City of Mitcham – The Innovation Council

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Using Car Tyres in Roadworks Rather than Waste To Landfill

Presented by the City of Mitcham

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Thankyou

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Tyre Stewardship Australia;

- Liam O'Keefe who funded the project
- Meagan for her help with publicity!

TyreStewardship AUSTRALIA

Liam O'Keefe

liam.okeefe@tyrestewardship.org.au

Thankyou

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Team at Topcoat and specifically Rod McArthur the technical expert!

Topcoat ASPHALT

vsa roads

Member of COLAS WE OPEN THE WAY

Performing Locally **Supported Globally**

Rod McArthur *rodmc@topcoat.com.au*

USA (California) – Environmental Reasons

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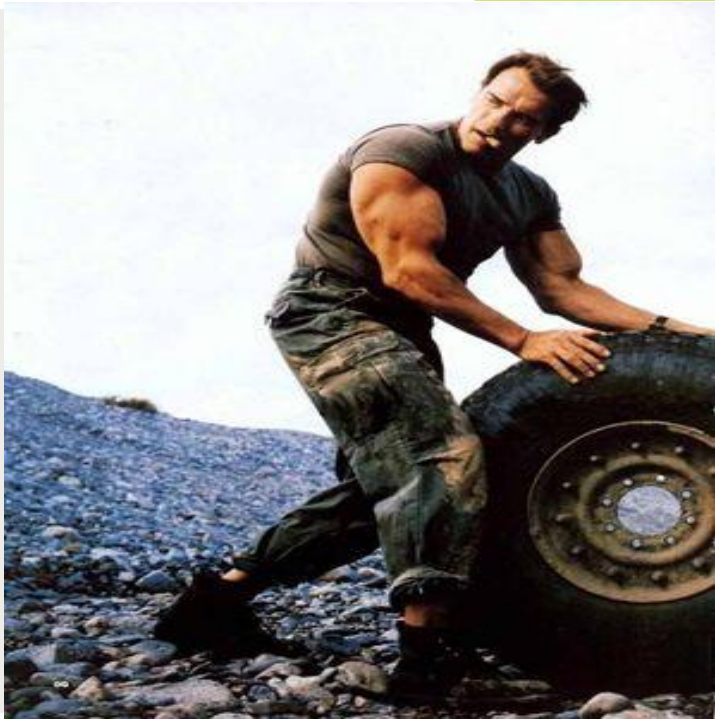
- Used extensively over last 20 years with success
- Became mandated for environmental reasons
- No issues with RAP-ability
- 2016 = 27,620 tonnes of rubber!!



Spain- Environmental and Austerity

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Tyre rubber cheaper than bitumen so used to save money and has now done over 1,600kms in last 20 years

But why tho?

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- Longer life through additives within the tyre to prevent oxidation (carbon black)
- Crack resistance through increased flexibility
- Strength, particularly resistance to rutting and heavier traffic loads

Hold on, so what exactly is crumb rubber?

So WHAT is a crumb rubber asphalt??

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- **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 at the asphalt plant and so the rubber particles don't completely dissolve, however requires specialised pumps and plant

Stanlake Ave, St Marys Trial Site

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- Long straight road (easy for a trial)
- Extremely reactive soil – class E (extreme)
- Low subgrade strength (CBR of 2-3)
- Extensive environmental cracks in new pavement and seals adjacent within 6 months of completion

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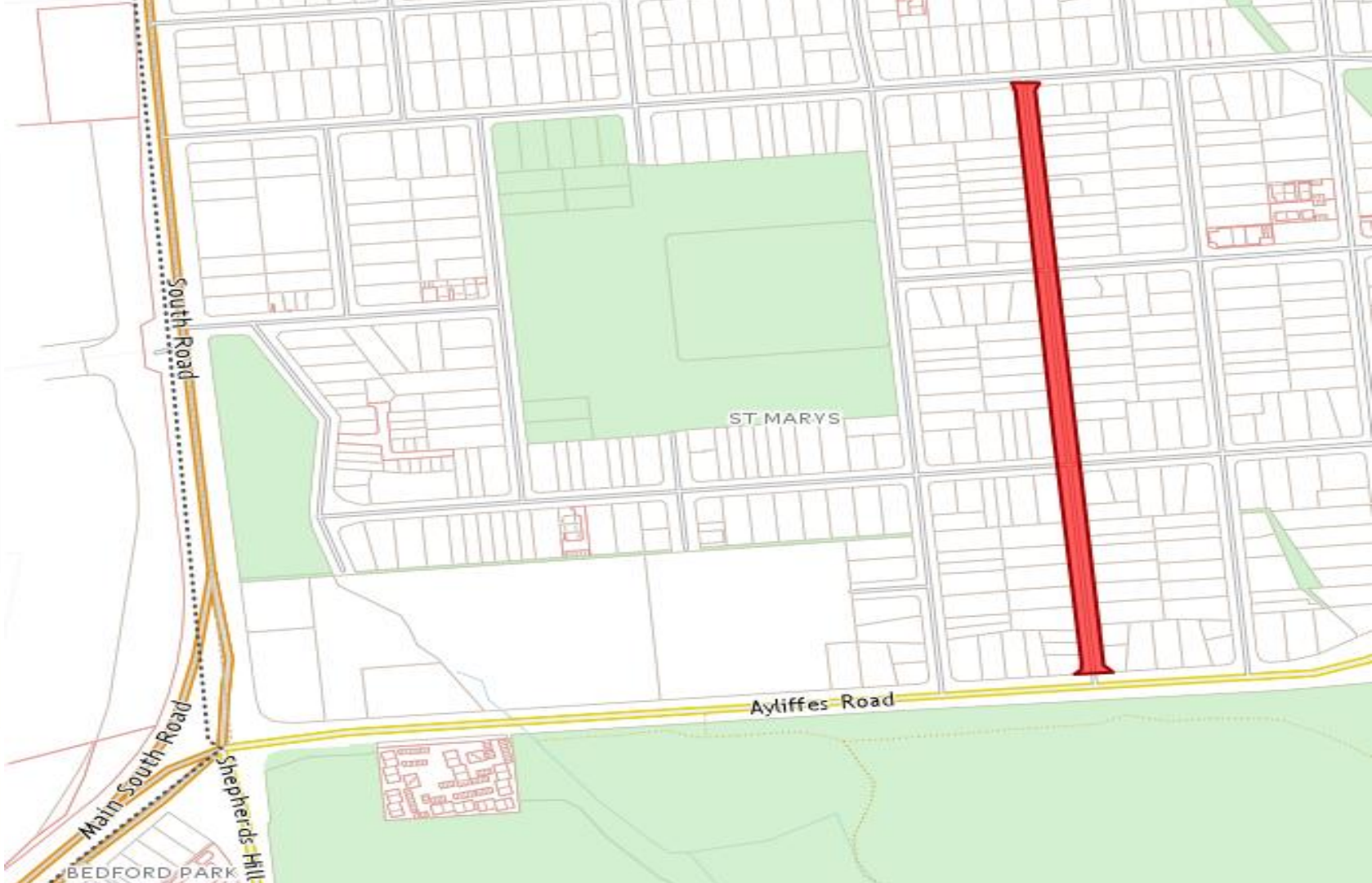

Stanlake Ave - Asphalt Arrangement

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The crumb rubber being used in our trial

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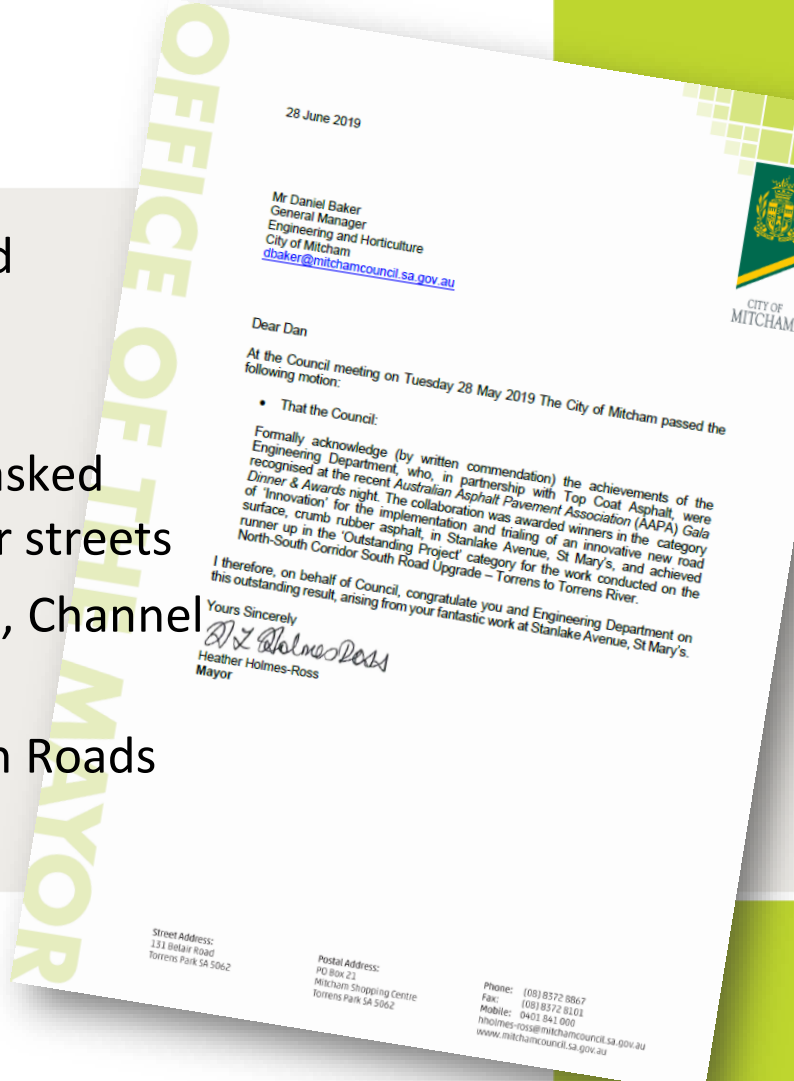
- Wet (Terminal) blend (transported from Victoria)
- 15% crumb rubber in the binder for trial
  = Roughly 1 tyre per tonne of mix
- Net bitumen binder 4.6% (instead of 5.5%)
- Warm mix additives so no smell (lay at 165^{o}C)
- Extensive preliminary geotechnical investigation, survey marks for movement, NSV for surface defects and on going monitoring

So what does it look like when laid?

Community Impression

- Written Commendation from elected members. They love it!!
- AAPA award for Innovation
- Residents from other suburbs have asked about it and the take up of it in other streets
- TSA promoted strongly; social media, Channel 9 news, radio, local newsletters
- Publication – IPWEA Magazine, Spain Roads Magazine



OFFICE OF THE MAYOR

28 June 2019

Mr Daniel Baker
General Manager
Engineering and Horticulture
City of Mitcham
dbaker@mitchamcouncil.sa.gov.au

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Dear Dan

At the Council meeting on Tuesday 28 May 2019 The City of Mitcham passed the following motion:

- That the Council:

Formally acknowledge (by written commendation) the achievements of the Engineering Department, who, in partnership with Top Coat Asphalt, were recognised at the recent *Australian Asphalt Pavement Association* (AAPA) *Gala Dinner & Awards night*. The collaboration was awarded winners in the category of 'Innovation' for the implementation and trialing of an innovative new road surface, crumb rubber asphalt, in Stanlake Avenue, St Mary's, and achieved runner up in the 'Outstanding Project' category for the work conducted on the North-South Corridor South Road Upgrade – Torrens to Torrens River.

I therefore, on behalf of Council, congratulate you and Engineering Department on this outstanding result, arising from your fantastic work at Stanlake Avenue, St Mary's.

Yours Sincerely

Heather Holmes-Ross
Mayor

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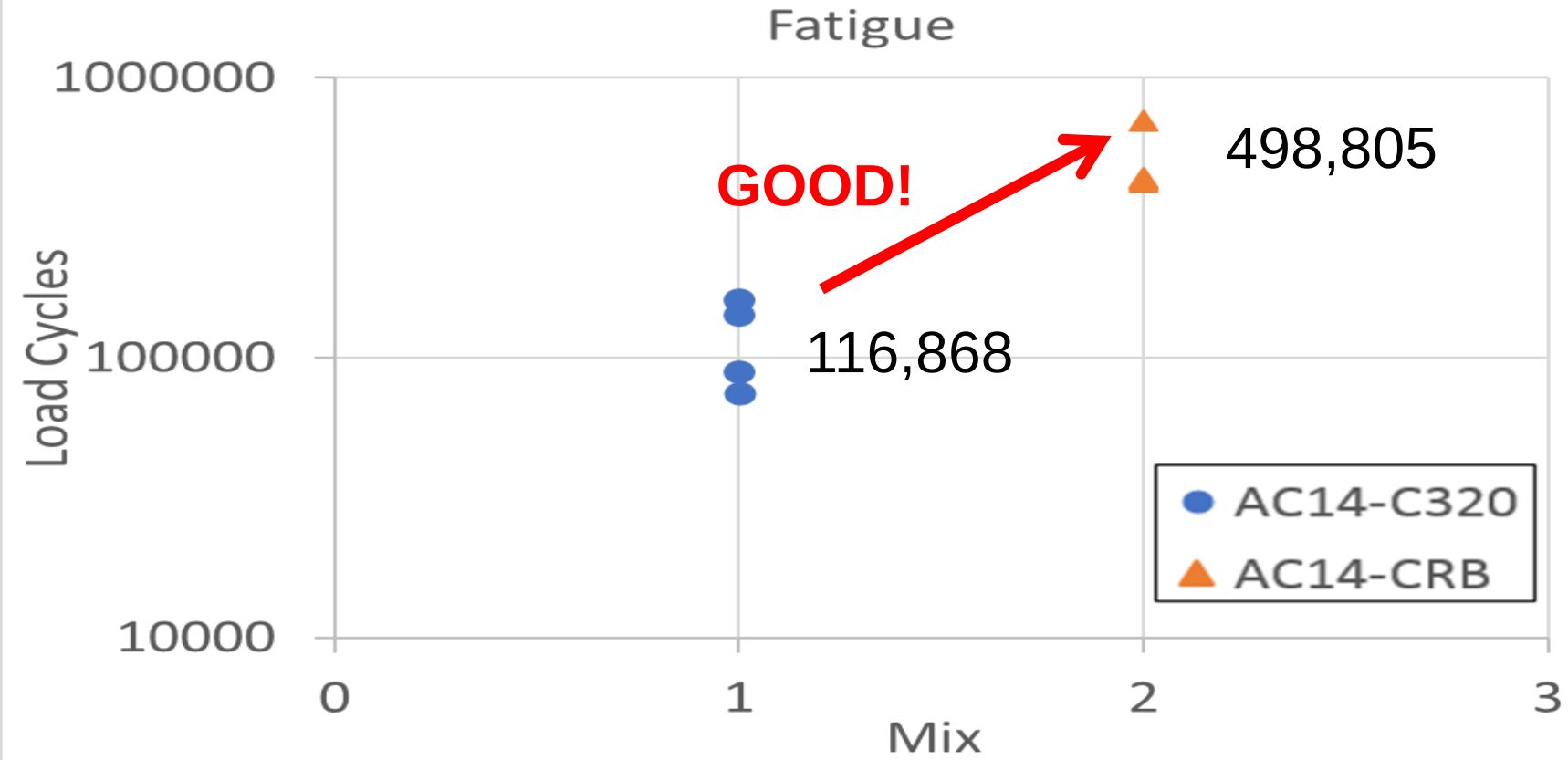
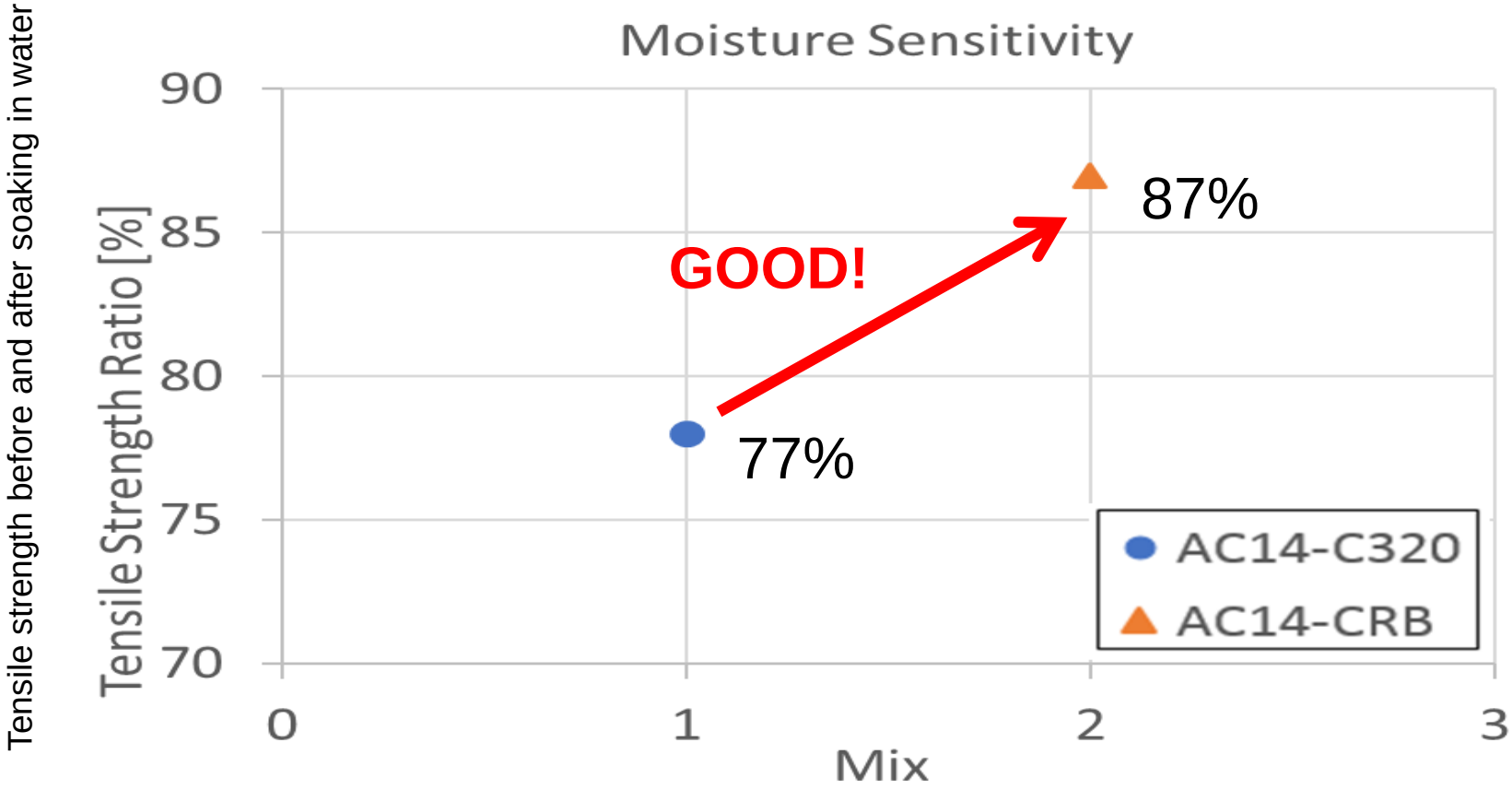
Fatigue – repetitive load until failure

(simulates repeated traffic loading)



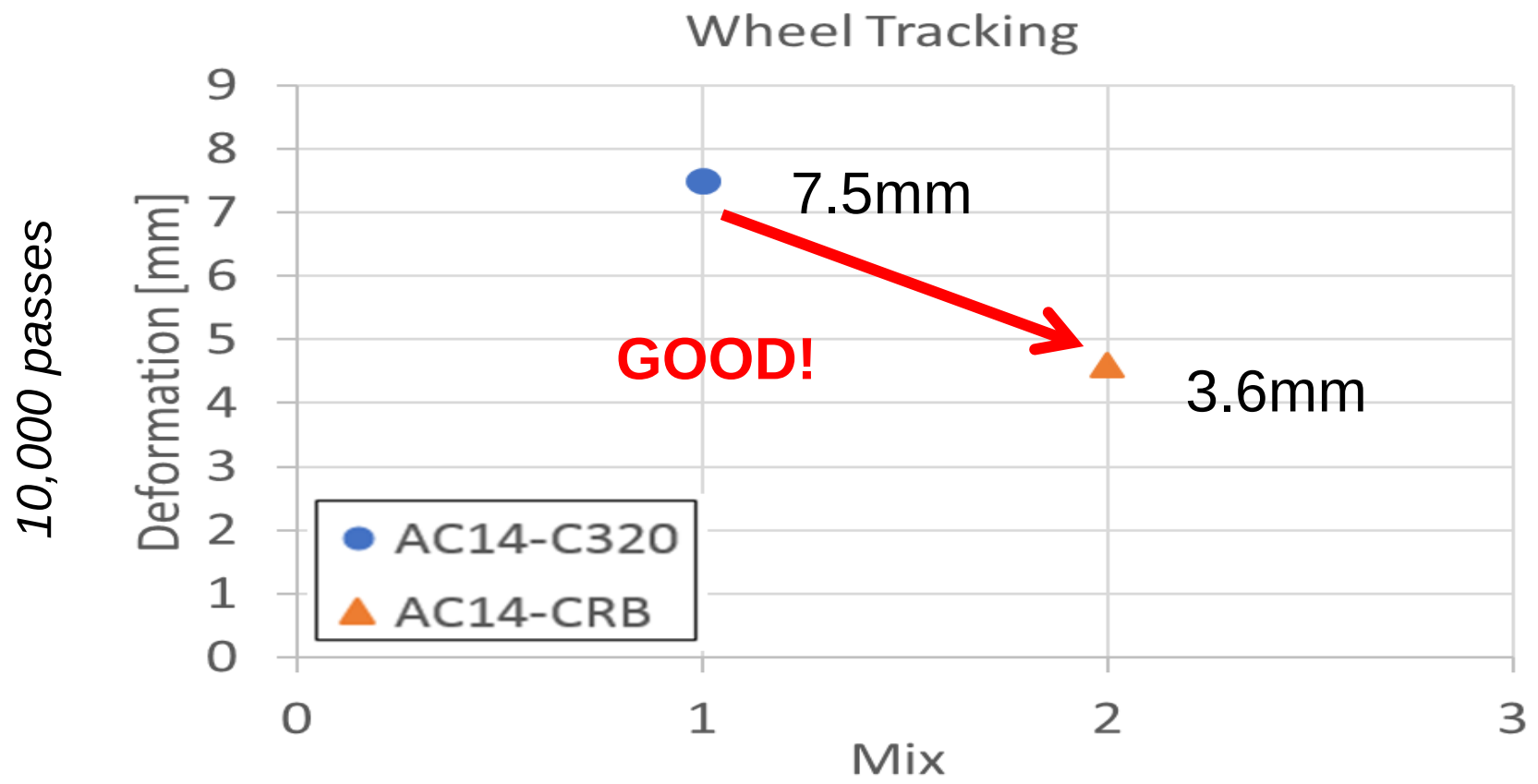
Moisture Sensitivity

(susceptibility of mix to degradation through water ingress)



Wheel Tracking

(resistance to rutting)



Field results and observations

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- A lot darker/blacker (the carbon black). Especially after almost a year.
- Rolling with steel drum roller instead of rubber tyre roller
- Air voids slightly higher than target, but this was consistent with the ‘standard’ asphalt mix (was actually lower)

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How hot does it get?

	Air Temp (Degrees) at 2:15 pm
22 Jan	36.8
23 Jan	38.5
24 Jan	46.8
25 Jan	25.2

Temperature during the day

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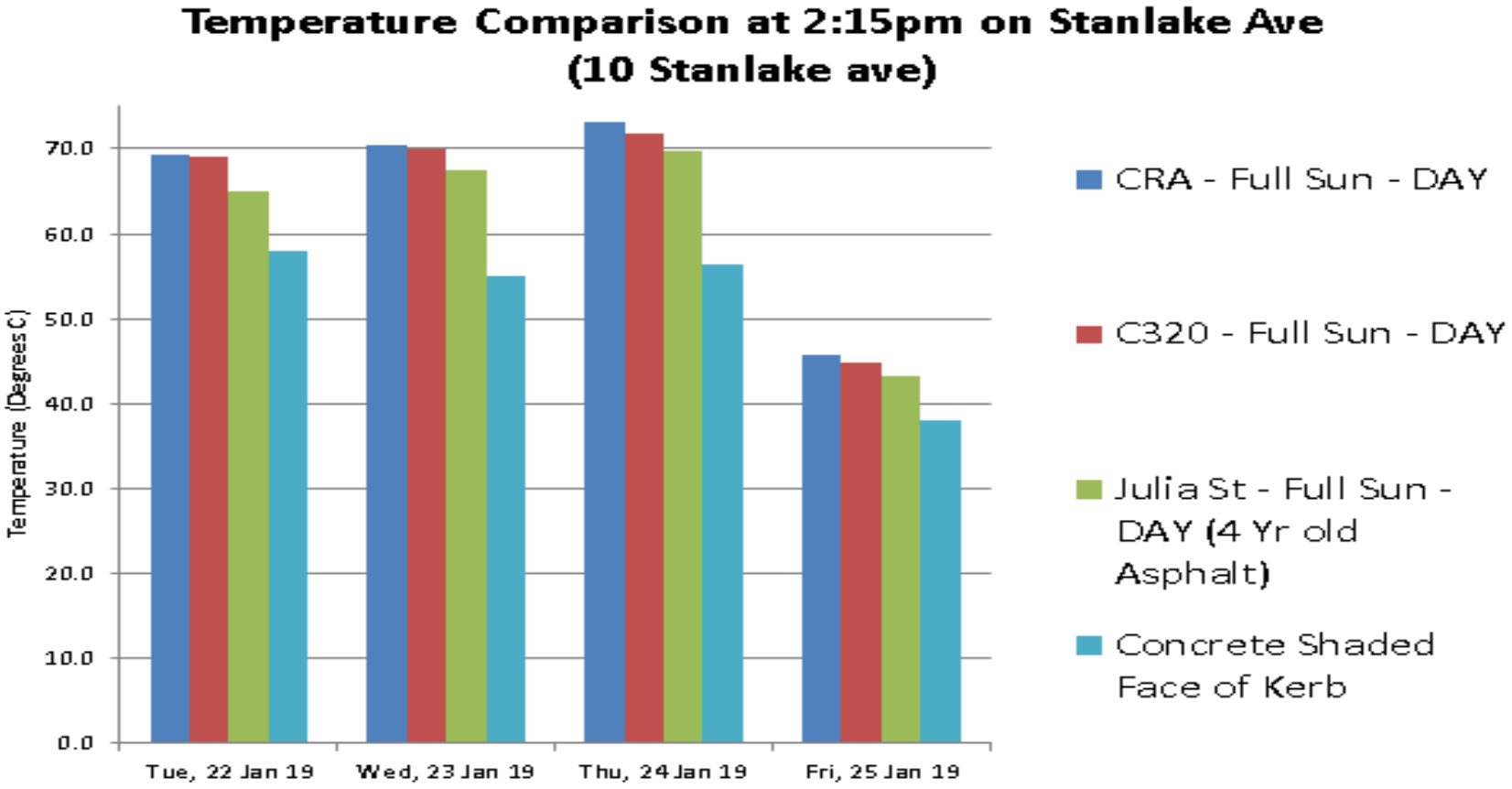

Temperature at night

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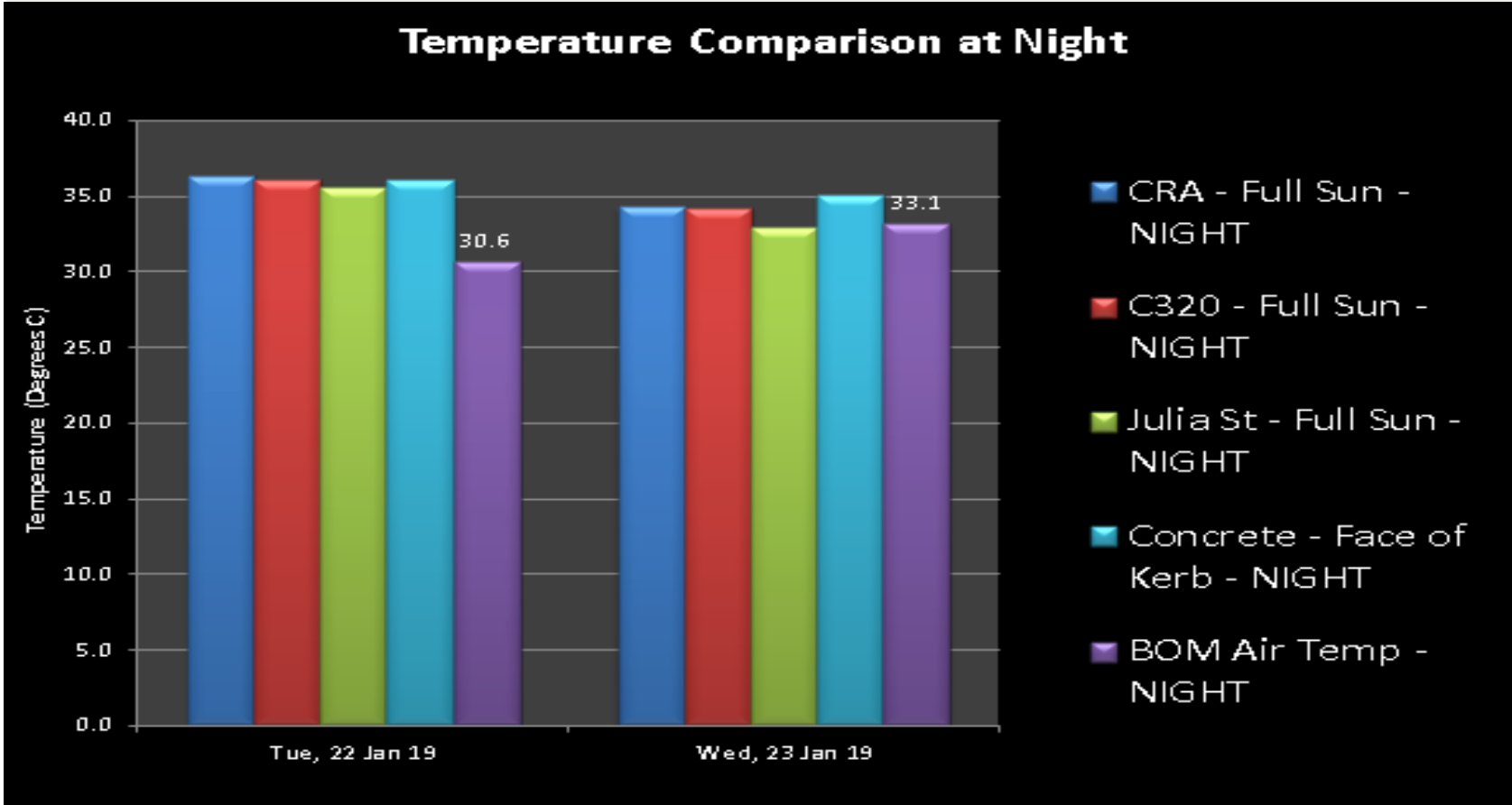

What next?

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Permeable crumb rubber asphalt!

Trial site is 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

Permeable Car Parks using Crumb Rubber

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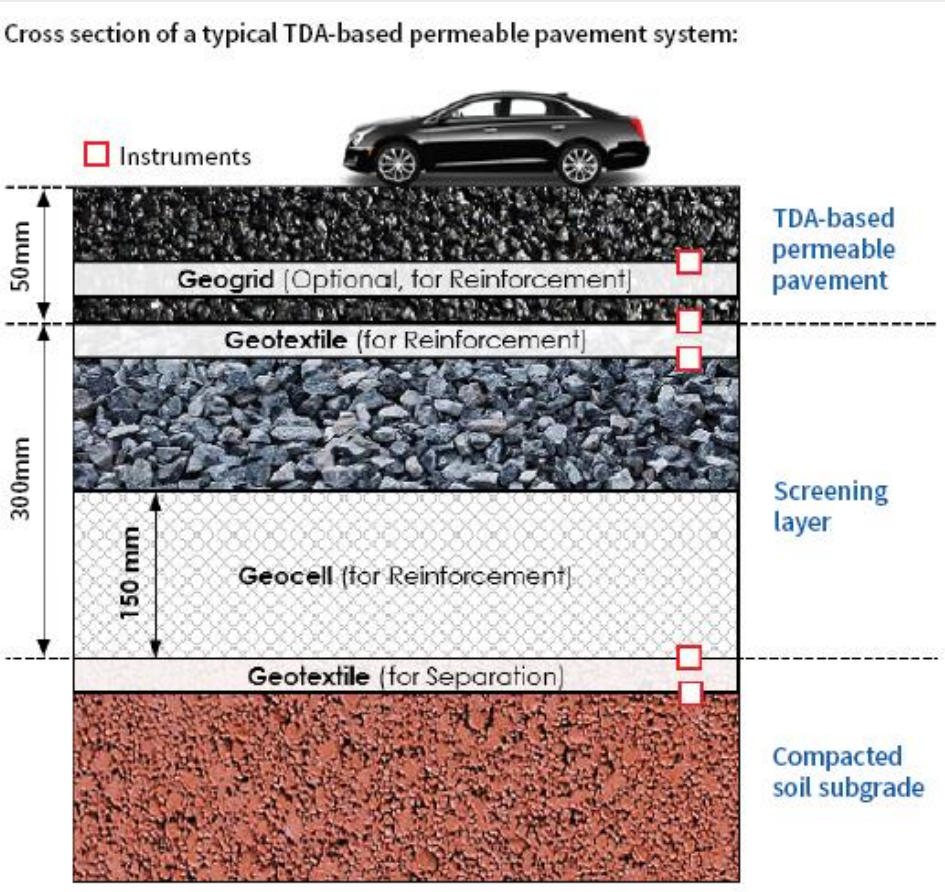
- Site is 400m^2
- 24 parking bays split into 6 test cells in total with
- Approximately 4 Tonnes of Rubber = 500 passenger tyre equivalent
- 60m3 of water storage = 1:100 year event



Permeable Car Parks using Crumb Rubber

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- Permeable surfacing: 50% Tyre Rubber 50% stone (5-7mm)
- Testing for: water quality and quantity, temperature differential, stress-strain monitoring

THE UNIVERSITY OF MELBOURNE

TyreStewardship AUSTRALIA

MERLIN SITE SERVICES

Pacific Urethanes

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Tyrecycle

Global Synthetics