works.

Additional resources: *TECHNotes* DES 034 and DES 035 provide more information on pavement stabilisation and *TECHreport TR 08* provides information for councils to build and maintain better sealed and unsealed roads by blending materials from different gravel pits to meet higher required performance standards.

Benefits of using recycled materials

Long term benefits of using recycled products in civil construction:

• Reduced impact on the environment through efficient use of available resources.

• Reduced waste to landfill.

• Reduced energy required to produce pavement construction materials. Recycled materials are less energy intensive to produce than quarry materials.

CONCLUSION

AUS-SPEC embeds the use of recycled materials in its road design, construction and maintenance worksections. However, it is up to councils to source appropriate recycled materials based on availability, transportation costs and approved sources for the optimum performance of the pavements. Use of recycled materials should be included in Councils' policies, procurement strategies and tender processes to utilise materials that would otherwise go to the landfill.

Examples of the use of recycled materials for pavement construction and rehabilitation

In situ Stabilisation

Use of crushed glass for pavements by Waverley Council

Crushed glass sand produced by Lismore City Council

Use of Crumb rubber

Crumb rubber asphalt

Use of Toner pave by City of Sydney

Recycled local road in Sydney

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8 APPENDIX 6 ADDITIONAL INFORMATION

8.1 Use of recycled material for infrastructure works in Victoria

Date	Council/ Organisation	Contractor/ Supplier	Location	Project	Link
Sep-18	City of Yarra	Alex Fraser	Margaret Street and Stanley Street, Richmond, Melbourne	Road resurfacing project • Asphalt contains recycled glass, asphalt and high-density polyethylene • Circular economy • Equivalent to 7300 two-litre plastic bottles, 55,000 glass bottles - roughly one year's worth kerbside recycling for every house on Stanley St	http://www.roadsonline.com.au/city-of-yarra-uses-100-tonnes-of-recycled-waste-in-road-resurfacing/
Jan-19		PGH Bricks and Pavers	Metro Tunnel Parkville Station, Melbourne	Clay waste from underground station tunnel project to be made in bricks for residential construction • More than 80 Olympic pools' worth will be excavated for project • First stage clay expected 300,000 tonnes - enough for 10 million bricks • Potential to produce 30 million bricks in whole project • Tunnel project expected to be complete in 2025 • PGH has also used clay from Blackburn station underpass redevelopment and sandstone from NSW projects	http://www.roadsonline.com.au/clay-waste-from-metro-tunnel-recycled-to-produce-bricks/; http://www.roadsonline.com.au/metro-tunnel-clay-makes-10-million-bricks/
Mar-19	Sustainability Victoria		Hoppers Crossing, Melbourne	220m long concrete footpath constructed with 199,000 recycled glass and plastic bottles • Recovered glass fines and shredded plastic in aggregate • Total 2600kg plastic and 5500kg glass in site • Circular economy	http://www.roadsonline.com.au/pavement-constructed-with-recycled-plastic-and-glass/

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

Date	Council/ Organisation	Contractor/ Supplier	Location	Project	Link
Apr-19	City of Greater Geelong Council	n/a	Barwon Heads Road and Marshalltown Road intersection, Geelong	Recycled rubber roundabout to improve safety and reduce congestion	http://www.roadsonline.com.au/new-recycled-rubber-roundabout-for-geelong/
May-19	n/a	Alex Fraser	Tullamarine Freeway, Melbourne	Road upgrade • New glass recycling plant in VIC • Glass sand consistently tested to ensure it remains within specifications • 40 million recycled glass bottles in road upgrade • Alex Fraser annually diverts up to 4.5 million tonnes from landfill • Recycled sand currently used in road base, asphalt, pipe bedding, pipe drainage, filters • Expect glass recycled glass sand will be used more in concrete and high-value applications • Five Alex Fraser recycling plants in VIC and QLD for concrete, brick, asphalt, rock, glass	http://www.roadsonline.com.au/the-road-to-recovery/
May-19	n/a	Alex Fraser	Laverton North	High recycled technology asphalt plant and glass recycled plant • Asphalt plant can produce half a million tonnes sustainable asphalt per year • Glass plant can process one billion glass bottle per year • Increasing recycled content in construction materials • Improving resource recovery • Plants located at integrated recycling facility, Laverton North	http://www.roadsonline.com.au/major-victorian-recycler-opens-sustainable-asphalt-and-glass-plants/

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

Date	Council/ Organisation	Contractor/ Supplier	Location	Project	Link
Sep-19	City of Port Phillip		Mozart Street, Port Phillip	Mozart Street in St Kilda was repaved with 2000 square metre section of road. It was rebuilt using former plastic car components, which otherwise would have been sent to landfill, to create a more environmentally-friendly alternative to traditional asphalt. It included 800 kilograms of recycled plastic, which is the equivalent to 180,000 plastic bags.	https://www.theage.com.au/national/victoria/recycled-plastic-hits-the-road-in-st-kilda-20190918-p52sjl.html
Jul-19	City of Bayside	Alex Fraser	Black Rock, Brighton, Brighton East, Highett, Hampton, Beaumarais	Council's maintenance resurfacing project • Residential streets in several suburbs repaved with over 12,000 tonnes sustainable asphalt • Green Roads PolyPave product – high-performance asphalt containing HDPE plastic, crushed glass, RAP • City of Bayside has reduced waste to landifll by 4000 tonnes and carbon emissions by over 21,600kg • Reused over 100,000 plastic milk bottles and 3.4 million glass bottles = annual kerbside recycling for 350 households • Significant commercial saving • Reduced carbon footprint of road maintenance by about 65%	http://www.roadsonline.com.au/city-of-bayside-uses-recycled-asphalt/
Oct-19		Downer	Downer Victoria	https://www.downergroup.com/downer-wins-victorian-premiers-sustainability	

USE OF RECYCLED MATERIALS FOR LOCAL ROADS IN VICTORIA

Date	Council/ Organisation	Contractor/ Supplier	Location	Project	Link
	State Government				
	Victoria State Government			The Victorian Government's Recycling Industry Strategic Plan provides a blueprint for a safe, resilient and efficient recycling system in Victoria	https://www.environment.vic.gov.au/sustainability/victorians-urged-to-keep-recycling; https://www.thefifthestate.com.au/waste/victorian-government-backs-recyclable-road-projects/
	Sustainability Victoria			Funding new products made from recycled materials. Nine new Victorian projects will receive a combined total of $1.6 million in funding to invest in development and research trials that make use of recycled glass, plastic, paper and e-waste.	https://www.miragenews.com/16-million-invested-in-victorian-projects-to-develop-products-sourced-from-recycled-glass-plastic/
				Recycled materials in pavements	https://www.sustainability.vic.gov.au/Government/Waste-and-resource-recovery/Recycled-materials-in-pavement
				Trials of recycled crushed glass in asphalt on local roads	https://www.arrb.com.au/news/arrb-gets-grant-from-sustainability-victoria

9 APPENDIX 7 POLICY DOCUMMENTS SHARED BY COUNCILS

Organisation	Documents shared
Bayside City Council	Procurement policy 2019
Brimbank City Council	Environmental sustainability policy 2017
City of Greater Dandenong	Council construction specifications based on AUS-SPEC https://cgdresources.mmgsolutions.net/Resources/Website/SiteDocuments/doc2258.pdf Sustainable strategy 2016-2030
City of Greater Geelong	Greater Geelong Planning scheme
City of Kingston	https://www.kingston.vic.gov.au/Community/Sustainability-and-Workshops/Sustainability-in-Council
City of Monash	Procurement policy 2018
Frankston City Council	Sustainability Policy 2012
Moira Shire	Environmental sustainability Strategy 2017-2021
Murrindindi Shire Council	Environment Policy
City of Melbourne	https://www.melbourne.vic.gov.au/sitecollectiondocuments/city-of-melbourne-procurement-policy-2019.pdf
Wellington Shire Council	Environmental sustainability policy 2018