THE UNIVERSITY OF MELBOURNE

Waste Tyre Permeable Pavements: Research, Commercialisation & Impact

EcologiQ Greener Infrastructrure Conference, Sep 2023

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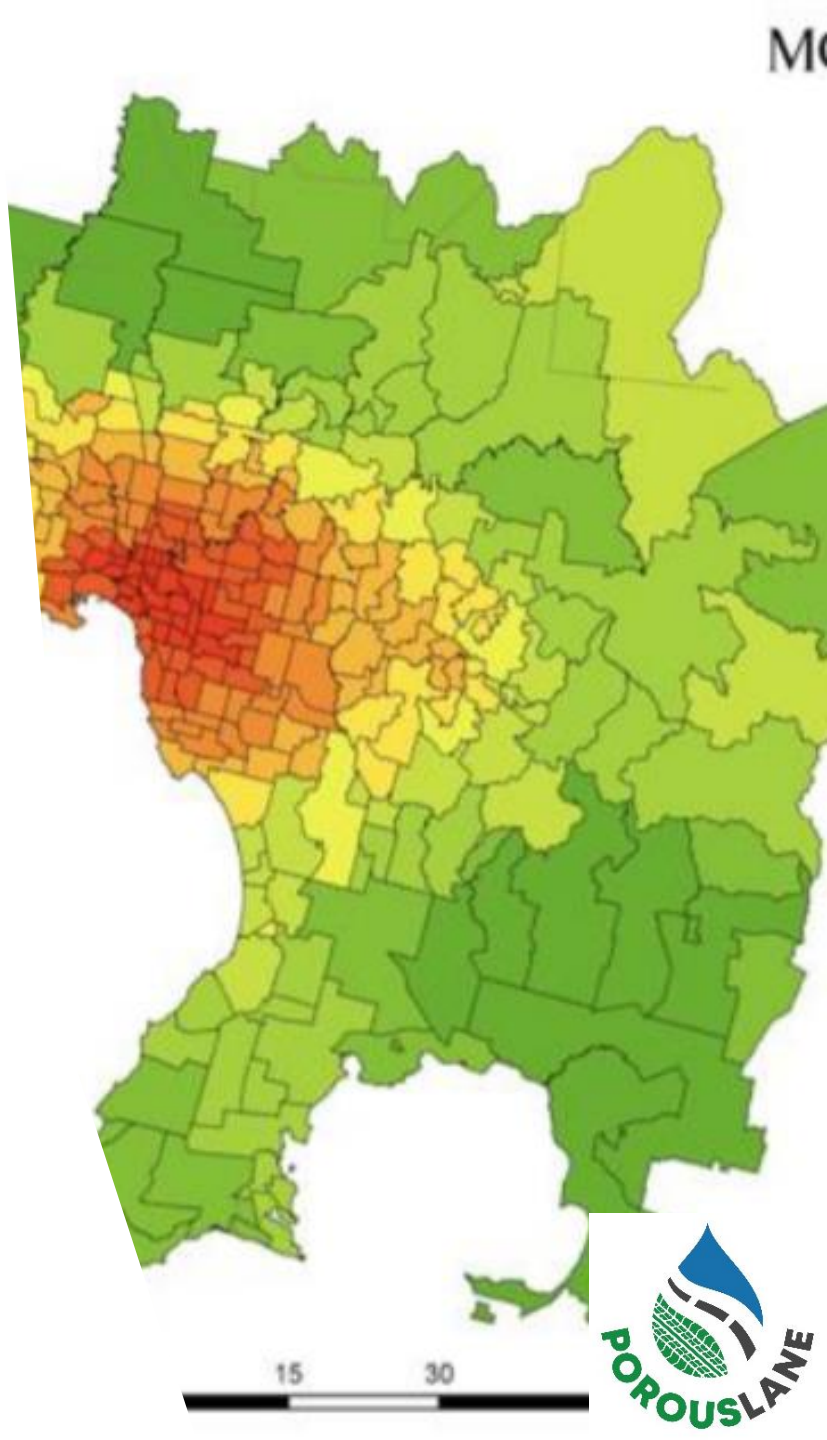
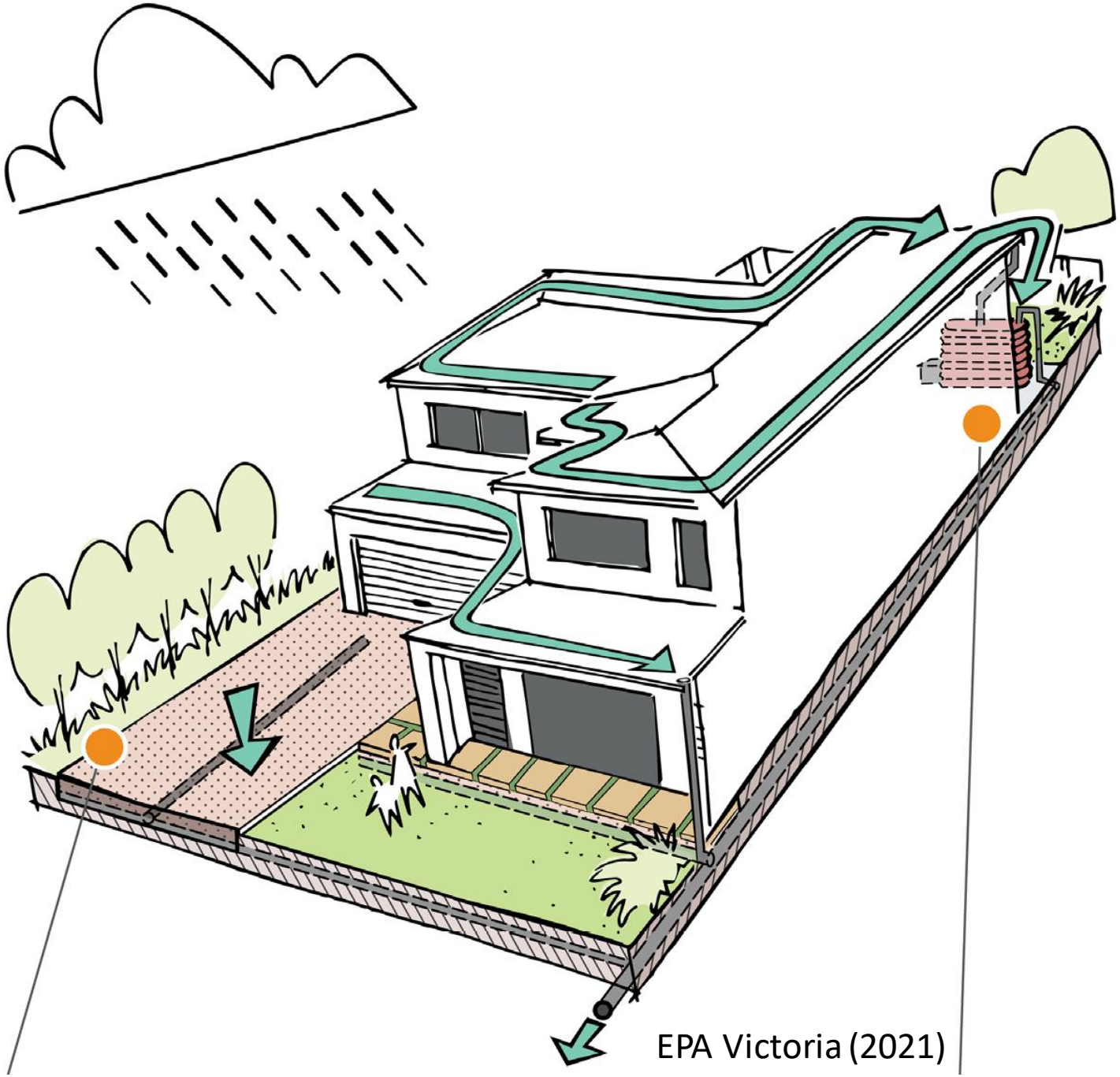
POROUSLANE


THE UNIVERSITY OF MELBOURNE
Current impermeable roads contribute to flash flooding
Current permeable pavements are not suitable for trafficked areas
Rapid Growth in Urbanisations (UN Report)
Permeable Surface is recommended in many developments now (EPA Vic)
via High St
POROUSLANE

Urban Heat Island and Green Canopy



Stormwater Compliance and Cost Saving



EPA Victoria (2021)


Every two seconds:
LESS THAN 1
IN EVERY 10 TYRES
IS RECYCLED IN AUSTRALIA
TyreStewardship
AUSTRALIA

Value Proposition of a Circular Economy Solution: Solving 1, 2, 3 & 4 Problems at Once

Cost Savings in:

Stormwater system upgrades

Watering trees

Maintenance and repair due to tree root damages

Advantages

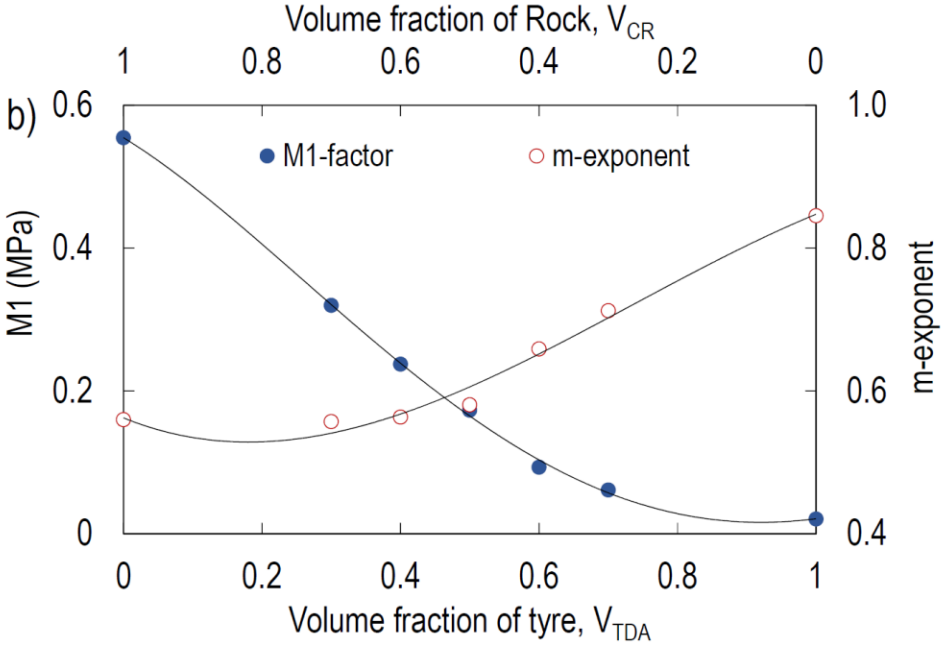
- Higher coverage of land
- Green star ratings
- Meeting council requirements
- Lower maintenance & Longer Life

Project # 1: Laboratory Investigation, 2016-2018

Flexural Strength

Testing the flexibility of our product under very extreme loading conditions and no supporting layer underneath. The material is flexible and can tolerate imposed displacements and loads.

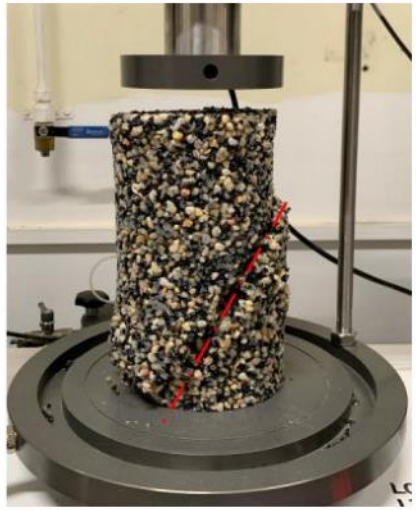
Standard: AS 1012.2000 – Determination of Modulus of Rupture



Compressive Strength

Measuring the ultimate compressive strength of the material under very extreme conditions where there is no confinement. The results are used for optimisation.

Standard: ASTM D5102-09 – Standard Test Method for Unconfined Compressive Strength of Compacted Soil-Lime Mixtures.



TyreStewardship AUSTRALIA

Project #2 Field Trial

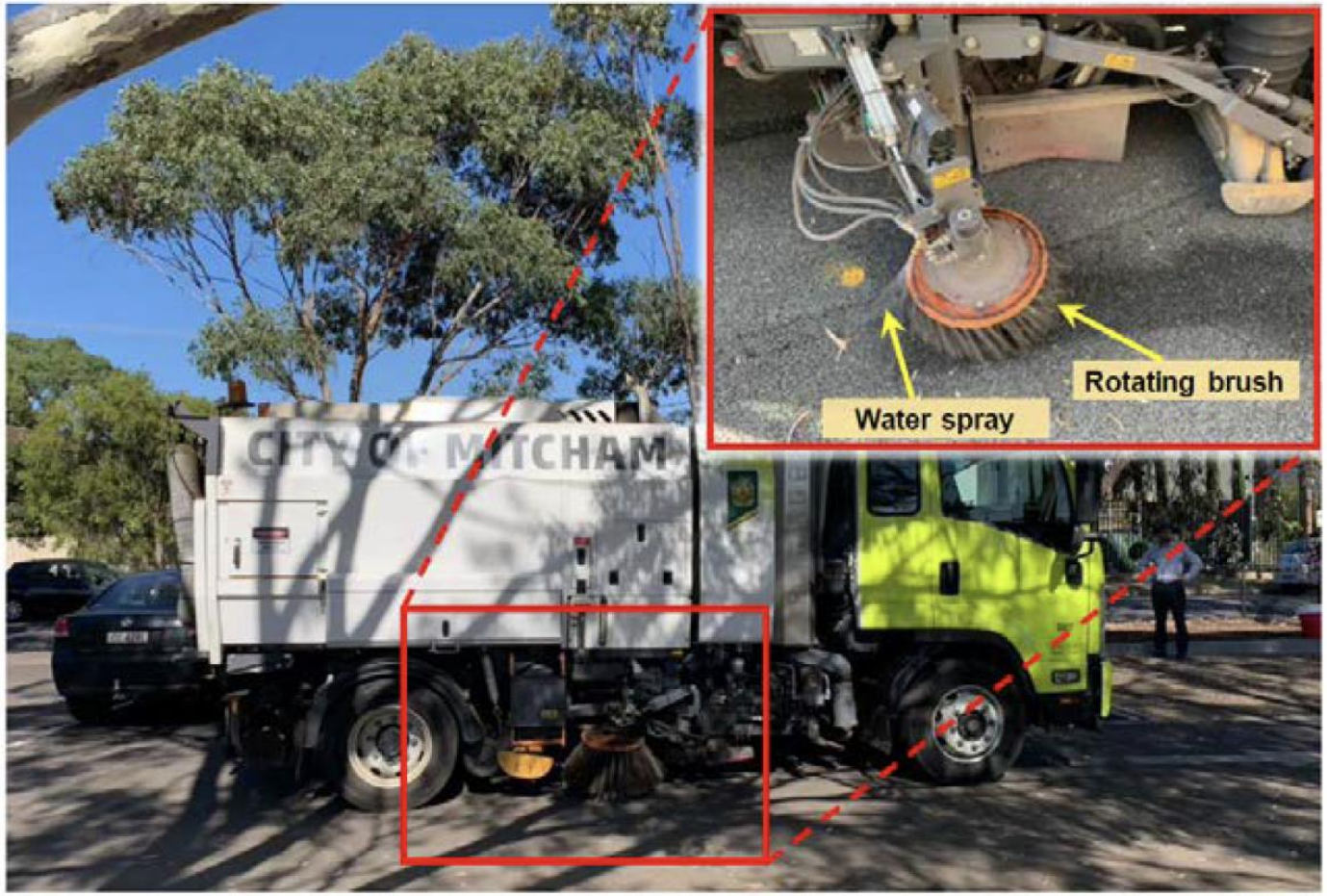
Waste Tyre-based Permeable Pavement (WTPP)

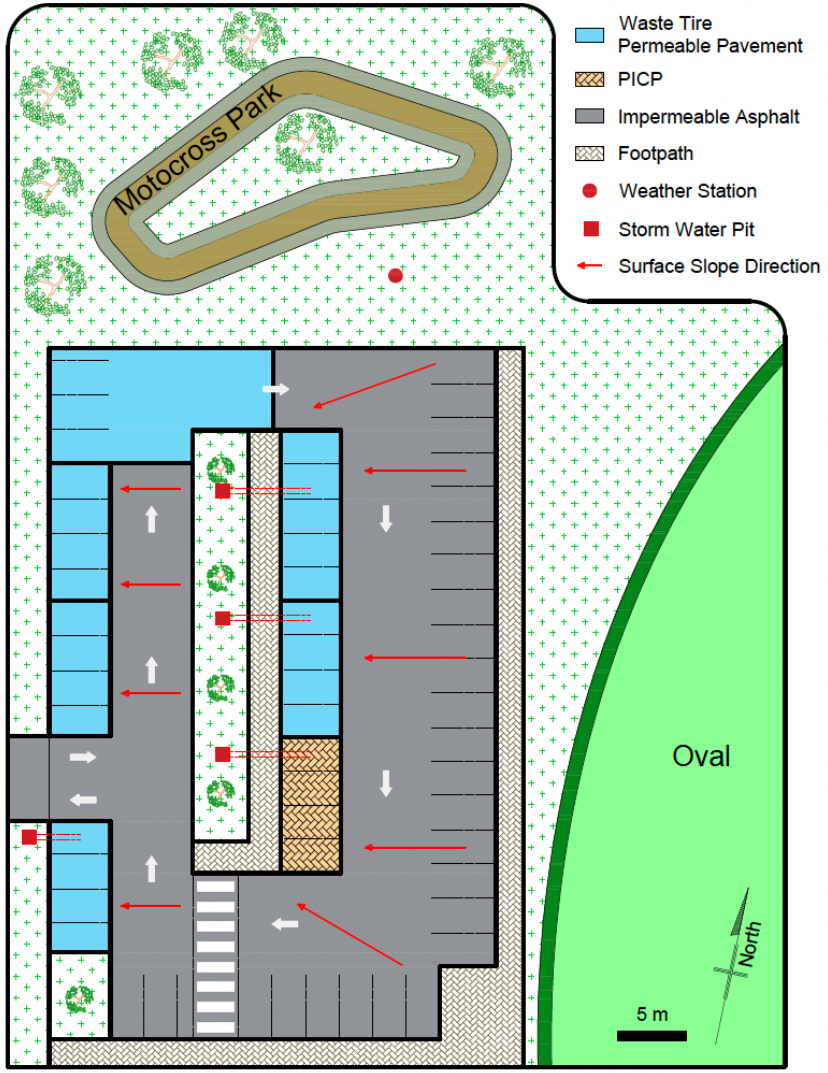
Tyre-Derived Aggregates (TDA)

+ Engineered Binder

Crushed Rock

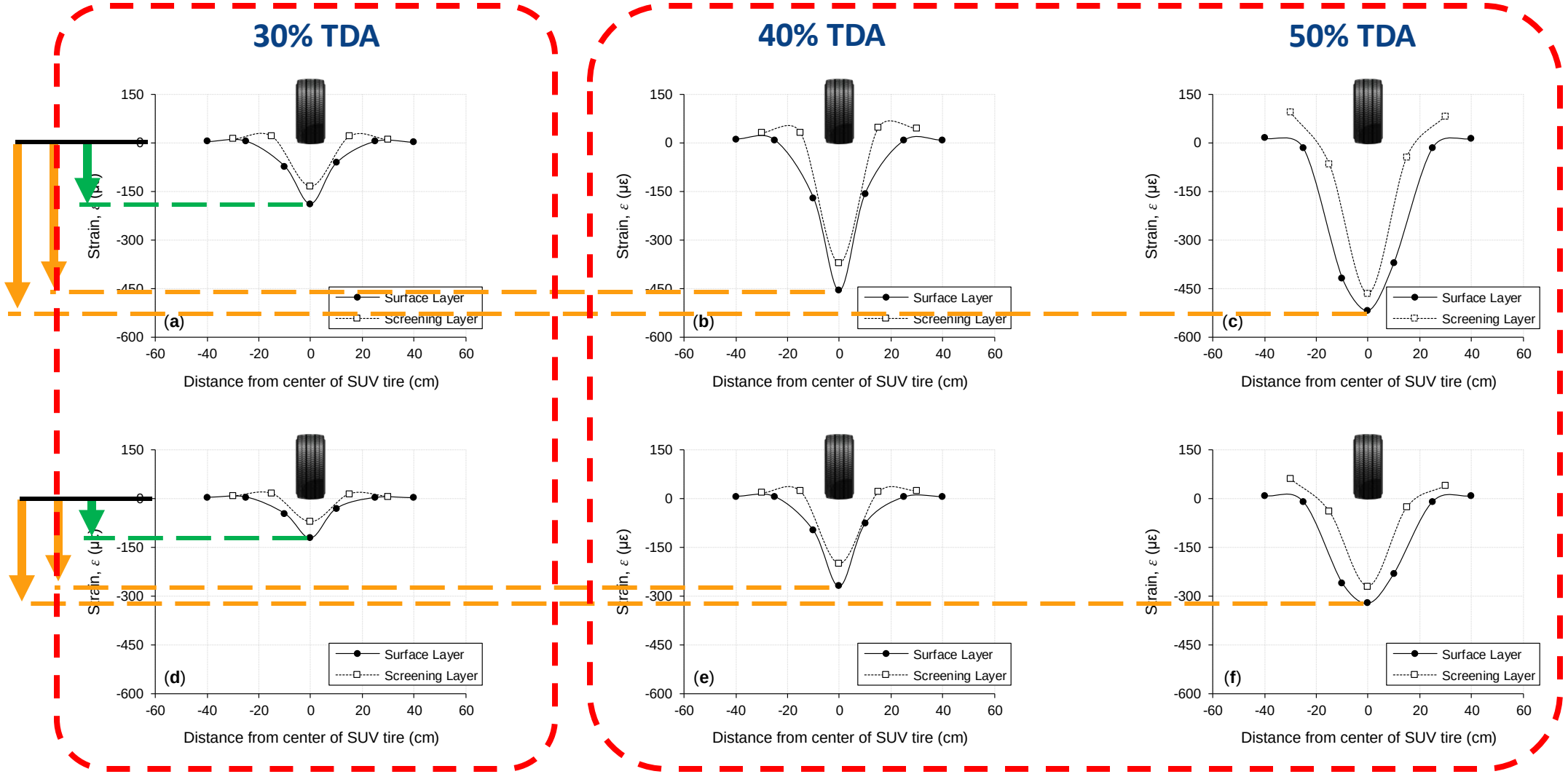
Project #2 Field Trial





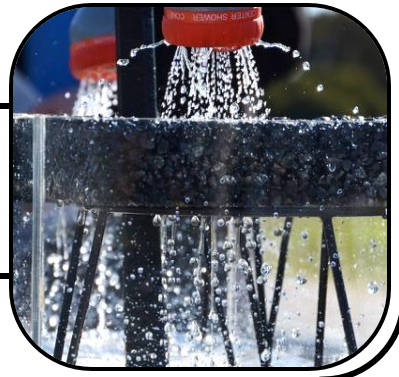
Project #2 Field Trial

Optic Fibre Sample Results



Commercialisation: UoM Start-Up; Porous Lane

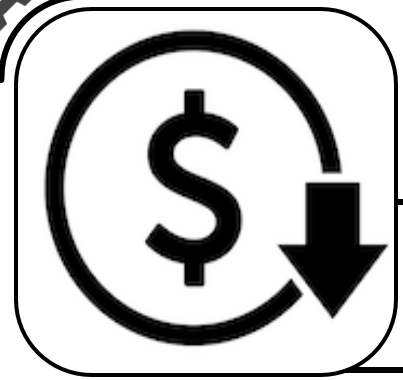
High Permeability
8 times higher than guidelines



More Durable
Engineered mixture and pavement design

POROUSLANE

Sustainable
More than 3 used tyres per m^2



Cost Effective
Competitive compared to other options

City of Yarra; Ramsden Carpark

City of Yarra; Rutland Street

Latest Project; John Holland Group, Porous Lane, KBR

Mechanical and hydrological performance of waste tyre permeable kerb and channel systems

Applications

Applications

Driveway

Applications

Shared Path

Applications

Bike Lane

Applications

Pedestrian Ways

Applications

Footpath Treatment

Clients

City of DAREBIN

CITY OF MITCHAM

City of GLEN EIRA CITY COUNCIL

Maribyrnong CITY COUNCIL

Balranald Shire Council

City of KINGSTON

BOROONDARA

HOBSONS BAY CITY COUNCIL

Mosman COUNCIL

CITY OF MELBOURNE

CITY OF YaRRA

Merri-bek City Council

Banyule CITY COUNCIL

OFF

Acknowledgements

THE UNIVERSITY OF MELBOURNE

TyreStewardship AUSTRALIA

Sustainability Victoria

VICTORIA State Government

CITY OF MITCHAM

POROUSLANE

Australian Government
Australian Research Council

WATER SENSITIVE SA

Department of Environment, Land, Water & Planning

State Government Victoria

JOHN HOLLAND

CITY OF YaRRA

Thank you

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POLAR ENVIRO

Smarterlite
Renewable Light for Safety

SmarterLite

Renewable light for safety in buildings & public spaces

20 Years experience

OMNIGRIP DIRECT
Smarter Road Safety

OmniGrip Direct

Recycled-glass & safety surfacing for public works

22 years working with governments

VIVACITY

Vivacity Smart Traffic

Energy efficient light for safety in public places. Safer riders, drivers & pedestrians.

18 Years Experience

Reduce crash trauma using Recycled Glass Safety Surfaces

OmniGrip Direct has 22 years of surfacing experience.

Actively reducing materials sent to landfill and contributing to State's Recycled First policy for infrastructure.

Main product comprises coloured recycled-glass to provide surfaces compliant to DOTP standard specification 431 in Victoria & TIPES Level 3 Certification in Queensland.

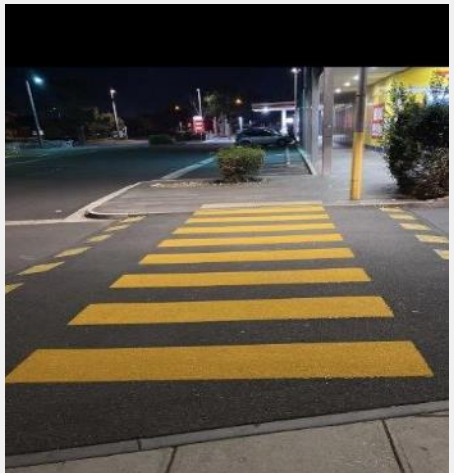
Expected life of surfaces is more than 5-years.

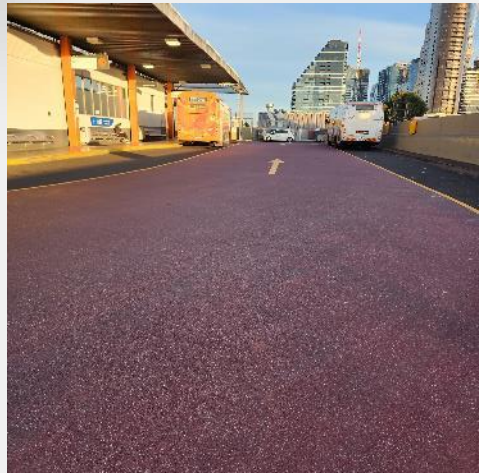

OmniGrip Direct becomes first recipient of TIPES certification

by Australian Road Research Board on June 10, 2022

The first proprietary surfacing systems have just been evaluated for use in Queensland under the Australian Road Research Board's (ARRB) Transport Infrastructure Product Evaluation Scheme (TIPES) as applied to High Friction Surface Treatments (HFST) & Coloured Surface Treatments (CST).

TIPES uses a performance-based assessment methodology, developed in





POLAR ENVIRO

OMNIGRIP DIRECT
Smarter Road Safety

Reduce crash trauma

Applied to high risk bends, intersections, school & pedestrian crossings, **HFST can reduce injury crashes by approx. 50-65%**

Reduce total crashes on curves by 57% & freeway ramps by 79%

Fast, easy and effective solution to reduce crashes

Our traditional HFST's use calcined-bauxite.

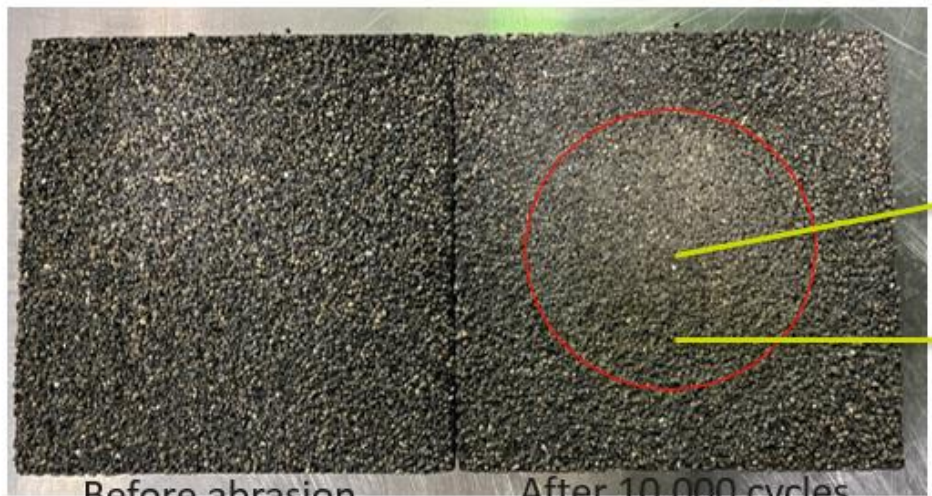
With Sustainability Victoria funding we worked with the Australian Road Research Board to develop a new surface.

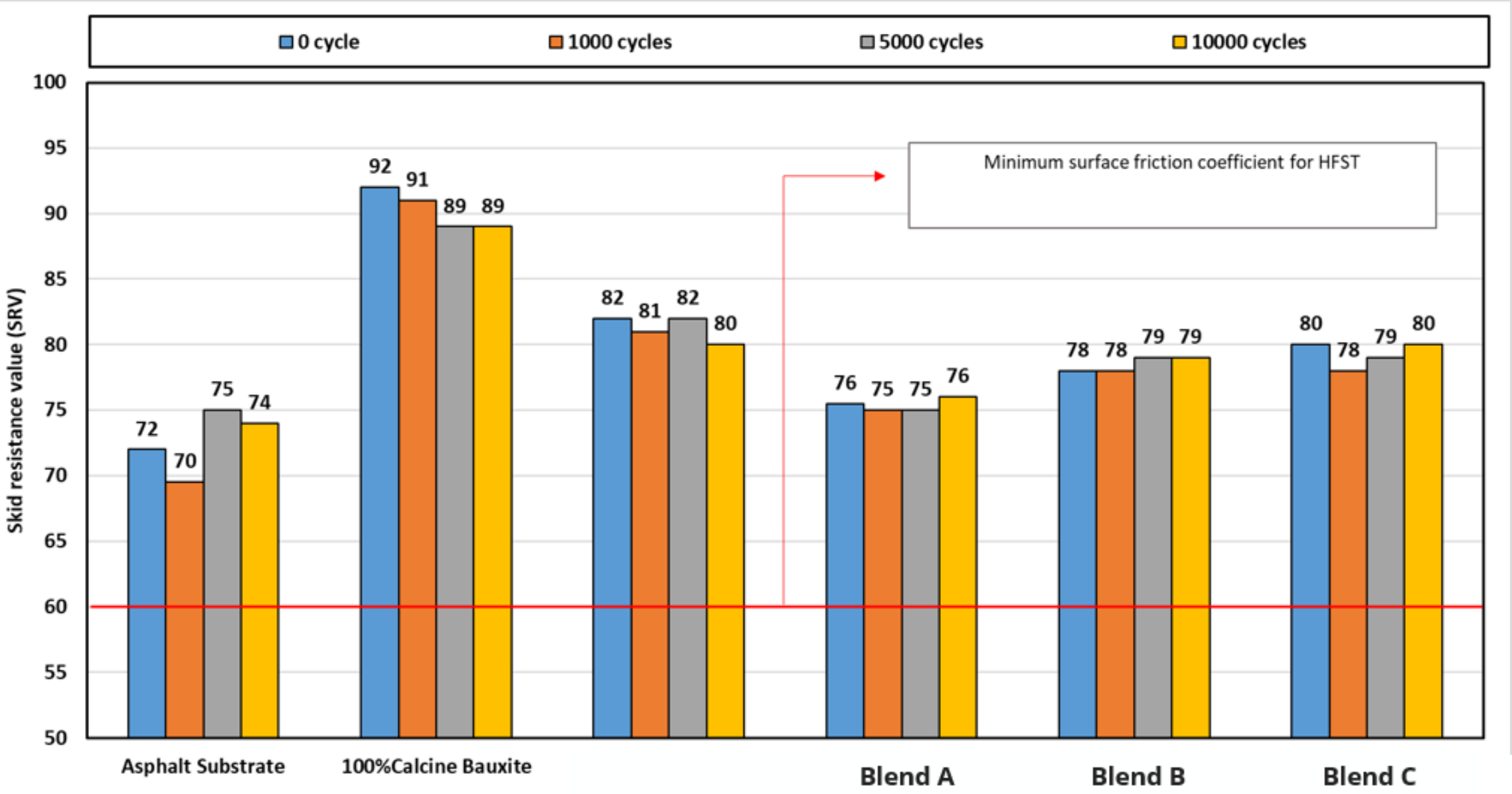
New High Friction Surface uses post-consumer glass diverted from landfill, and was designed for compliance with DOTP specifications.

60%

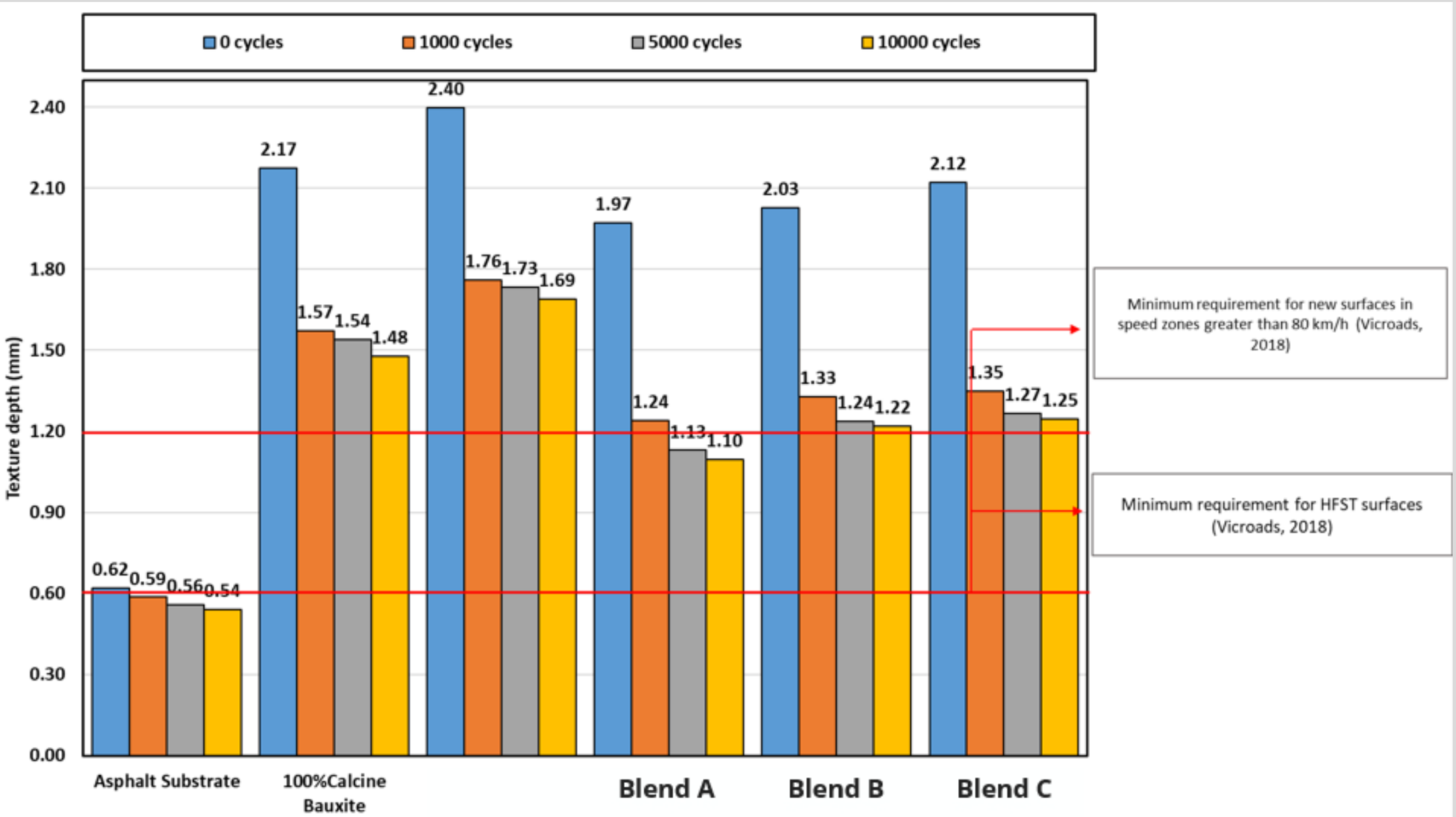
post-consumer recycled-glass

Laboratory Test Results (Abrasion Testing)





Source: Australian Road Research Board



Source: Australian Road Research Board

Reduces crash trauma & increases slip & skid resistance

A high friction surface treatment (HFST) now available using 60% post-consumer recycled-glass.

Environmental Product Declaration being finalised right now.

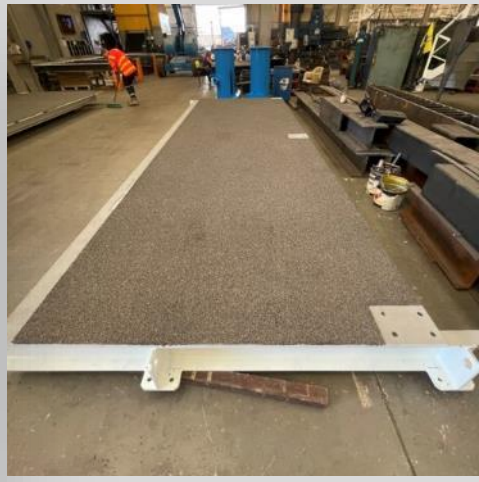
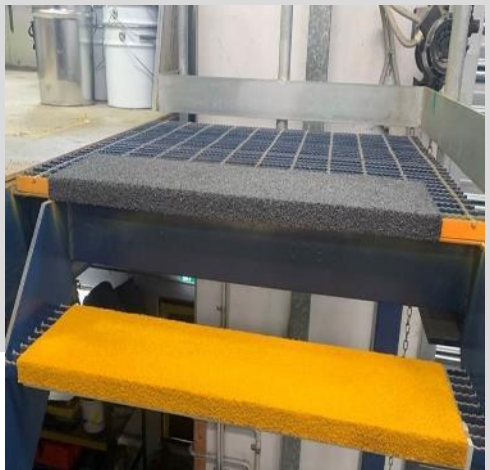
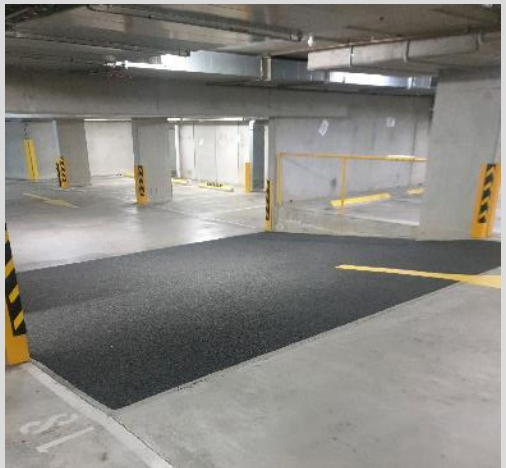
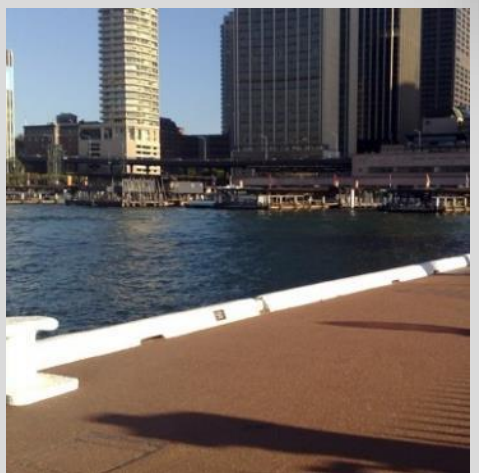
Fast, easy and effective solution to eliminate skidding/slipping on roads, paths & commercial applications.

Creating market for glass collected by Victoria's Councils.

Can reduce injury crashes by 40-80% at high risk intersections.

Images show typical examples of where it can be used.



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Smarter Road Safety

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VICTORIA

Showroom

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Office & Depot

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QUEENSLAND

Office & Depot

8 Hampshire Street, Archerfield QLD 4108

ONLINE INFORMATION

https://www.omnigripdirect.com.au

https://youtube.com/@PolarEnviro

https://www.linkedin.com/company/omnigrip-direct/

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Sustainability Victoria's Recycled Product Showcase

Turning Waste into Value Added Products

Downer
Relationships creating success

Sustainability Victoria

The Journey from R&D to Application

- Downer spent years developing an Asphalt product containing a significant proportion of repurposed products yet still complied with relevant specifications.
- The product was named "**Reconophalt**"
- The precursor, Tonerpave, contained printer toner from used toner cartridges
- After **Reconophalt** underwent initial trials and health testing, Downer applied for a grant from Sustainability Victoria to partially fund the "**First Ever Trial of Reconophalt**"
- In May 2018, the first ever trial was placed on Rayfield Avenue in Craigieburn for the Hume city Council
- The Minister for the Environment attended to witness the trial

The Trial

Rayfield Avenue
Drone Footage

Repurposed materials utilised in Downer's Reconophalt

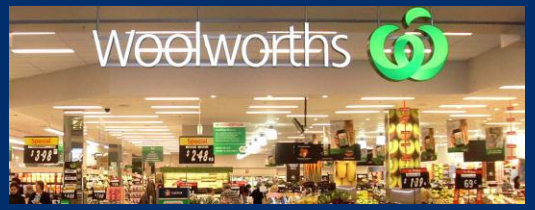
- Reclaimed asphalt pavement (RAP)
- Toner from used toner cartridges
- Waste crushed glass
- Waste soft plastic
- Waste oil

INNOVATIVE SOLUTIONS

SUSTAINABLE SOLUTIONS

INCREASED VALUE

Getting Soft Plastics into Asphalt



Close the Loop

TonerPlas

Performance Benefits

Since May 2018

- Downer conducted extensive environmental testing of Reconophalt to gain acceptance by the NSW EPA
- Registered Reconophalt mixes with the Victorian Department of Transport
- Produced and Laid Reconophalt in every State & Territory in Australia
- Produced and Laid Reconophalt on:
  - The M80 and Monash Freeways
  - Many other MRPV projects
- Produced and laid over **420,000t** of Reconophalt in Australia

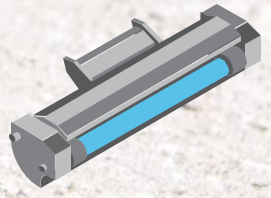
Reconophalt™

Downer
Relationships creating success

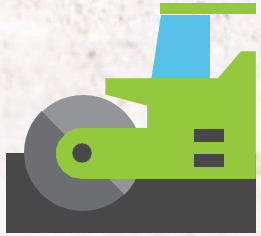
Created Savings of
3,300t CO_2e
And Diverted:

373 million
plastic bags/
soft plastics

11 million
used toner
cartridges



126k tonnes
reclaimed
asphalt



32 million
recycled glass
bottles

USED FROM FIRST TRIAL IN MAY 2018 TO SEPT 2023 IN ROAD AND PAVEMENT PROJECTS IN AUSTRALIA

And We Won an Innovation Award

Large Business Category 2019 Victorian Premier's Sustainability Awards