



SUSTAINABLE AGGREGATES

SOUTH AUSTRALIA

NEWCASTLE CRESCENT DRY CREEK

Bitumen Emulsion Stabilised Recycled Pavement Material

Products

In association with the City of Salisbury, reconstruction of Newcastle Crescent Dry Creek was undertaken using "Bitumix", a bitumen emulsion stabilised material which was chosen as the most economical option by comparison to other pavement configurations. Bitumix is produced in the Resourceco pug mill by adding a specialised high float bitumen emulsion and 2% cement to reclaimed asphalt ("Bitumate™") which has been crushed and screened to specification PM2/20RM. The product was developed with the assistance of a ZWSA grant and undertaken by ARRB Group using mix design proportions based upon the Austroads stabilisation mix design protocol and structural integrity and performance confirmed through a number of field trials.

Application

Newcastle Crescent is an access road to transport yards and is required to carry a high traffic loading (10 million ESA's over 20 years) mainly comprising 'B' – double vehicles. Reconstruction required boxing out and removal of the old pavement exposing a high plasticity clay subgrade (CBR 3%).

Three alternative designs were considered with Bitumix being selected on the basis of cost and forming part of the product evaluation as part of its development, namely.

- 510mm granular layers with 50mm PMB hot mix asphalt wearing course (\$252,800)
- 330mm Bitumix with 50mm PMB hot mix asphalt wearing course (\$78,250)
- 270mm hot mix asphalt layers including 50mm PMB hot mix asphalt wearing course (\$151,250)

The Bitumix was placed with an asphalt paver (the product is also suited to grader laying) and compacted under traffic in two 165mm layers to 97% modified compaction density. The hot mix asphalt wearing course placement was delayed for 12 months in order to ensure the satisfactory performance of the Bitumix.



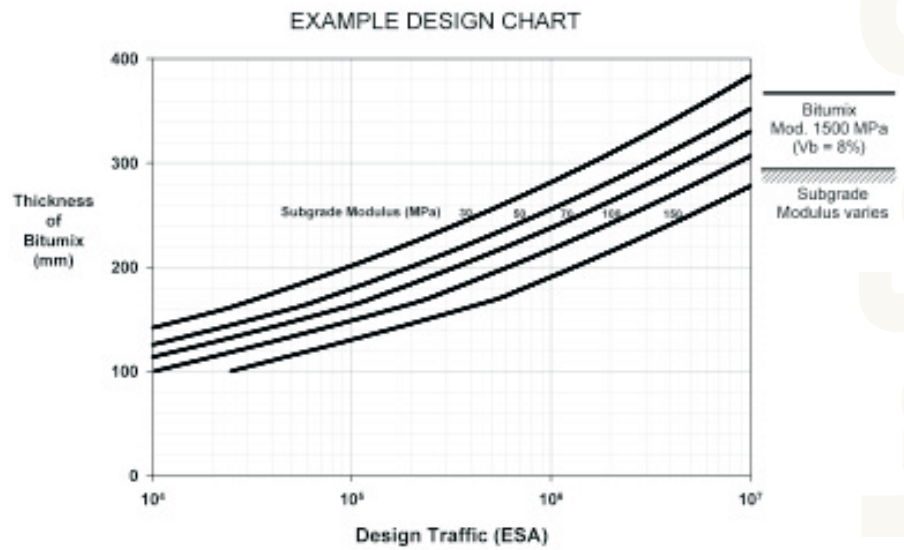
Figure 1. Removal of old pavement and boxing out for new Bitumix pavement

Figure 2. Pug mill with cement and heated emulsion silos for manufacture of Bitumix

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Design Charts

Empirical design charts based upon the Austroads Design Guide were developed from mechanistic analysis to enable estimates of structural thickness based upon traffic loading and subgrade strength. An example is shown below.



Performance

Subjected to heavy triple axle configurations since construction, prior to applying the final hot mix asphalt wearing course the pavement showed no signs of structural distress (ie. fatigue cracking or rutting). In addition turning movements displayed no lateral shoving or scouring of aggregate on the surface. The final asphalt wearing course adopted a polymer modified bitumen to manage lateral stresses and increase surface wear resistance.

CONTACT INFORMATION

For information on this project or any application of recycled materials as granular or bound pavement layers please contact:

Andrew Wilson (0439 682 970)

PO Box 542
Enfield Plaza SA 5085

Bob Andrews (0438 827 432)

ARRB Group
123 Sandgate Road
Albion QLD 4010

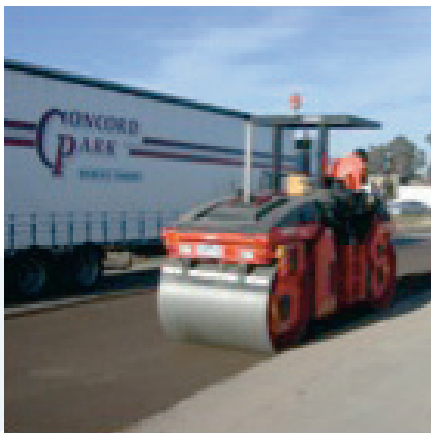


Figure 3. Paver placement and compaction under traffic

Figure 4. Completion after 12 months prior to hot mix wearing course placement

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