

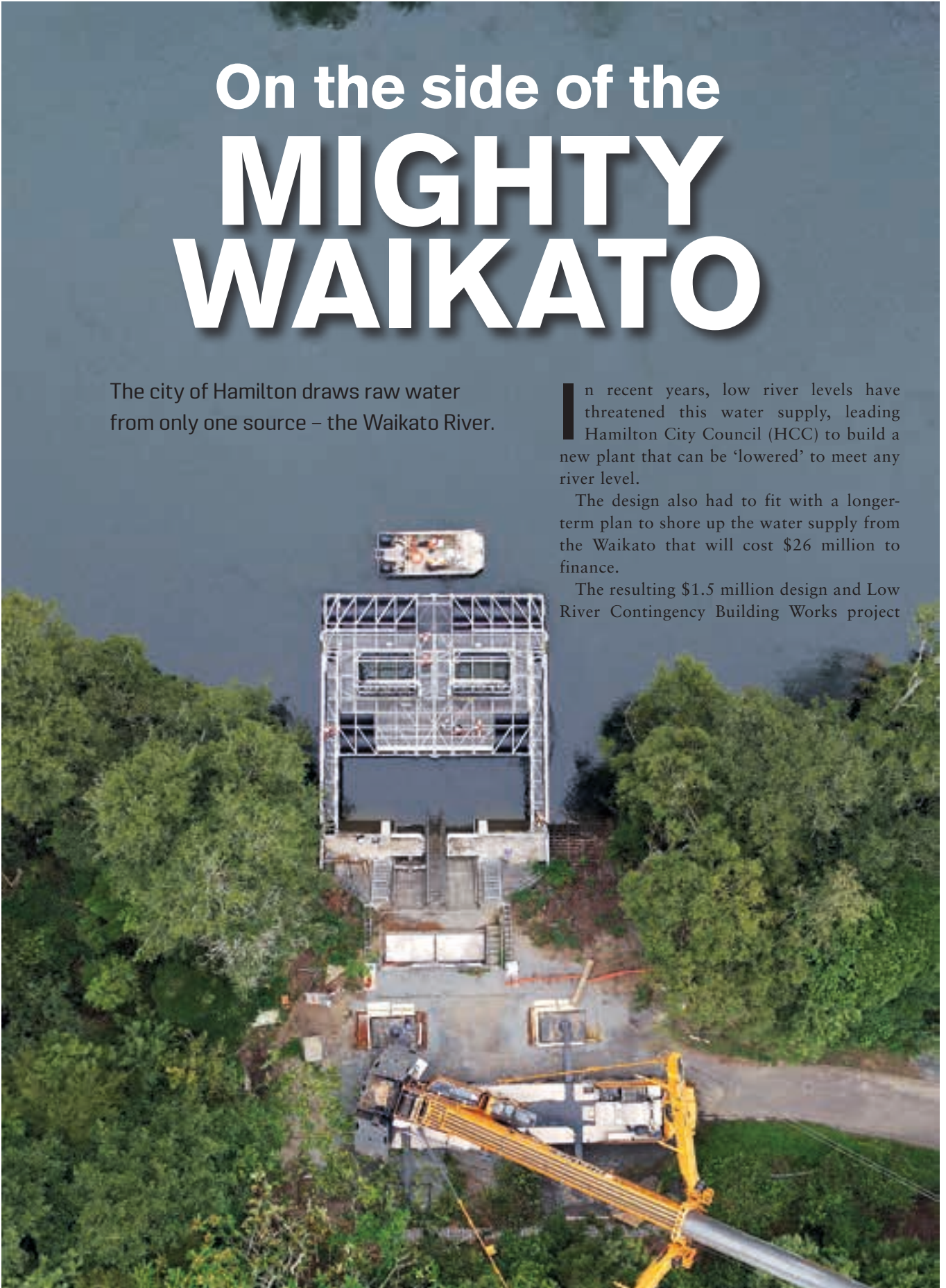
On the side of the **MIGHTY WAIKATO**

The city of Hamilton draws raw water from only one source – the Waikato River.

In recent years, low river levels have threatened this water supply, leading Hamilton City Council (HCC) to build a new plant that can be ‘lowered’ to meet any river level.

The design also had to fit with a longer-term plan to shore up the water supply from the Waikato that will cost \$26 million to finance.

The resulting \$1.5 million design and Low River Contingency Building Works project



was awarded to Brian Perry Civil (Fletcher Construction).

This project involved a floating platform and pump system on the banks of the river that can pump water into the Waikato's intake structure if required when river levels get too low for the existing outlet. It is also designed to be integrated into future plans for upgrading the water intake structure.

Both the contractor and the council conceded it was an extremely challenging project, particularly after the initial

tendered plans required an extensive redesign. Working on a river bank and over fast flowing and fluctuating water also had its unique safety risks. The contractor had to work closely with Mighty River Power, which controlled the Karapiro Dam, to ensure river levels were safe to carry out platform works. The site was also within a 'live' water treatment plant (WTP) with the use of heavy machinery operation five metres from the river bank.

In the end the project eventually scored a 92 percent 'Excellent' rating by the HCC health and safety assessments.

Taking a new approach

The change in the platform's design also led to a change in methodology for building it and delivering its structure in the river. These additional works altered the contract conditions and increased costs to the council.

The original plan involved placing a pump platform in fluctuating river levels, then bolting four separate sections together to complete that platform – which was an enormous physical risk. It would require personnel working in the river and beneath the steel structure inside the water for extended periods.

When they designed the water intake structure and floating pump platform, the original designers estimated the river to be at certain levels. In the past 10 years, however, the water levels were often above the upper operating range. This had not been brought into the design.

"We just changed the way they planned to do things. It wasn't difficult to convince the HCC of this new methodology," says Eamon Stynes, the project manager.

"We worked through this with them. There was little input from them as to how we were to put it in the river. It was open skies."

Placing the pump platform into the river in one lift greatly mitigated environmental risks to the river so, instead of a 100-tonne crane being used to drop four sections of the floating platform into the river, it was decided that a 400-tonne crane would do a single, if not complex, lift and drop.

The ground under the mobile crane needed extensive geotechnical testing to see if it could support a much heavier crane, one of the largest in the country.

Unfortunately, there had been no geotechnical investigation into the ground conditions. Once the geotechnical results did come through, the contractor saw the ground was filled with backfill material from when they built the intake structure.

Being only five metres from the banks of the Waikato, Brian Perry Civil (BPC) was concerned about slip circles, where the ground could slip and give way. The solution was platforms and then special steel plates put in under the crane to spread the load more evenly.

The platform

The new methodology allowed them to fully assemble the platform in the car park area adjacent to the low lift pump building. It was far more productive to build the floating platform on the ground.

The four pump platform sections were fully assembled



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with all the webforge decking and handrails installed, before two pivot arms were attached to the platform.

After a lot of redesign work, geotechnical investigation and changing the build to land instead of in the river, the focus was on getting the structure of the floating pump platform right.

The platform fabrication company Eastbridge, a Kiwi company that specialises in the supply of steel structures and heavy steel fabrication, was tasked with building the platform in its factory in Napier.

Mill certificates for all steel components were required to fabricate the platform. This showed that all the steel used was of the correct grade.

The same was expected of bolts and fixings. The welds were inspected by third party inspectors to verify that they were completed to specified quality and procedure. Test samples were taken during the painting process to confirm the paint systems being applied were to the correct film thickness.

Brian Perry Civil also carried out its own inspections, visiting the Eastbridge plant in Napier on five occasions.

Other quality assurance tools included work plans, testing, engineer and building inspections, producer statements and warranties, all of which were carried out through the life of the project. These were used to ensure quality requirements were being met for everything from

concreting, pipes and joins, to the electrical ducting used.

Working closely with Mighty River Power, the river could be held back by using the Karapiro Dam, allowing river levels to reach an acceptable level for project work.

Once onsite the Brian Perry Civil team did the lift design, strengthened the platform and added new lifting points.

By attaching the platform by the pivot arms to the intake structure before it was lowered into the river, they removed the risk of river currents side-loading the boom. The procedure worked so well that HCC has adopted this methodology for all future deployments of the pump platform.

Subcontractor Hennessy trained the operators who drive the pump platform and systems through the WTP's computer system. A SCADA program allows full automation of the pumps, and monitors rising river levels with the platform's stilling wells. This means WTP operators do not have to be onsite in order to check river levels, and can monitor the treatment plant system remotely.

The project began in July 2015, and was completed in August 2016, falling within a revised deadline. It also came in under budget by \$750,000.

Since then Brian Perry Civil has been awarded the contract to deploy the pump platform when necessary over the next four years for the council. [WNZ](#)