

INNOVATION AND EXCELLENCE AT MANUKAU HARBOUR CROSSING



Geoffrey Peel stands with the innovative pile cutter.

World-wide interest in project invention

An underwater pile cutter that can be operated remotely, from dry land, has been developed by the MHX team to remove and recover valuable steel casings at the end of the project. It is understood to be a world first and is attracting international interest, particularly from the oil industry.

The pile cutter is the brainchild of bridge engineers Jonty Pretorius and Jarred McLachlan and the project's engineering workshop manager Geoffrey Peel. Thames based engineering company A & G Price fabricated the cutter, providing valuable design input along the way.

The problem that confronted the project was how to remove the approximately 42 steel casings that have been driven into the seabed to support the new bridge as it is built. It's a job that is normally done by divers who cut the casings off at seabed level, leaving behind the portion of casings below that level.

The new pile cutter will work inside the props, cutting through the 12.7mm steel wall approximately 8 metres below the seabed level. It will enable longer sections of the props to be reclaimed, resulting in significant cost savings and a better environmental outcome.

ACHIEVEMENTS

Recent Manukau Harbour Crossing achievements have included:

- ▶ Merit in the HR Institute of New Zealand (Auckland) 2009 awards for a team building exercise to capture ideas from all members of the team
- ▶ The Fletchers 2009 "Bloody Good Idea" award for development of a new pile cutting machine
- ▶ Completion of a six-day cycle for completion of one deck segment on the duplicate Mangere Bridge (compared to 23 days a year earlier)
- ▶ One million man hours completed with only 21.5 hours lost through injury requiring medical attention, compared to an industry best average of 28 hours
- ▶ A new industry benchmark for environmental compliance – 95% of scores at 1 or 2 compared to the ARC's best practice measure of 80%
- ▶ 56% of construction waste recovered for re-use on the project to date
- ▶ Traffic Management for the project is independently audited every month, and February saw the tenth month in succession that we scored a "One" – This is an exceptionally high standard

SOLID FOUNDATIONS IN LESS TIME

Extensive use of cement treated basecourse (CTB) for the motorway foundations has been a major innovation by Manukau Harbour Crossing.

CTB is a wet mix of aggregate and cement that forms the main structural layer of seven kilometres of new and refurbished motorway between Queenstown Road in the north and Walmsley Road in the south.

Over the 12 months of motorway construction on the project, 63,000 tonnes of CTB was produced at the project's construction site using a pugmill, which is similar to a giant cake mixer. Into the mix went the equivalent of 90 tanker loads of cement, 2000 truck and trailer loads of aggregate. There were 5,727 truck movements out the gate to deliver the mixed CTB to site.

The CTB sits directly on top of the motorway sub grade. It forms the base for the layers of asphalt that follow. Using it is quicker and better value for money than the traditional basecourse process involving weeks of grading and rolling metal.



Pugmill used to mix CTB



CTB being rolled on the motorway

PLANS FOR RESTORATION OF THE WATERFRONT ROAD RESERVE

The Manukau Harbour Crossing construction site in Mangere will be restored to the park it once was following completion of the project.

Restoration plans were developed following consultation last year with the community and Manukau City Council.

They are for an open, grassy reserve where locals can exercise their dogs, kick a ball around or sit and contemplate the views to the harbour.

Design manager Matthew Sturge says what's planned is similar to what was on the site before construction began, and that's what the community said they wanted.

"People said they wanted an open area that felt safe. They didn't want too much planting. Nor did they want picnic and barbecue areas or a children's playground. Essentially, it will be an extension of the Kiwi Esplanade harbourside reserve."

The major changes will be the addition of 3-metre wide paths for cycling and walking, one around the coastline to Mahunga Drive and the other across the reserve from Crawford Avenue.

Drainage will be improved to reduce the likelihood of the flooding that occurred before construction began. Carparking will be provided, with allowance for more if required for the proposed all-tide boat ramp nearby. And a new footpath will be built from the entrance of the reserve to the Old Mangere Bridge.



Before



Now



After

2020 Visualisation: Open reserve with views from Waterfront Road to Manukau Harbour retained through stands of open branching Pohutukawa on low mounds



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New Zealand Government



Manukau Harbour Crossing

APRIL 2010

CROSSING WILL FINISH WITHIN SIX MONTHS



Transport Minister Steven Joyce visits the site to announce the early finish and meet some of the team.

The Manukau Harbour Crossing project involves widening the Southwestern Motorway to three traffic lanes and one bus shoulder lane. The project will be finished by 31 August 2010, seven months ahead of its original programme and three months ahead of the 30 November "stretch" target that the project team set itself when construction began in April 2008.

In announcing the early finish, Minister of Transport Steven Joyce said this would bring relief to motorists now held up in congestion as well as major businesses that regularly use State Highway 20.

"Within six months motorists will have full use of all six lanes of the widened motorway and four lanes in each direction across the Manukau Harbour."

He said the early completion of the Manukau Harbour Crossing, which is a key section of the planned Western Ring Route between Manukau and Albany, was the result of hard work,

great team work and innovation by the team on site.

The Manukau Harbour Crossing Alliance partners – the NZTA, Fletcher Construction, Beca Infrastructure and Higgins Contracting – had demonstrated what was possible when a collaborative, best-for-project team came together.

"It has been great to witness the impressive progress. The rapid changes have been amazing."

Alliance Project Manager Andrew Rose says the additional motorway capacity being built by the project would be opened for use section by section.

"We plan to have southbound traffic on the new bridge in late June or early July, and to then work on refurbishing the existing bridge for northbound traffic only."

The final major works will be restoration of the Waterfront Road Reserve and completing the foot bridge over Onehunga Harbour Road."

What's ahead in the next three months

- ▶ Completion of all deck segments of the duplicate Mangere Bridge
- ▶ Final surfacing of all completed sections of the widened motorway
- ▶ Opening of the new Beachcroft foot bridge and demolition of the existing bridge
- ▶ Start of construction of the Onehunga Harbour Road foot bridge
- ▶ Completion of the new shared cycle/pedestrian path Queenstown Road to Orpheus Drive
- ▶ Completion of new path from Onehunga Lagoon to the Beachcroft foot bridge
- ▶ Start of winter planting programme, which will see 92,000 more native trees and shrubs planted
- ▶ Installation of the first underground section of the Watercare Hunua No. 4 Watermain along Crawford Avenue
- ▶ Progression of ideas for possibly advancing the opening of some motorway segments to relieve congestion even earlier than August 31st
- ▶ Planning for a public open day in June/July, before the new Mangere Bridge is opened to traffic



WALKING AND CYCLING IMPROVEMENTS



Mangere Bridge Walking Group members enjoying a coffee after their walk

"Cycle Action Auckland is impressed by the new shared paths and the new cycle and walking bridges. These new facilities for walking and cycling will transform the area and give us all, both locals and visitors, more reasons to visit local cafes, parks and harbour frontage."

Barbara Cuthbert, Cycle Action Auckland, March 2010

The Manukau Harbour Crossing project includes local cycling and walking improvements to make it easier to get around on foot or by bicycle.

Ten separate cycling and walking initiatives, as shown on the diagram, will be completed by the end of the project.

All the new works will connect to existing cycling and walking connections – the Kiwi Esplanade path on the south side of the Harbour, the Waikaraka cycleway and Orpheus Drive on the north side of the Harbour, the Old Mangere Bridge and the underpass on the existing motorway bridge.



At the 'Go By Bike Breakfast'



Two members of the Mangere Walking group 'out and about'

'Go By Bike Breakfast' on 17 February held under the Pohutakawa trees at the Kiwi Esplanade Reserve



Beachcroft foot bridge takes shape

A distinctive 3.5m-wide cable-stayed bridge is being built to replace the popular foot bridge over the motorway between Hillsborough and Onehunga. It's due for completion in by the end of April in time for the second school term to begin.

The steel superstructure of the bridge will be supported by stay cables which transfer loads to a tall steel pylon. The pylon is inclined 10 degrees to the west to give a distinctive appearance.

The main spans of the bridge are bright blue while the pylon is white, to fit with Onehunga's maritime environment.

At the western end, the bridge connects directly to Sealcliffe Road via a short concrete ramp. At the eastern end, there will be a 31m-long curved concrete ramp that has been raised to bridge a Watercare Services sewer and to link to Beachcroft Avenue. Steps at the start of the ramp will give walkers direct access to the Onehunga Harbour Reserve and a new path across the reserve to the Lagoon.

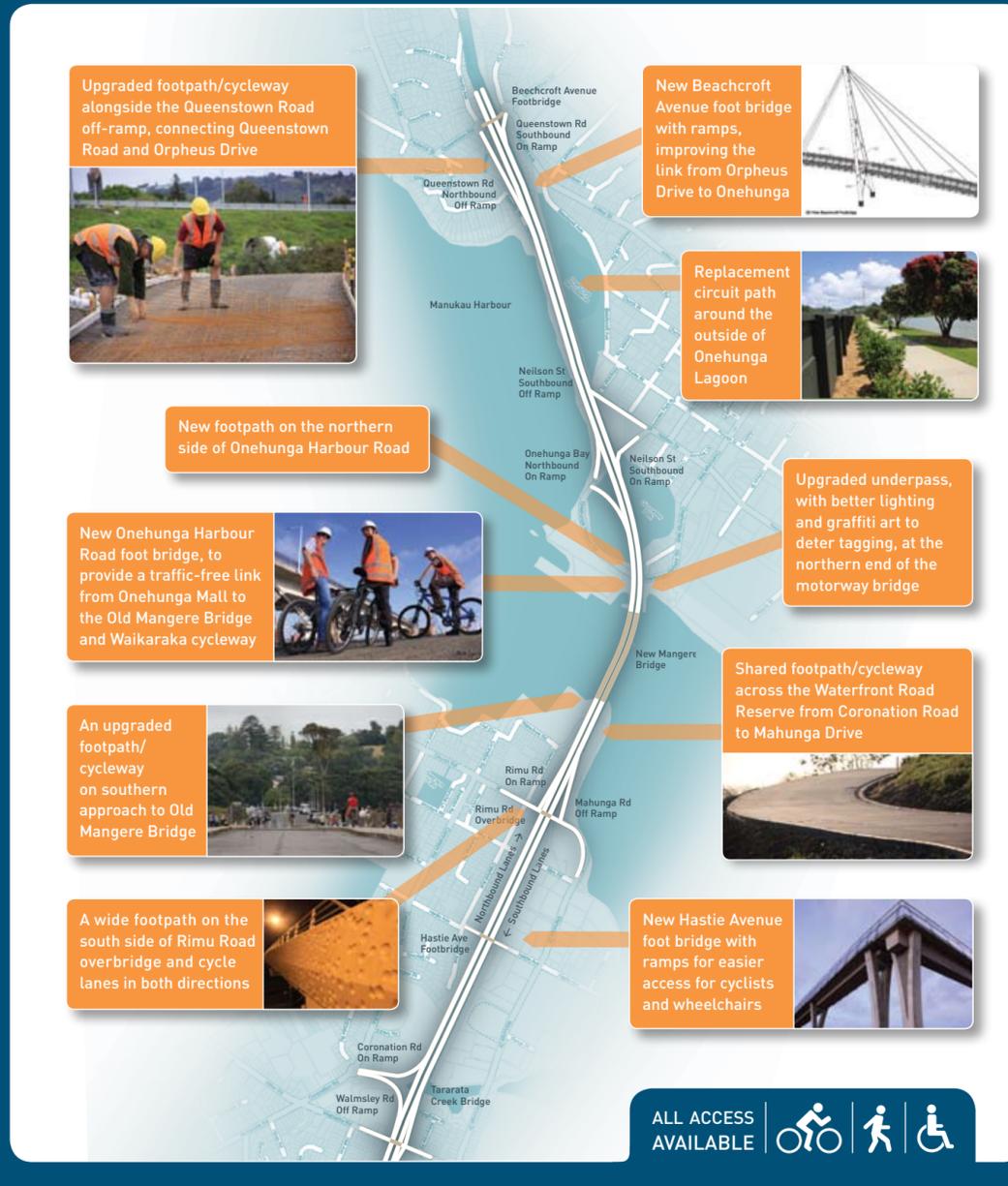
The existing bridge will be demolished once the new one is usable. It is being replaced because it is too short to fit over the newly widened motorway.



Artist's impression of the Beachcroft foot bridge

BETTER ACCESS BY FOOT OR CYCLE

The Manukau Harbour Crossing project includes local cycling and walking improvements, to make it easier to get around on foot or by bicycle



ALL ACCESS AVAILABLE

SAFE CROSSINGS AHEAD

More elaborate designs were passed over in favour of a simple look that better suited the "busy" environment.



A traffic-free walk or ride from Mangere Bridge Village to Onehunga will be possible by the middle of 2010 when a new foot bridge over Onehunga Harbour Road – one of Onehunga's busiest roads – has been completed.

Construction of the bridge will begin in April. It will cross the road from the end of the Old Mangere Bridge and be connected via new paths and a refurbished underpass to Onehunga Mall.

Community representatives from both sides of the Harbour, members of Cycle Action Auckland and staff from Auckland City Council contributed to a workshop last year to establish what the bridge should look like. More elaborate designs were passed over in favour of a simple look that better suited the "busy" environment. The bridge will be a 3.5-wide concrete structure with vertical side barriers to meet the needs of both pedestrians and cyclists.

The underpass beneath the motorway bridges (between Onehunga Harbour Road and Onehunga Mall) is being upgraded to make it safer and more attractive. Internationally accepted Crime Prevention Through Environmental Design (CPTED) criteria have been applied to planning for the upgrade, which will include light painted surfaces, a mural along the northern wall, fences each side of the entries and improved lighting.

While bollards at the entries will be retained to prevent vehicles from using the underpass, it will be ensured that they don't hinder cyclists. An alternative path will also be provided around Onehunga Harbour Road.

Breakfast fuels pedal power

Manukau Harbour Crossing was co-sponsor with Manukau City Council of the 2010 Go By Bike Breakfast held under the pohutakawa trees at the Kiwi Esplanade Reserve.

The more than 60 cyclists who stopped for cereals and sausages included regular commuters across the Old Manukau Bridge, school students, recreational cyclists and a handful of overseas tourists on their way to the airport after cycling around New Zealand. It is the second year that the Manukau Harbour Crossing Project has supported the breakfast, which is part of the NZTA's national Bike Wise Month.



Go By Bike Breakfast



School kids using the cycleway



A passing cyclist enjoys the Go By Bike breakfast