

## Mercer Longswamp section Waikato Expressway – construction of a major highway

“Due to time constraints some chipsealing had to be completed in the winter. There was only a window of approximately three hours per day when the atmospheric conditions were suitable for sealing.”

“Traffic management requirements were extensive with this project, with positive traffic control requirements meaning traffic was re-routed on a 24-hour basis.”

CLIENT NZ Transport Agency (Transit New Zealand)

CONSULTANT Bloxam Burnett & Olliver

PRINCIPAL CONTRACTOR Ross Reid Contractors Ltd



Analyse | Solve | Construct

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PAVEMENT**  


Research | Design | Analysis



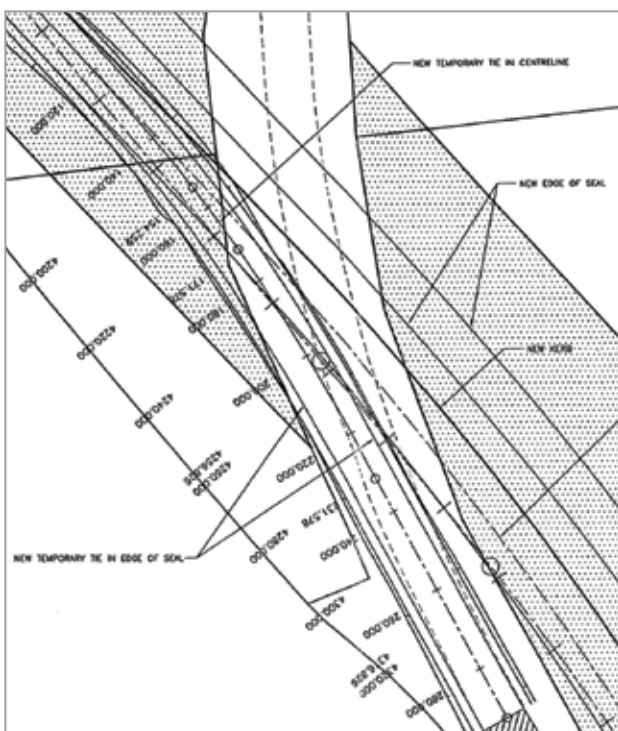
## A 'greenfields' construction project plus reconfiguration of existing highway

Waikato Expressway engineers faced a massive challenge after finding "global" instability at 13 slip sites in the underlying rock formation through the Mercer hills and then swampy zones further south. The slips were up to 20m deep and causing as much as three metres of ground settlement.

Transit's initial plan in the 1990s was to try to fit a four-lane highway between the hills and river at Mercer, but early investigations revealed a risk of triggering massive landslides, so the inland route was chosen for the southbound lanes.

In a project that lasted for five and a half years, the Mercer – Longswamp section of the Waikato expressway was created. Ross Reid Contractors undertook the earthworks. An artificial pre-loading was created to ensure settlement and lessen the chance of the road sinking at a later stage. As well as the greenfields inland section, existing parts of the original highway had to be rebuilt and traffic re-routed.

Blacktop was subcontracted to Ross Reid Contractors to build the sub-base, basecourse and complete the sealing. The 15km stretch of road was completed in a year and a half timeframe.



Linking the old road with the new

### The sub-base was built in stretches during the winter months, with 200mm GAP 65 (graded all passing 65mm aggregate) laid on top of the sub-grade

Careful traffic management planning was crucial with this project. Contra flow (two way traffic) had to be maintained at all times. This called for tie-ins and crossings being completed at night. Traffic was accommodated on the existing carriageways as long as possible and accommodated on newly constructed sections while existing sections were reconstructed. Positive traffic control (moving traffic across lanes) was in place on a 24-hour basis for two days after sealing to ensure proper bedding of the chip.

Due to time constraints some chipsealing had to be laid in the winter, and because of temperature constraints an emulsion was proposed. This proposal was however rejected as a result of the potential environmental impact should emulsion run off and find its way into the Waikato river.

During winter sealing operations, there was only a window of approximately three hours per day when the atmospheric condition (air temperature) would be 10 degrees, ensuring the road temperature would be roughly 12 degrees (the essential pre-condition for fail-safe sealing.)

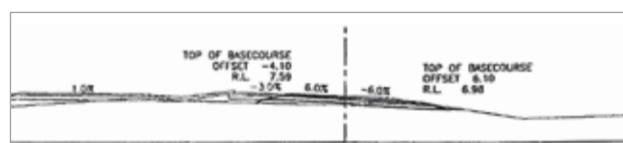
### Cross-overs needed to be designed due to differing levels between new expressway and the old highway

It was not a straightforward matter of linking up the old road with the new.

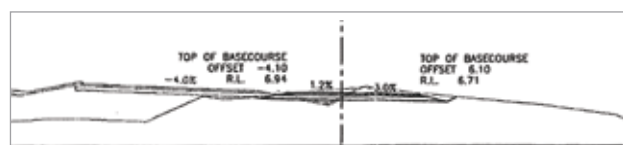
There were many areas where structural asphalt had to be used to tie-in new pavement with the existing road, due to different levels.

Structural asphalt (SAC)	Advantages
Coarser aggregate 150/200mm depth to achieve structural strength.	SAC is just a faster method of constructing sub-base and base than with aggregates, as you can accommodate traffic on it as soon as it gets cold.

The use of structural asphalt providing a load-bearing single-layer levelling solution where road levels are uneven. The use of structural asphalt sped up construction of tie-ins / cross-overs which were generally done during night time with lower traffic volumes.



160 – Cross-section, new tie in at centreline



220 – Cross-section, new tie in edge of seal