



The North Island Weather Events (NIWE) that struck the top half of New Zealand had a significant impact on the transport system, across state highways, local roads and rail. Along with the slips, damaged bridges and culverts, there was significant damage to road surfaces and pavements, particularly in the Tairāwhiti region.

With the events taking place between mid-January and mid-February, it was Autumn before the Response Phase was completed, and next steps could be considered. During network inspections pavement condition on State Highway 2 between Ōpōtiki and Gisborne was identified as a significant risk over winter, with a need to quickly improve overall condition to ensure goods could continue to be transported into and out of Tairāwhiti.

With this work falling into the Recovery Phase, faults could be repaired to return the state highway to pre-event condition. A pavement condition assessment across the region identified number of locations that required immediate and effective rehabilitation works. Due to the urgency of works, and considering that works would be completed during the winter period, NZTA took the position that the solution did not need to be technically perfect, it just needed to ensure the road stayed open during a key period, especially as construction was set to take place in winter.

A range of options were considered, however there were a number of challenges for most of these. For examples, there is no asphalt plant able to produce Stone Mastic Asphalt (SMA) in or near Gisborne, and the region relies on a mobile asphalt plant for annual surfacing programmes. There were a number of areas where materials would be very sensitive to moisture, which meant standard granular pavements would be prone to rapid deterioration if constructed during winter.

The solution: Foam Bitumen Stabilisation (FBS) rehabilitation treatments. Quick to build compared to standard pavements, and with less sensitivity to moisture under ideal conditions, this treatment provided the solution required while not having the disbenefits of other options. However, special considerations were still needed to provide the best possible outcome.



Delivery model

Once FBS was identified as the preferred treatment, NZTA decided to engage directly with specialist contractors, Hiway Group. Additional suppliers would be required for other aspects of the work, such as first coat seals, drainage, hi-lip removal, and temporary traffic management. Downer, Fulton Hogan and Pro Traffic Solutions (PTS) were engaged to undertake these works.

NZTA engaged SLC Technical Services to lead the programme, with assistance from Roding Industry Support Services (RISS) for traffic management planning expertise.

The project team commenced working together on 10 April 2023.

Design

As well as owning the delivery of FBS, Hiway Group were responsible for pavement design. Testing and investigation was limited due to the tight timeframes and need to start work as early as possible. NZTA enabled a fast-track process to keep designs moving as quickly as possible, whilst limiting the design risk as far as possible.

RISS used their robust framework to develop traffic management plans that considered the actual risks on site and site-specific needs. The use of cones through the worksite was removed as this would have been obstructive to both road workers and road users. The outcome of the framework and discussions was to use piloted vehicles to control road users through worksites, managing speeds and delineation in a dynamic way.

Delivery

Three weeks after the project team was established, work at the first site commenced.

Prior to FBS work commencing, sites needed minor enabling works to allow the rehabilitation to commence. This included the removal of hi-lip and any detritus that had built up alongside the site, and reformation of any drainage channels. At some sites sub-soil drainage was installed.

Hiway Group then arrived onto site, conducting pretreatment of the existing pavement, introducing new material if required and applying lime to control moisture levels. Following this foamed bitumen is injected into the pavement. Moisture level is important when this step takes place, and thus timing and sequencing was critical.





Finally, the pavement was prepared for surfacing, followed by line marking. Following any enabling works a typical site took 8 days to construct

Weather was always going to be an issue over winter, and to improve efficiency the team had the ability to move to different parts of the network depending on weather and whether designs or enabling works were ready. This ensured productivity remained high throughout.

Traffic management

Pilot vehicles were used to manage vehicle speeds past the worksite. There was an aim to remove the number of people working on foot around moving plant or near traffic, whilst also reducing setup and pack-down time required.

Based on site audit feedback and lessons learned, the team quickly added extra variable message boards to advise road users what to expect. The pilot vehicles allowed vehicle speeds to be managed dynamically, keeping people moving over newly constructed or sealed sections to minimise the risk of flushing.

Education was an important part of the traffic management approach, and engagement with TTM suppliers and Hiway Group crews took place each time work re-started after weather enforced delays.

Outcomes

Overall, 43 lane kilometres were delivered over a period of 12 months. While the lifetime of the asset may not be that of a standard Foam Bitumen Stabilisation treatment (approximately 25 years), the quality of workmanship was high, with very few sites requiring any re-work ahead of the following winter. The pavements are expected to last several years, enabling Recovery works to take place, goods to continue being transported, and communities to be connected for the foreseeable future.

The risk-based Temporary Traffic Management approach provided a safe system to enable the physical works to be delivered efficiently. Initial feedback from crews was that they had never felt so safe when working in a live road environment. The supporting processes ensured that safety was not compromised, and lessons learnt could be applied quickly. PTS also found that the set up and pack down time for equipment was significantly reduced. This resulted in less time on the road, reducing another risk.

As the programme matured efficiencies were created. Resources were shared across suppliers and journey management was improved as other Recovery works came online during the second half of 2023.

Both client and supplier acted collaboratively, with a single purpose driving decision making. Overall, the programme was delivered under budget, a testament to the ways of working established by the various organisations involved.