

TYRE STEWARDSHIP AUSTRALIA

National Local Roads & Transport Congress

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The background of the image is a close-up, high-angle shot of several tires stacked on top of each other. The tires are arranged in a way that creates a strong sense of depth and repetition, with the tread patterns of the tires visible. A solid blue color is overlaid on the entire image, creating a monochromatic effect. The text "TYRE NUMBERS" is centered in the middle of the image in a white, bold, sans-serif font.

TYRE NUMBERS

THE NUMBERS – LATEST REPORT INDICATES (2017):

56.3 million (Approx.)

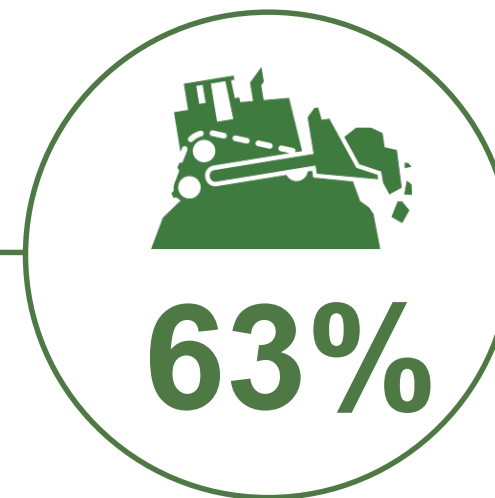
EPU* disposed in Australia 2015-16, equivalent to 447,000 tonnes (an increase of 16%)*



of end of life (EOL) tyres
are used productively locally



are exported as fuel
(roughly doubled
since 2009-10)



are either disposed
to landfill or
destination unknown
(most likely stockpiled
or unaccounted exports)

*Volume based on Equivalent Passenger Units (EPUs). An EPU is a standard passenger car tyre.

Full EPU Ratio Tables available at greentyreproject.com.au

*(Number taken from National Market Development Strategy for Used Tyres).

An aerial photograph of a multi-lane highway with a monorail track running alongside it. The image is overlaid with a teal color filter. The highway has several lanes of traffic, with cars and a large truck visible. The monorail track is on the left side of the highway. The surrounding area includes trees and a small body of water. The text "ABOUT TSA" is centered over the image.

ABOUT TSA

ABOUT TSA

A voluntary Scheme under the National Product Stewardship Act in 2014.

TSA is a not-for-profit company created to administer the National Tyre Product Stewardship Scheme.

Formed by the tyre industry with endorsement of Federal, State and Territory Governments.

Funded by an ACCC endorsed levy of 25c per passenger tyre equivalent paid voluntarily by the member tyre importers.

Participation is free for participant categories.



TSA Levy Paying Members

KUMHO TYRE



Volkswagen



Member Brands



TSA ACTIVITY AREAS

TSA ACTIVITY AREAS



Accreditation, Audit and Compliance



Education and Awareness



Market Development



Administration and Reporting

Tyre Stewardship Australia

Life of a tyre with Local Government

1. Procure

1. Specify fleet vehicles have TSA accredited tyres affixed.
2. Specify replacement tyres purchased are TSA accredited.
3. Source tyre supply and fitment through a TSA accredited tyre dealer or workshop.

4.  Specify Australian tyre-derived rubber products in your procurement and asset management. For:

Roads

Asphalt Mix
Spray seal

Playing surfaces

Footy/ Soccer Fields
Hockey Pitches
Netball Courts
Equine applications
Playground Matting
Running/athletics tracks
Access tracks/Walking trails

Parks & Gardens

Composite irrigation pipe
TDA mulch/groundcover

Civil/Commercial Construction

Permeable Pavements
Retaining walls
Pavement sub-base stabilisation
Access roads
Hard stand areas
Erosion protection
Noise walls
Water walls
Bridge abutments
Impact barriers
Cyclone rated structures



2. Dispose

When disposing of EOLTs choose a TSA accredited collector or recycler. For:

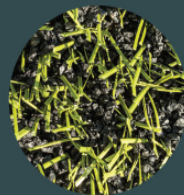
- Council fleet
- Council approved collections
- Dumped items

LOOK FOR TSA STAR ACCREDITATION



3. Engage

1. TSA & Councils communicates on tyre recycling and collection options in the municipality
2. Promote positive stories using recycled materials for a circular economy.
3. Work together to stamp out stockpiling





MARKET DEVELOPMENT

ROLE OF TSA IN MARKET DEVELOPMENT

- ✓ TSA is an **enabling** agency
- ✓ We **support** industry to deliver the best solution
- ✓ Provide the resources and **investment**
- ✓ **Demonstrate the benefit**
- ✓ **Facilitate** relationships
- ✓ We **advocate and influence** to drive uptake

MARKET DEVELOPMENT ACROSS MANY SECTORS

Lead Organisations	Project Title	TSA Contribution	Potential Market Volumes (tonnes) p.a
University of Melbourne & Merlin Site Services	Recycled tyre in permeable pavement applications	\$200,000	5,000
Chip Tyre, BioAust Energy, Sequence Blast & Drill	High speed polymer coating of rubber crumb fuelled explosives.	\$198,500	-
University of Wollongong and the Rail Innovation Cooperative Research Centre	Performance of recycled rubber inclusion for improved stability of railways	\$200,000	-
Polymeric Powders	Production of tyre crumb derived composite material	\$213,000.00	1,000
Flexiroc, Tuff Turf and Pakenham Racing	Equine Air Pakenham Racing Club Project	\$70,000.00	1,500
Flexiroc & Australian Defence Force	Protectiflex Pumped & Composite Blast Mitigation Project	\$63,000.00	635

CASE STUDY: PERMEABLE PAVEMENT





**RUBBER ROADS =
COST EFFECTIVE, PROVEN
PERFORMANCE**

ENGINEERING

- Overall increases pavement life
- Improved durability
- Rut resistance
- Lower maintenance costs
- Reduced spray back
- Improved aging and oxidation resistance

ENVIRONMENTAL

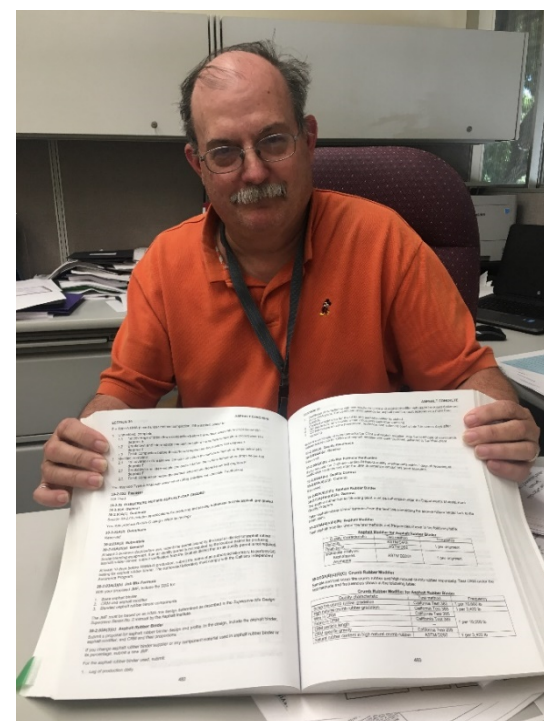
- Increase use of waste tyres
- Reduced noise
- Savings in energy and natural resources
- Less use of non - renewable resources



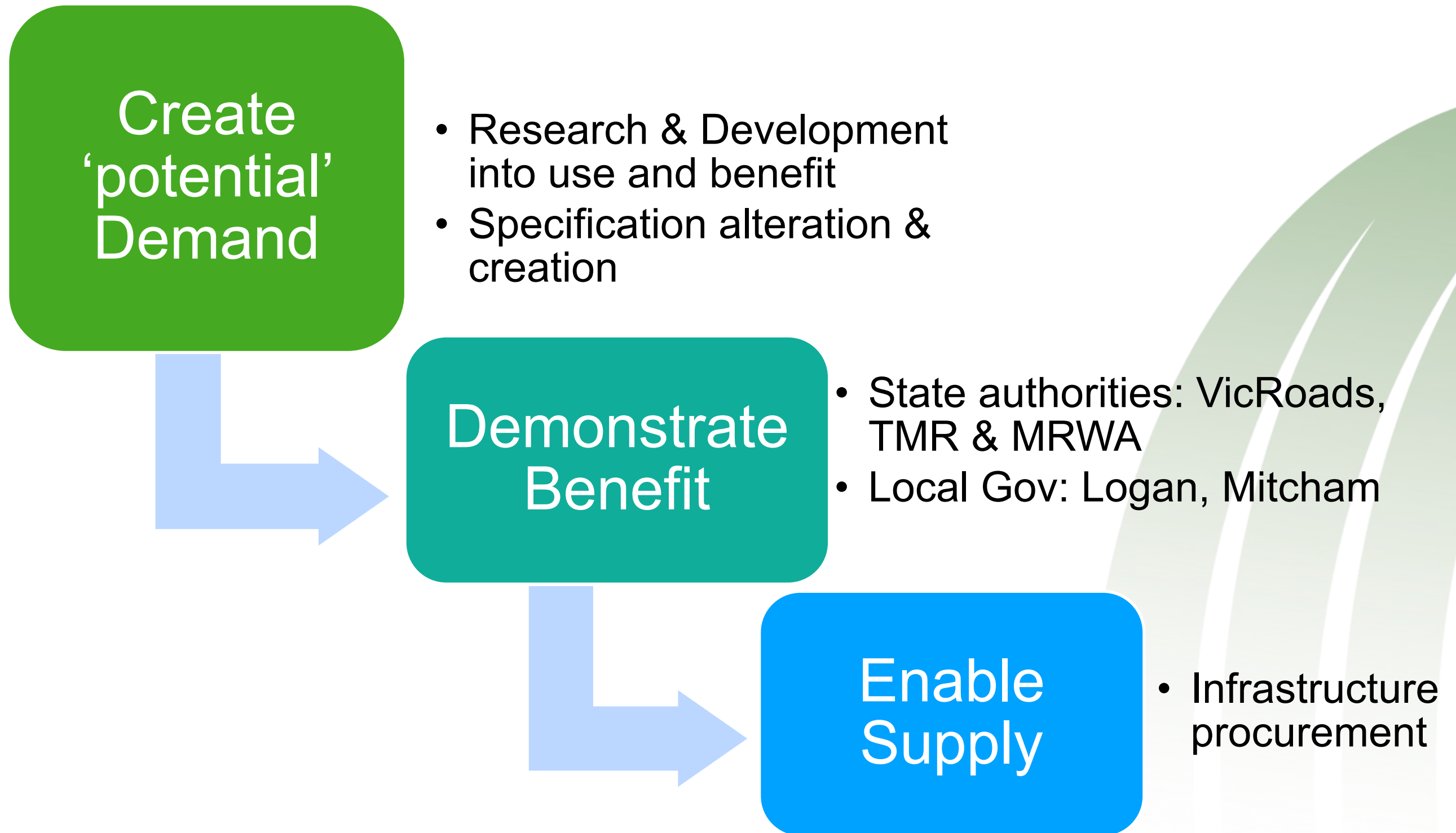
Circular Economy:

Tyres are made to service the roads industry. Therefore, if there is a mechanism to utilise the material productively in the industry that demands the products use in such high volumes, there is an additional imperative to support its utilisation.

HOW DO WE (AS AN INDUSTRY) REALISE THE POTENTIAL?



HOW DO WE (AS AN INDUSTRY) REALISE THE POTENTIAL IN AUSTRALIA?



CREATE DEMAND

Lead Organisations	Project Title	TSA Contribution	Potential Market Volumes (tonnes) p.a
Swinburne University & VicRoads	Tyre-derived aggregate as a supplementary material in pavement sub-bases	\$91,812	2,000
Australian Road Research Board (ARRB) Queensland, Transport and Main Roads Queensland, Department of Environment and Heritage Queensland	Transfer of crumb rubber modified asphalt and sealing technology to Queensland	\$150,000	6,500
ARRB Victoria, VicRoads and Sustainability Victoria	Dense graded and structural fatigue layer assessment	\$113,715	-
Australian Asphalt Pavement Association	Training course for engineers and road manufacturers on how to utilise crumbed rubber in various road applications	\$51,250.00	-
University of Melbourne	Concrete road barriers performance with crumb rubber additive	\$280,000.00	750
Austroads	National Specifications for crumb rubber binders in asphalt and seals	\$200,000.00	-
TOTAL		\$886,777	9, 250

DEMONSTRATE BENEFIT

Lead Organisations	Project Title	TSA Contribution	Potential Market Volumes (tonnes) p.a
City of Mitcham (SA), Australian Road Research Board, Topcoat	Dense Grade Crumb Rubber Asphalt Trial – City of Mitcham	\$200,000.00	6,000
ARRB - Vic Roads	Crumb rubber asphalt trial	\$200,000.00	100
AAPA, ARRB, RMS	Demonstration of crumb rubber modified asphalt as overlay to concrete	\$59,357.00	600
Topcoat	CalTrans Gap Graded Technology Transfer	\$275,000.00	1,650
City of Logan	RAP Crumb rubber asphalt mix	\$150,000.00	TBC
Main Roads WA, Fulton Hogan AAPA	Investigation of recyclability of crumb rubber modified asphalt	\$59,357.00	-
TOTAL		\$943,714.00	8,350

Tyre trial paves way for streets

RENATO CASTELLO

THE equivalent of 3500 old car tyres will be crumbed, mixed with asphalt and laid on South Australian roads in what is being described as the largest trial of its kind in Australia.

Campbelltown, Mitcham, Onkaparinga, Salisbury, West Torrens Council and Port Adelaide Enfield councils will each lay a 200m section of road with recycled rubber mix using tyres that would normally end up in landfill.

The wear and tear on the rubber roads – such as rutting, susceptibility to cracking and moisture damage – will be monitored for a minimum two-years against an equivalent asphalt section laid at the same time.

Tyre Stewardship Australia, which promotes development of viable markets for old tyres, is providing \$275,000 towards the \$800,000 project which



will be formally announced at a national road and transport congress being held in Adelaide next week.

TSA chief executive Lisa Goodman said the trial was largest of its type conducted in Australia.

"This is a no-brainer," she said. "It's a win-win for the ratepayer and the environment by improving asphalt performance and removing old tyres destined for landfill."

"It's time we saw old tyres as a valuable product that can be used to make roads last longer all around Australia."

The trial builds on a smaller trial conducted by Mitcham Council which sealed a 335m section of rubber-modified road at St Marys a year ago.

The council's principal en-

gineer Russell King said the road had experience "no cracking" compared to other "recently reconstructed" roads in the same area.

"The rubber in the road also prevents premature ageing and oxidation of the road's bitumen binder, and already in comparison to surrounding roads and segments done at the same time you can see it is significantly blacker so already we're seeing we can achieve a significantly longer life from the asset," he said.

Topcoat Asphalt will lay the road for the councils and the company's technical manager Rod McArthur said international experience had proven crumb rubber roads can outperform regular asphalt.

Annually the equivalent of 29 million passenger tyres are processed locally for use in infrastructure.

But more than 27 million tyres still end up in landfill.

ENABLE SUPPLY

Lead Organisations	Project Title	TSA Contribution	Potential Market Volumes (tonnes) p.a
Industry Partner	High Shear Crumb Rubber Mixer	\$175,000.00	2,500
Industry Partner	Fume minimisation of crumb rubber asphalt investigation	\$90,000.00	-
Industry Partner	Automated crumb rubber hopper system for asphalt production	\$90,000.00	1,000
Industry Partner	Advanced crumb rubber bitumen plant	\$250,000.00	1,500
Industry Partner	Crumb Rubber Capacity Expansion	\$300,000.00	2,000
TOTAL		\$905,000.00	7,000

SUCCESS TO DATE

Category	Rubber (tonnes)	Steel (tonne)	Total	% of the Market
Total Material Recovery (2018/19)	24,231	9,627	33,858	
Road market estimate (2018/19)	12,300	4,887	17,187	51%
Potential (2020/21): Increased uptake & 15% modified binder	18,480	7,342	25,822	76%

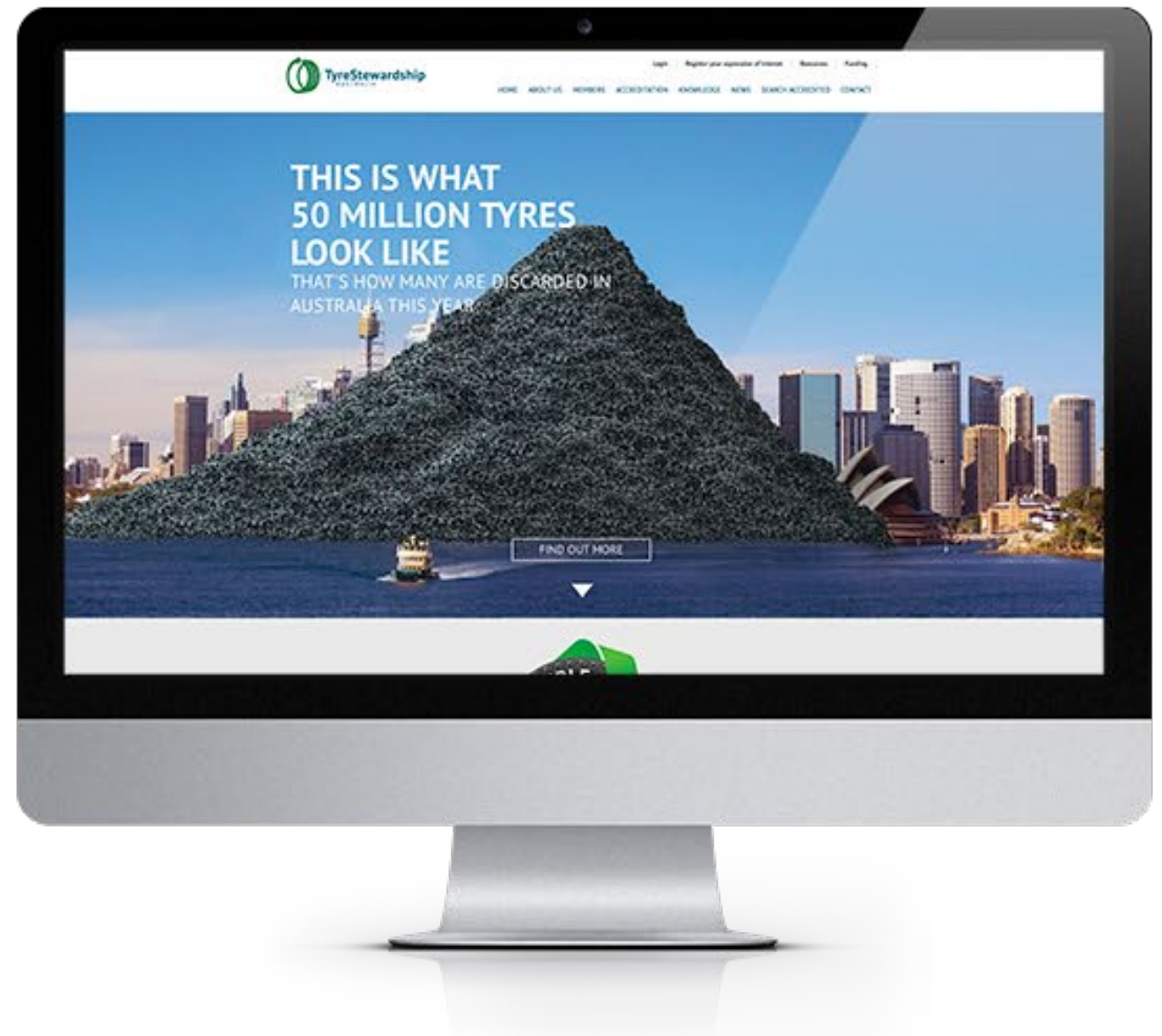
Category	Rubber (tonnes)	Steel (tonne)	Total	\$ value of TDP
Increase	6,180	2, 455	8, 635	\$3, 090,000

CURRENT ACCESSIBLE MARKET (Passenger & truck collected tonnes)	230,000
ROADS AS A % OF TOTAL ACCESSIBLE MARKET	11%

Tyres & roads in Australia

- ✓ Rubber in roads: it's proven & cost effective
- ✓ The market is shifting very quickly
- ✓ Local government are instrumental in the shift
- ✓ There is much more we can do to recycle more, while creating better, more cost effective infrastructure
- ✓ Work with Tyre Stewardship Australia and contribute to the solution...

For full details on TSA, members, supporters, how it works, what it does, how you can participate and what accreditation entails.



tyrestewardship.org.au

Whenever you find yourself on the side of the majority, it is time to pause and reflect...



Hold on, so what exactly is crumb rubber?



So WHAT is a crumb rubber asphalt??

- **Dry mix** - particles mixed in with the aggregate
- **Wet Mix**
 - Terminal Blend - 100% dissolved into the binder, but then can be stored and transported for later use
 - Mobile Blend – mixed into the binder on site and so the rubber particles don't completely dissolve, however requires specialised pumps and plant

The crumb rubber used in our demonstration

- Wet (Terminal) blend (transported from Victoria)
- 15% crumb rubber in the binder for trial
- Net bitumen binder 4.6% (instead of 5.5%)
- Gap graded trial will have higher binder content and wet blend not fully dissolved for higher performance
- Warm mix additives so no smell (lay at 165°C)
- Extensive preliminary geotechnical investigation, survey marks for movement, NSV for surface defects and on going monitoring

Stanlake Ave, St Marys Trial Site

- Long straight road (easy for a trial)
- Extremely reactive soil – class E (extreme)
- Low subgrade strength (CBR of 3)
- Extensive environmental cracks in new pavement and seals adjacent within 6 months of completion

So what does it look like when laid?



Lab results of mix

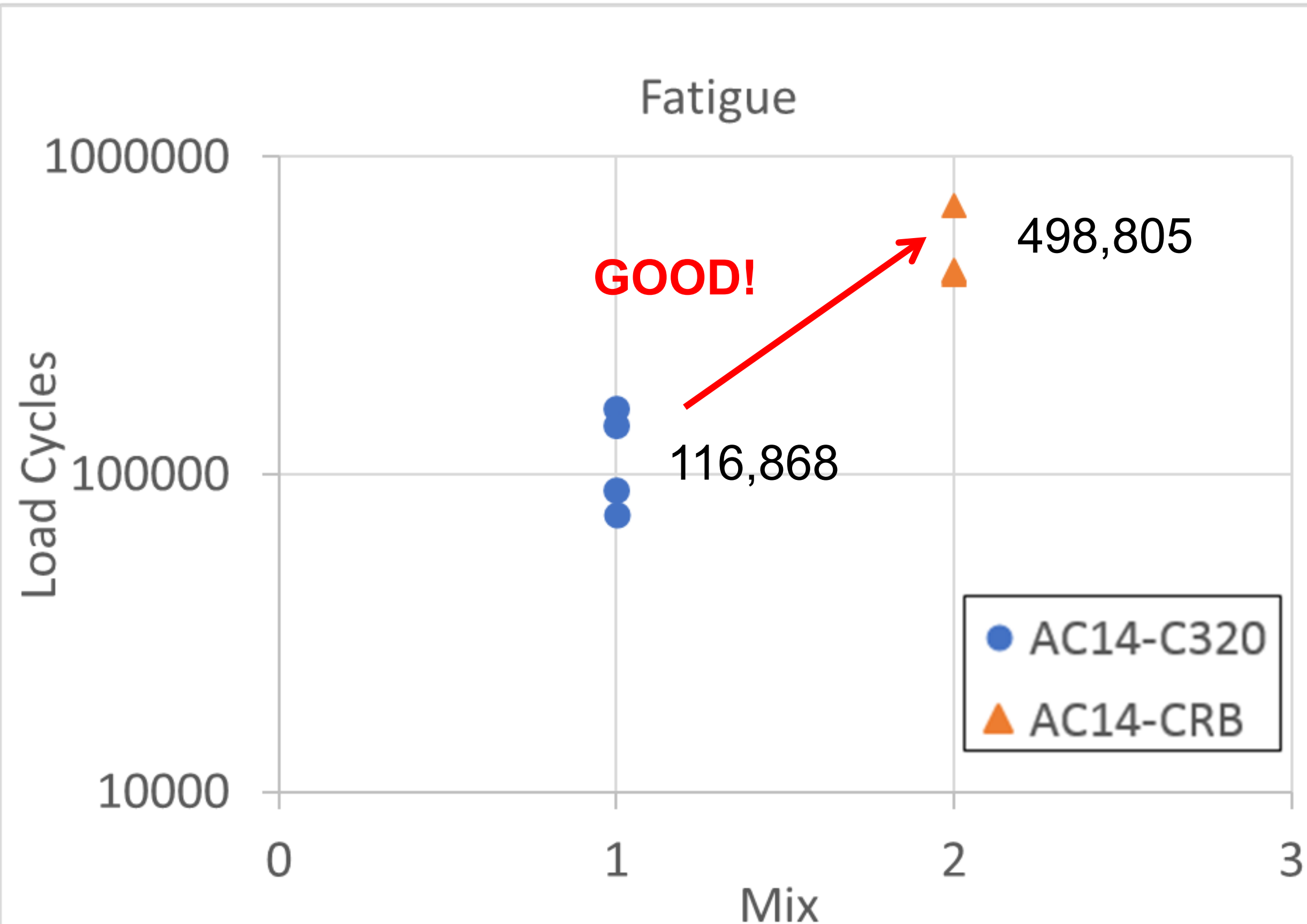
Fatigue (cycles to failure)

Moisture Sensitivity

Wheel Tracking (rut resistance)

Fatigue – repetitive load until failure

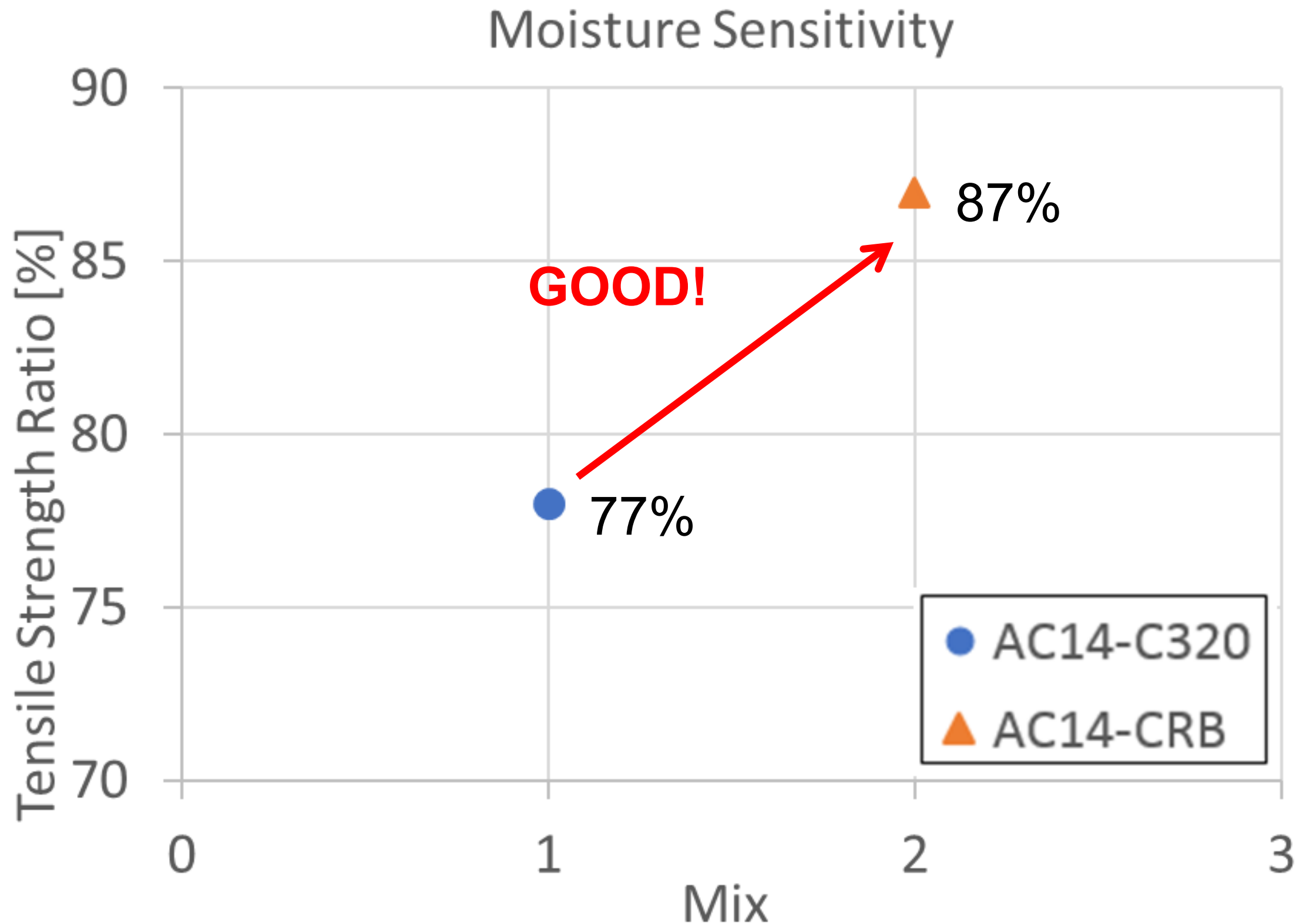
(simulates repeated traffic loading)



Moisture Sensitivity

(susceptibility of mix to degradation through water ingress)

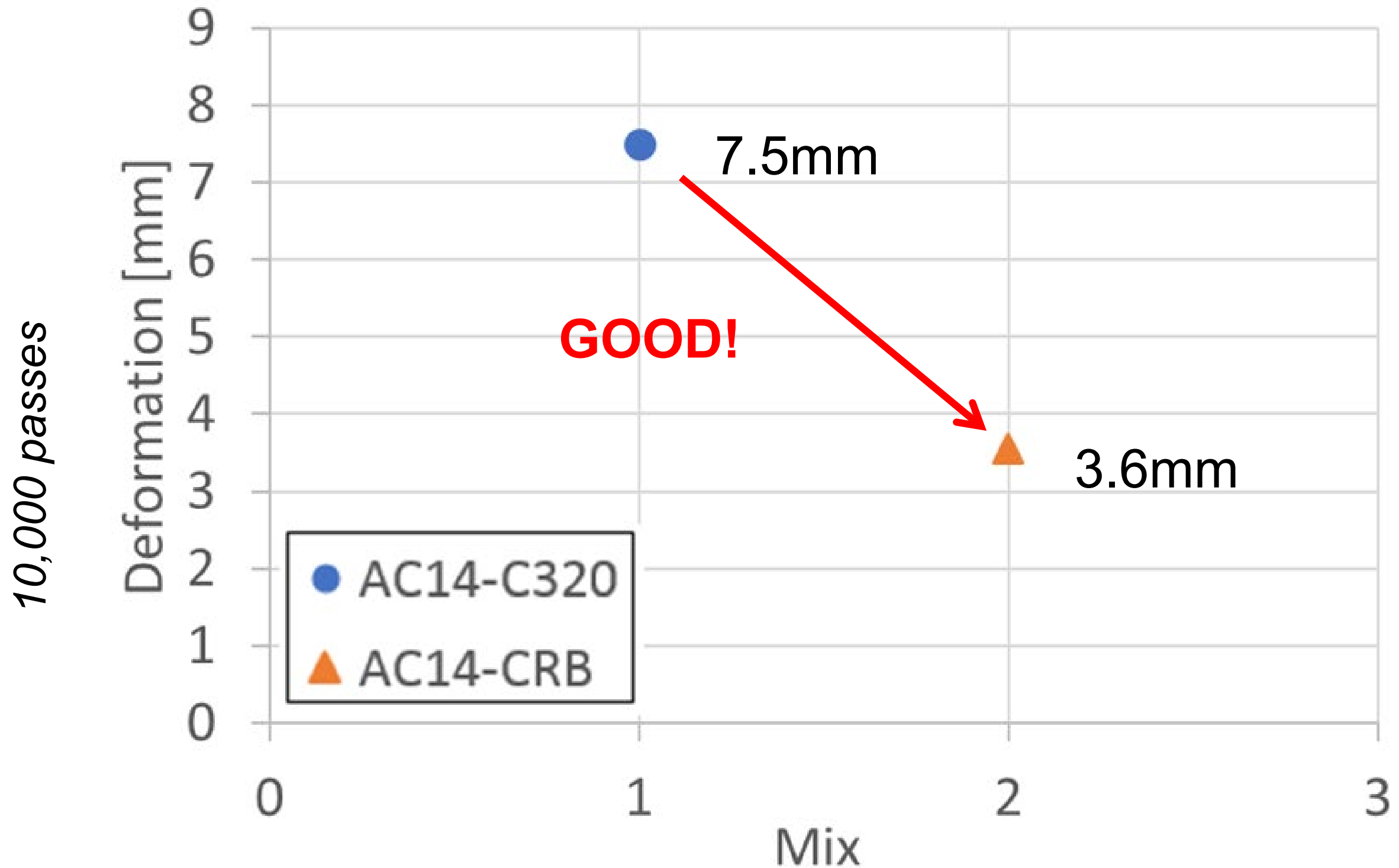
Tensile strength before and after soaking in water



Wheel Tracking

(resistance to rutting)

Wheel Tracking



Looks like a normal road!



Observations/Summation after 12 months

The test results would indicate better (or certainly not worse) than 'standard' asphalt, so why not?

Recycling – lots of investigations and research out of California on the suitability of the product as RAP, so can get recycled yet again (Calrecycle)

Hasn't collapsed or failed! Certainly no cracks yet!!

What next?

Permeable crumb rubber asphalt!

A carpark about 250m away that has many nearby water sensitive urban design features

Same reactive soil (class E) and intent is that by making permeable the underlying soil can retain an even moisture profile instead of wetting/drying and reduce movement



