

TECHNICAL PAPER

GLENFIELD TO LEPPINGTON RAIL LINE PROJECT

5TH FEBRUARY 2016

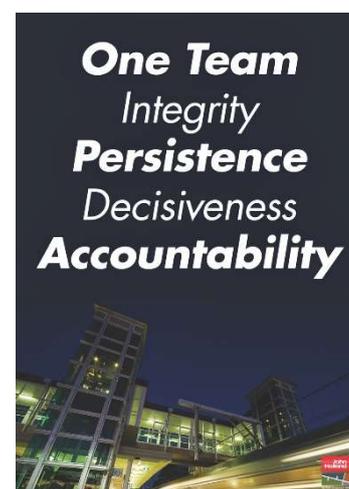


John Holland was selected to design and construct the greenfield section of the Glenfield to Leppington Rail Line (GLRL) on behalf of Transport for New South Wales (TfNSW), a statutory authority of the New South Wales Government. The project provides essential infrastructure for the rapidly increasing population in Sydney's south west growth centre and provides a link to major employment centres, including Liverpool, Parramatta and the Sydney CBD.

The \$650 million D&C project was designed, constructed and commissioned by John Holland six months ahead of the Contract Date and \$300 million under TfNSW's original budget, setting an industry benchmark for a large-scale complex rail project.

The senior management team established project values which maintained a strong can-do, leading-from-the-front culture throughout the project. The team led more than 130 engineers, supervisors and support staff in the delivery of the works and ensured a positive and cooperative work environment throughout the project. The early completion of the project was predominantly the result of strong leadership throughout the teams with highly collaborative working across the three disciplines, interface planning and phasing over 9,000 activities.

The project required significant interaction with several key stakeholder groups, particularly TfNSW Transport Projects Division, Sydney Trains, Roads and Maritime Services, Campbelltown Council, Liverpool City Council, Camden Council, several local utility authorities, utility providers and local community clusters.



Key Project Achievements:

Safety: The project's exemplary safety record included 4.2 million man hours worked with zero LTIs. The peak workforce was 860.

Time: Practical Completion was delivered six months ahead of the Contract Date with commercial train operations brought forward by more than 12 months.

Cost: The project was delivered \$300 million under TfNSW's original budget

Key Result Areas: TfNSW identified Key Result Areas (KRA's) that were deemed fundamental to successful project completion. 100% of the criteria were achieved and accepted by TfNSW.

Environmental: There were no major reportable environmental events, which was a significant milestone considering the high volume of inclement weather, in particular through the earthworks stage.

Sustainability: GLRL demonstrated its commitment to sustainability through initiatives including rainwater collection, 80% spoil reuse and 90% of construction waste reused or recycled.

Stakeholder Satisfaction: No notable complaints were received throughout the construction period. Based on regular feedback, the community and stakeholders viewed the project as highly successful.

Commissioning: The project required extensive commissioning activities involving several third parties and an 11-stage contract-nominated commissioning stage gate process. The team developed excellent cooperative relationships with all stakeholders and successfully achieved all commissioning activities.

Key Project Challenges:

Hume Highway: A major challenge was the requirement to take the alignment under the Hume Highway via a 90m tunnel. A highly experienced team developed the design and construction staging to meet both RMS and TfNSW requirements and delivered a successful outcome.

Narrow Project Corridor: The project alignment was limited to 40m in width for the majority of the route, presenting special challenges in cuts and requiring smart design and construction solutions.

Site access and storage: The long, narrow work site was surrounded by private properties, roads and water courses requiring the project to establish 16 access points with dedicated traffic control, 10 strategic site offices and eight dedicated storage locations. Materials were then transported within the project corridor along temporary haulage/access roads.

Large material deliveries: Several large material deliveries were required, such as bridge planks, large transformers and structural elements. A particular challenge, however, was the delivery of rail in 110m lengths from a single point of access via an interface project at Glenfield Junction. A construction methodology was developed which allowed 5.3km of 60kg/m rail to be delivered every 3 days by a rail train with each new delivery traversing newly constructed track an additional 1.5km into the worksite.

Staged road closures: The project had approval to close only a specified number of roads at any one time, requiring a number of traffic switches to divert traffic over a new bridge before the next bridge could be constructed.

Interface projects: High level interface management was undertaken for a number of projects being constructed concurrently with the GLR project. These included the Glenfield Junction rail project, housing developments, RMS road upgrades and utility upgrades.

Separation of plant and people: A particular challenge was to maintain the separation of plant and people across a long linear worksite with a large number of workers, work sites, haulage of materials and construction plant. Following considerable planning, separate haulage, small vehicle and work areas were established and updated on a weekly basis as the works progressed. This was successfully implemented with no incidents.

Innovation: An innovative change from the reference design was the redesign of a tiered retaining wall structure “the wedding cake” within a narrow section of corridor to an elevated viaduct structure. This innovation reduced programme constraints, removed a major risk of settlement and provided a significant visual improvement.

Key Safety Initiatives:

See the difference behavioural safety: A five-hour experiential learning program highlighted the impact of significant injuries and was delivered to staff and workforce, including subcontractors.

Industry speakers: The project invited several survivors of significant incidents to speak to the workforce on the direct link between attitude to personal safety, its long-term impact to risk exposure and an accident’s impact on an individual’s and family life.

House Rules: Through consultation, the team established a set of Project House Rules and Minimum Safety Standards. These set out the requirements and expectations for all persons in relation to safety.

Excellence Awards: A monthly Excellence in Safety Award for site personnel who were recognised by their peers as having a positive impact on safety.

Passport to Safety: Passport to Safety courses ensuring those identified as key personnel in the management of risk were appropriately trained in the John Holland SQE process. More than 90 personnel were trained in Operational and Strategic SQE.

Overall, the GLRL project was delivered under budget, well ahead of schedule with zero LTI’s and a high level of satisfaction for all stakeholders. It achieved its ultimate objective of stimulating and supporting urban growth and represents a significant achievement by the project delivery team.