

# *Category 4: Excellence in Pavement Recycling and Stabilising in Local Government*

## Wandana Avenue, Gilles Plains

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Nick Boumis, City of Port Adelaide Enfield



## *2024 AustStab Awards of Excellence*

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# Project Overview

- Council initially provided Downer with a FBS design and requested a quote to complete works on Wandana Avenue
- Initial Design had potential subgrade removal, would have been over budget and difficult to construct in nominated time frame
- Downer believed the design could be optimised and sought advice from consultant PAS
- Due to operating environment (notes in next slide), it was paramount to reduce program and complete works in school holiday period to ensure minimal disruption to public
- Pavement design was ultimately optimised
- Works were completed early, under budget and with additional sustainable outcomes



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# Operating Environment

- Connector road between two major Arterial Roads
- 140 two-way daily bus movements, 6 bus stops
- 4 schools and childcare centres
- Mosque which caters for congregation of >500 people, 3 times a week
- 4 other commercial businesses



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# Pavement Design Optimisation

- Downer engaged PAS to complete additional coring, sampling and testing to optimise the initial pavement design
- Via Downer's Road Science laboratory, several FBS Mix Design trials were completed for the optimised design
- After an initial visual inspection, it was clear there were areas on Wandana Avenue that did not have clear deformation or failures. Due to this, PAS recommended Deflectograph Testing to confirm if areas could be excluded from pavement structural treatment to reduce cost and program. This exclusion also included parking bays and resulted in 42% of the road not requiring a structural treatment

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**Mix Design Report**  
 On Foamed Bitumen Stabilised Materials as Blended in the Laboratory  
 AGP1/7301, AGP1/7302, AGP1/7303, AGP1/7305

Report Number: R23-0947      Date Sampled: 29/11/2023  
 Sample Number: 23-0947      Client: Joseph Rogert  
 Sample Source: Wandana Avenue, BH02 0.950m - 0.350m base & subbase      Client Address: 115 Sherwin St, Underdale, South Australia 5032

**1. Mix Identification**

**1.1 Individual Components**

Bitumen:	8.5% - C170
Secondary binder:	2.0% - Hydrated Lime
Foaming agent:	0.5% - Downer Foamix
Target moisture content:	5.8%
Hot material:	BH02 0.950m - 0.350m base & subbase material

**2. AGP1/7305: Foaming Characteristics of Bitumen**

**2.1 General**

Date of testing:	13/12/2023
Foaming unit:	Wagner V08 300
Method used to determine expansion ratio:	Calibrated dipstick
Bitumen identification:	C170
Foaming agent used and amount added:	Downer Foamix - 0.5% by mass of bitumen
Temperature of the bitumen at the time of foaming:	160°C

**2.2 Foaming Characteristics**

Reading	Water Injection Rate During Foaming (L/h)			Mass of Bitumen and Condensed Water (Dried weight (g))			Foam Expansion Ratio			Half-Life (Sec)		
	Individual	Individual	Average	Individual	Individual	Average	Individual	Individual	Average	Individual	Individual	Average
1	8.00	7.50	7.75	624	540	582	18	16	17	133	148	142
2	12.00	12.50	12.50	516	508	512	20	22	21	75	90	83
3	15.00	14.25	14.75	584	520	552	24	24	24	68	43	66

Authorised Signatory: *Karin Oller*      Date: 25/01/2024  
 Checked by: *Imogen Mann*      Date: 25/01/2024

Accredited for compliance with ISO/IEC 17025 - Testing, NATA Accredited Laboratory number: 13113  
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MIL-01-08      Page 1 of 4      Rev: 23-Oct-2023

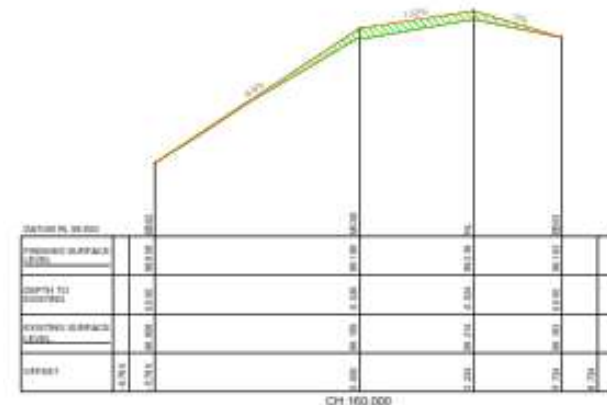


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 Pavement Recycling and Stabilisation Association

# Road Geometry Optimisation

- From the cores taken, it was established that there were large variances in the depth of existing pavement. Due to this it was imperative to complete a geometrical review of the road and see where raising the crown of the road was achievable to reduce the likelihood of encountering subgrade in specific areas
- Services locations were completed during design to confirm areas of issue, prior to works beginning. This also ensured the construction program was not affected by potential issues that could have arisen
- There was a risk of a large portion of service lids being required to be lowered prior to stabilisation works. Raising the road level slightly assisted in reducing the program by enabling service lids to be raised post completion with other ancillary works



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# Initial vs Optimised Design

- The below is a comparison of the initial vs optimised design. This showcases how optimising a design can lower project costs and fit within strict deadlines.
- Initial Design (~\$1,216,000)
  - Treatment Type 1 - FBS (10,336m<sup>2</sup>)
    - 320mm FBS Layer (3% C170, 1% GP Cement)
    - 50mm AC10 A15E (20% RAP)
- Optimised Design (~\$1,030,000)
  - Treatment Type 1 – Resurfacing from Deflectograph Analysis (4,340m<sup>2</sup>)
    - 50mm AC10 A5E (3% Glass, 20% RAP)
  - Treatment Type 2 – FBS (5,796m<sup>2</sup>)
    - 240mm FBS Layer (3.5% C170, 1.25% Hydrated Lime)
    - 50mm AC10 A15E (3% Glass, 20% RAP)
  - Treatment Type 2 – FBS Bus Stop (200m<sup>2</sup>)
    - 190mm FBS Layer (3.5% C170, 1.25% Hydrated Lime)
    - 50mm AC14 C320 (10% Glass, 50% RAP)
    - 50mm AC10 A15E (3% Glass, 20% RAP)

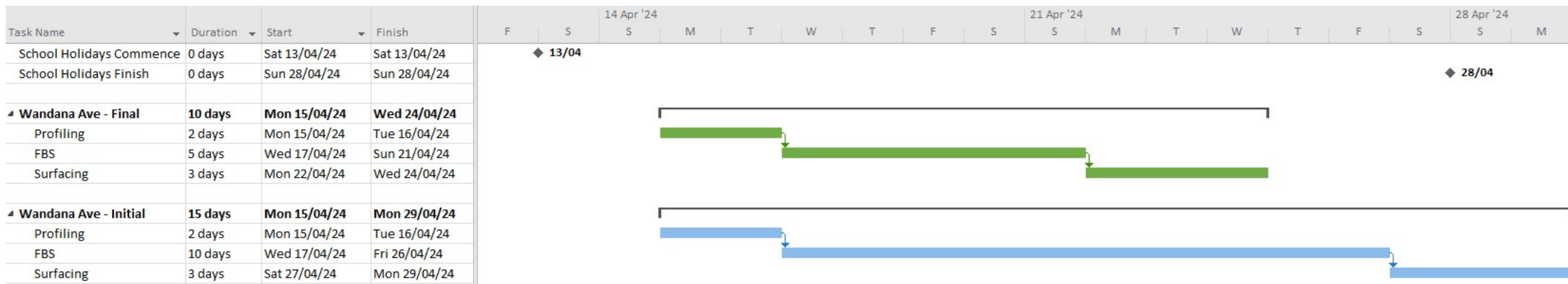


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# Initial vs Final Program

The below program comparison shows the proposed initial program verses the actual completed program. The program has excluded preliminaries and ancillary works that were completed without major traffic restrictions.

- Initial: Will extend past school holiday period, Risk of subgrade delays, no contingency allowance
- Final: Finished well before end of school holidays with sufficient contingency allowance

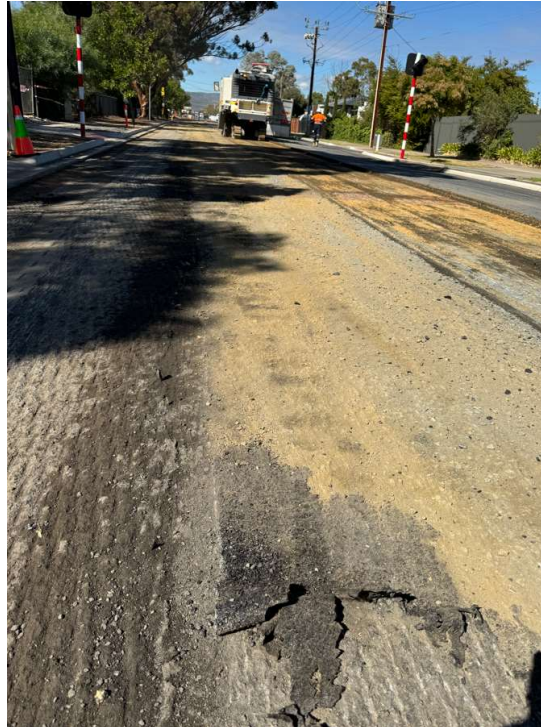


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# Sustainable Outcomes between Downer and City of PAE

- The following metrics have been measured for the Wandana Ave project.
  - 33T of glass recycled in laid asphalt
  - 278T of RAP recycled in laid asphalt
  - 5544T of existing granular recycled via stabilisation process
  - 778T of geo-fabric lined profilings were sieved, saving 81% of this material from landfill and then recycled into Downer's Reconobase product (Recycled Rubble). This process is a 41% cheaper alternate than disposing of all material to landfill as low-level contaminated waste
- The use of glass, high RAP content and geo-fabric lining separation has been implemented in projects between City of PAE and Downer for the past few years



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# Completed Project



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