A LEVEE WITH A DIFFERENCE

Located within the Tamar River floodplain at the junction of the Tamar, North and South Esk Rivers, Launceston is prone to flooding. A major flood in 1929, which devastated the city, and several smaller floods since prompted the Flood Levee Project to begin construction in the 1960s. The levee walls – some as high as four metres – protect the low-lying areas on the flood plain to separate Launceston from the surrounding rivers. While the levees continue to offer some protection, many have collapsed.

To repair and rebuild the existing system, construction of the Launceston Flood Protection Scheme began in 2010. The Scheme is a $55 million project being funded by the Federal, Tasmanian and local Governments, comprising a levee and floodgate system which includes 12 kilometres of earth levee, 700 metres of concrete levee and 16 floodgates.

A priority for the project was not only to reduce the risks against the potentially devastating and catastrophic impacts of flooding, but to beautify the levees, by making the earth levees into public grassed grounds and the concrete levees into city features for pedestrian and cycle use.

The high quality, long life, durability and strength of precast concrete, combined with the range of surface finish on offer, made precast the best choice for the project's levee walls.

National Precast member Duggans Precast, supplier of precast concrete elements to all sectors of the construction industry in Tasmania, was engaged to manufacture the 700 metres of levee walls for the project from its versatile factory in the Huon Valley.

According to Precast Project Manager Andrew Duggan, the flood levee panels were larger than the company would usually produce. "The panels themselves were 300 millimetres thick and weighed nearly 20 tonnes – quite large panels – and the reinforcement required was very heavy as well," he says.

"They need to withhold tonnes of water during a substantial flood and make sure they hold the water back to protect the Invermay area."

Mr. Duggan says there were no real production issues in manufacturing panels this size, but they were almost at the limit of the company's gantry crane and most panels had to be delivered one at a time.

The project required the construction of 700 metres of concrete levee.

Fifty-nine of the precast panels were produced using different rubber form liners. Some of these were standard patterns, while others were custom designed for the Flood Authority. For an even more impressive impact, 20 of the panels had specially designed stencils from a local Tasmanian artist.

"A local artist [Watermark] cut their designs into a plastic sheet which consisted of numbers representing flood dates and also a full length wave pattern," says Mr. Duggan. "We laid the sheet on top of the panel after our concrete finishers had finished trowelling. Then a concrete retarder was painted on the concrete through the stencil to create the surface pattern. The next day we pressure washed the panel to expose the concrete aggregate and the pattern."

Mr Duggan says the end result was impressive. "You wouldn't usually expect retaining flood walls to look so good, but the finished product does look great, so it's a feather in our cap."

The project brief included a design life of 80 years for all structural components. It also needed to sustain a one-in-200-year flood. The precast levees are manufactured to be durable and low maintenance to meet those requirements.

Mr. Duggan says the large scale of the project was a rewarding experience for his team. "This was a very different project for us. Most of our manufacturing would include precast walling for various commercial and residential buildings of various shapes and sizes as well as regular retaining walls, but providing this kind of infrastructure was a challenge that our business is very proud of." ■

Twenty of the levee panels used specially designed stencils from a local artist.

STORMWATER SYSTEM FOR SAFE INSTALLATION AND LONG LIFE

When GMK Logistics outgrew its existing facility, it partnered with Fordham Industrial Enterprises to structure a new pre-lease on Gregory Hills Corporate Park. Located 59 kilometres south-west of Sydney, Gregory Hills is at the epicentre of Sydney's South West Growth Corridor. Offering 2000-square-metre to 20,000-square-metre, fully serviced and ready-to-build lots, the park is a 30-hectare business and bulky goods retail location.

Asset owner Fordham Industrial Enterprises identified early on that the originally specified stormwater detention system had inherent safety and design life risks. The risks would have exposed personnel to unnecessary safety compromises, both during construction and during operation. The proposed four-barrel steel pipe tank was not designed for truck loading, despite being directly adjacent to a gross pollutant trap that required maintenance by a vacuum truck. It had a 20-year design life.

To avoid these risks, Fordham approached National Precast member Humes to design and supply a robust and trafficable 400,000-litre precast concrete stormwater detention system.

Humes offered the prefect solution – its StormTrap system. As a fully trafficable storm water detention system designed for SM1600 traffic loadings, it also provided a 50-year design life.

Had the original steel pipe alternative been adopted, the tank would have required reconstruction twice over the same period, at considerable cost.

The 400,000-litre system consisted of 50 individual modules, which were installed in just seven working hours over two days. Backfill of the system was able to commence immediately after installation, with no construction delays.

Fordham Enterprises were extremely happy with the outcome, recognising the value, design life, peace of mind, and safety that a precast concrete solution provided.

According to Glenn Fordham, Director of Fordham Industrial Enterprises: "We were particularly impressed... having brought Humes in at the 'eleventh hour' for them to be able to initially meet, assess the previous design, offer alternatives, tender, finalise design, gain approvals, manufacture then deliver and us have it installed in under 12 weeks." ■

The new Seventh Avenue Maylands Railway Bridge opened in May, 2015.

NEW HISTORY CREATED FOR CENTURY-OLD BRIDGE

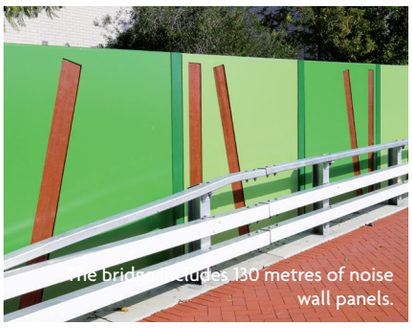
An historic railway bridge in the Perth suburb of Maylands has been replaced with a modern precast concrete alternative.

The Seventh Avenue Maylands Railway Bridge was built in 1913 in response to an increase in road traffic and complaints about the inconvenience to get over the busy railway line. Originally built with timber, the bridge was upgraded several times over the years with columns and structural steel.

One hundred years on, the Western Australian Government determined the Seventh Avenue Bridge had reached the end of its working life. To improve safety and to smooth traffic flow, the WA Main Roads Department decided to demolish the old bridge and replace it with a new one. The project included the deconstruction of the existing bridge and construction of a new four span concrete bridge over the Perth-Midland Railway Line, Railway Parade and Whatley Crescent, in the City of Bayswater in Perth.

Given the history of the original bridge and its distinctive wooden structure, it was important the wooden theme was somehow incorporated in the design of the new bridge, particularly in the noise walls and in the colour scheme of the piers and abutments. Being built on the same footprint as the original bridge, which carried up to 3500 vehicles every day, another priority in construction was to minimise any traffic disruption. Offering versatility in design with high quality outcomes and speedy construction times, precast concrete was chosen for the project.

Perth-based precast concrete manufacturer and National Precast member Delta Corporation was contracted to supply the precast concrete for the new $9.3 million bridge to builder Decmil-OHL.



The bridge includes 130 metres of noise wall panels.

According to Delta Corporation's Executive Director, Matt Perrella, both structural and architectural precast elements were part of the build. "We used high quality steel moulds, with all the architectural wall panels being wet cast horizontally," he says. The manufacture included 66 retaining wall panels, 50 noise wall panels, eight column formers, 316 parapet panels and 16 prestressed TeeRoff beams.

The retaining wall panels adjacent to the bridge on-ramps were painted prior to installation. The same colouring was used on the 130 metres of noise wall panels. The parapet panels were manufactured using a granite aggregate and grey concrete, and were sandblasted for a textured finish.

Mr. Perrella said the new 80-metre bridge was completed on schedule and on budget. It has improved turning and lane widths and allows for increased load capacity and shared paths. The bridge accommodates four rail lines and includes guardrails and electrification screens. It was officially opened in May 2015. ■