



PASSING ALL EXPECTATIONS

The Northern Sydney Freight Corridor - Gosford Passing Loops required the construction of 4km of new passing tracks between Gosford and Narara Stations on either side of the existing tracks. Work also included six new rail bridges, removal of existing sidings, signalling and communications system modification.

CLIENT : Transport for NSW
MAIN CONSTRUCTION COMPANY : Downer
CONTRACT VALUE : \$90 million

Photo supplied by Transport for NSW

Australia's busiest rail corridor, the East Coast Interstate, connects Melbourne, Sydney and Brisbane. Part of this corridor, the Main North Line, stretches from Strathfield through the Central Coast and Newcastle, supplying a high volume of freight and passenger services.

To eradicate bottlenecks along this line, the Australian and NSW Governments initiated four infrastructure projects, comprising the Northern Sydney Freight Corridor (NSFC) Program. One of these projects was the \$90 million contract for Gosford Passing Loops, involving the construction of two new northbound and southbound passing rail loops alongside the existing rail between Gosford and Narara stations. Downer, a leading provider of engineering and infrastructure management solutions, designed and constructed the new loops for the client Transport for NSW.

One of the most significant problems plaguing the Main North Line has been the delay of passenger services by slow moving freight trains. The Gosford Passing Loops provide a solution by allowing passenger trains to pass as freight trains are diverted to the loops or held on main lines. This not only improves the reliability of passenger services but also creates a more efficient freight rail network.

Besides construction of the loops themselves, the Gosford Passing Loops project required a number of new infrastructure works. To accommodate the new tracks, six new rail bridges were constructed over Brady's Gully, Wingello Creek and Wyoming Creek. Modifications were made to the existing signalling and communications system plus the installation of associated overhead wiring. Maintenance access roads and gates were established while the existing maintenance sidings and redundant sections of track were removed.

Work was completed during a number of 48 hour rail shutdowns. To achieve maximum efficiency during the shutdowns, Downer devised innovative construction methodologies that were successfully implemented through extensive pre-planning.

The two northern turnouts connecting the passing loops to the main line were installed pre-assembled, delivered to their pre-prepared location by a radio-controlled PEM/LEM motorised trolley then fitted into place. The installation had to be completed during one of rail shutdown as these sections of track connected into both main lines (and trains could not travel). The positive of this was the work

was safely and successfully completed within the scheduled timeframe enabling the passenger and freight services to safely return.

Downer's expert coordination of the Gosford Passing Loops project further overcame the challenges presented by the age of the existing railway infrastructure. Before major earthworks were able to commence, it was necessary to address the underground "minefield" of existing cables.

In response, the design and construction for relocating the signalling and communication routes to the boundary of the rail corridor was prioritised. Similarly, through complex planning and resourcing, the new computer-based interlocking control system was combined with the extant 1959 electro-mechanical control systems. Modifications to the new system were required to negotiate changes to the track layout throughout the project.

Bringing the old in line with the new rail infrastructure was accompanied by a forward-looking approach to the sustainability of the project. Implementing both Downer's own energy saving initiatives and the Transport for NSW Sustainability Guidelines, development of the Gosford Passing Loops included the recovery of ballast for reuse as structural fill, the use of biodiesel in all earth moving machines and the

inclusion of approximately 30 percent fly ash in structural concrete to reduce the Portland cement component.

Ancillary to the main construction, the Gosford Passing Loops project delivered additional benefits to the local community. Improving public safety and accessibility to the station, initiatives included Australia's first "glow in the dark" aggregate pedestrian/cycle path and a new 720m footpath connecting to the existing walkways.

Downer Group provides planning, design and construction services across a range of industries including Transportation, Mining, Energy and Industrial Engineering, Utilities, Communications and Facilities. With a history dating back more than 100 years in Australia and New Zealand, Downer is an industry leader that builds trusting relationships with customers and maintains a "Zero Harm" policy towards people and the environment.

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Below SMEC Australia provided structural design of bridges for the new passing loops.

Snowy Mountains Engineering Corporation (SMEC) was formed from the Snowy Mountains Authority to preserve the engineering skills and expertise of the technical workforce engaged on the 'Snowy Mountain Hydro Electric Scheme.'

The iconic project spanned the 1950s to the 1970s and redirected inland waters for irrigation and peak load electricity to growing areas in NSW and VIC. SMEC has grown substantially since its local origins to include a network of 75 offices and 5,000+ employees situated all over the world.

Today SMEC is a multi-disciplinary engineering firm who are engaged internationally in the fields of transport, water and energy. They are a traditional design consultancy working in complex environments providing smart design solutions and engineering advice.

Philip Pearce is National General Manager of the Rail division and describes the company's status: "Within rail now, we're one of only a handful of authorised engineering organisations. That classification has been granted by the Asset Standards Authority of New South Wales and allows us to self-certify works. So it's recognition of our design process and competent management processes."

SMEC recently completed a contract on the Transport for NSW and Australian Government Project, Gosford Passing Loops Rail. The problem was slow moving freight trains delayed passenger services on the Main North Line. The solution to alleviate this problem was provisions of two passing loops to be constructed between Gosford and Narara Stations that allowed freight trains to wait while passenger services pass.

This solution not only promoted greater freight access whilst relieving a serious

bottleneck, it also improved the reliability of passenger services on the Main North Line.

The design work included six rail bridges that were required to cross three creeks, 2.5km of retaining walls and a substantial amount of drainage had to be installed.

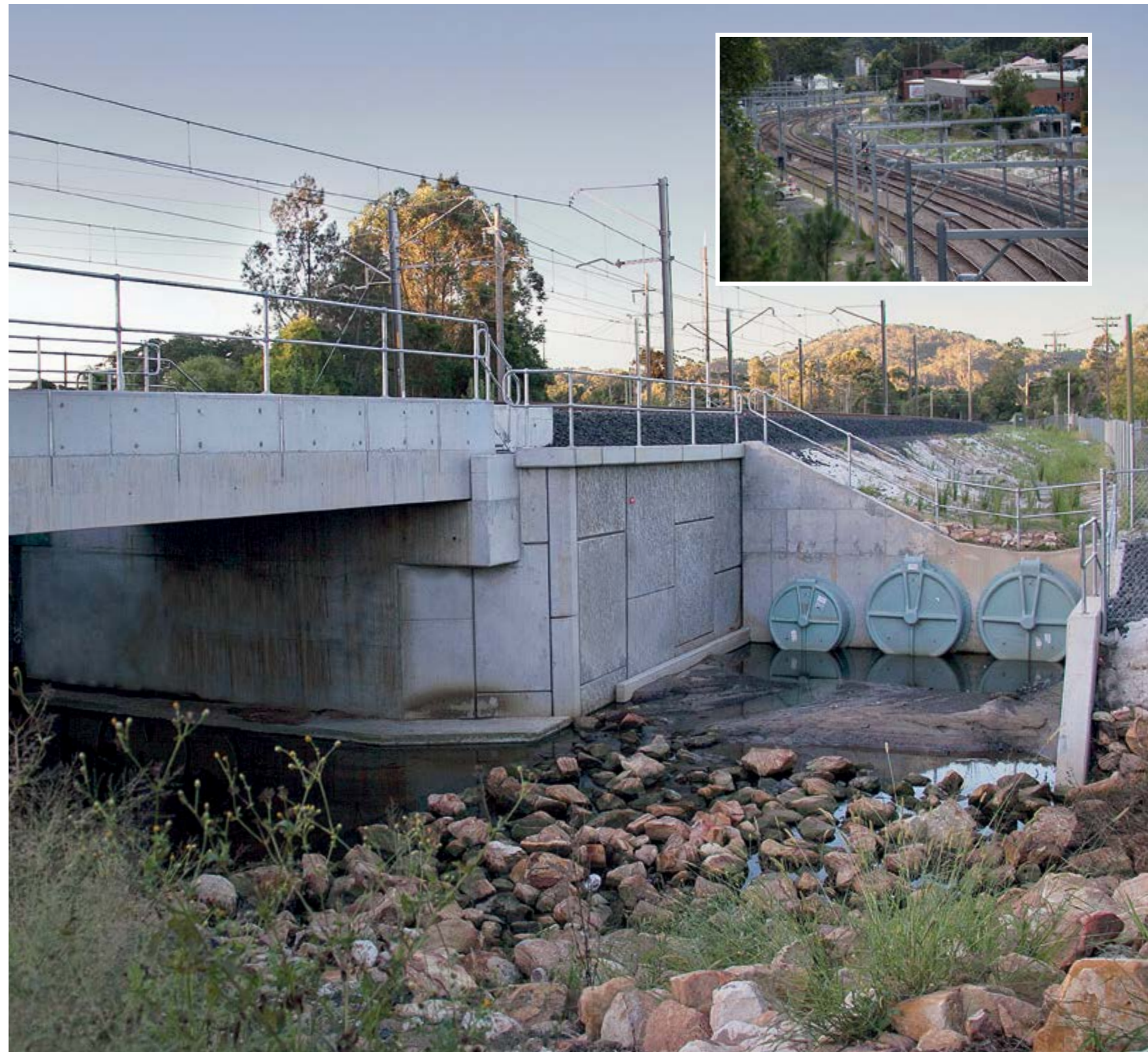
SMEC undertook flood modelling due to the site being part of a wetlands area in order to ensure that the completed works would be capable of taking floodwaters in heavy rain. As part of their scope of works, SMEC also conducted geotechnical investigations and community liaison.

As part of the rail system design, SMEC provided track and overhead wiring design and also managed a contractor to conduct communications work and relocated signal systems. Track design undertaken by SMEC included two new freight tracks with the two existing tracks being realigned to accommodate the new trackwork. Maintenance access roads and walkways were designed to provide operations with access for regular maintenance works within the rail corridor.

Despite the challenging time frame and the main line being fully in service during construction, SMEC successfully completed the design consultant contract and received a Consultants Australia Award in recognition of their persistence and success at collaborating with all the other sub-consultants on the project.

Pearce says "We're pleased with the award and the way the project turned out and we'll take the same mind set with us to the next consultant job we move on to."

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Gosford Passing Loops, NSW
Photo supplied by Transport for NSW



Below QAntrol developed the QAntrol System to manage and streamline both quality assurance process and document management.



Simon Unsworth and Andy Moore formed QAntrol 9 years ago, due to the need for quality assurance software in the construction industry. Andy is the civil engineering construction expert while Simon is the software developer. Together they have developed the QAntrol system.

This is a unique tool widely used on construction projects around Australia to manage and streamline both quality assurance process and document management. The program consists of a desktop application used by onsite engineering staff and an internet portal allowing third party collaboration.

Recently QAntrol was used on the Transport for NSW and Australian Government, Gosford Passing Loops project by the main contractor Downer, as well as the civil subcontractor Robson Civil. The \$90 million project has provided new tracks and upgrades around the existing rail station. Two passing loops (northbound and southbound) were constructed between Gosford and Narara Station, to allow freight trains to wait whilst passenger services pass, relieving a serious bottleneck on the Main North Line.

“The Engineers used the QAntrol software to manage their Inspection and Test Plans (ITPs), lot checklists, test requests, hold points, non-conformances and supplier registers, like the delivery

of concrete reinforcement and capping materials” described Andy Moore from QAntrol.

“QAntrol was used heavily for all aspects of the work for quality control on the Gosford Passing Loop Project. The take-up with Engineers and Supervisors was high and the reporting outputs were perceived as professional and highly regarded by Downer. We were pleased with the application and will be adopting this application for our civil projects going forward” described Greg Barnes from Downer (Project Manager).”

“QAntrol allowed excellent traceability of quality documentation on the works due to its ability to link Lots, Test and Non-conformance records and to store all relevant documents which can be uploaded against the Lot records. I was very happy with the useability of the program especially the sort functionality and the ability to export to excel for reporting” said Albert Low from Downer (Quality Engineer). Given the reported usability and functionality of the QAntrol system, it seems destined for increasing deployment within construction environments.

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