

Infrastructure Australia

Project Business Case Evaluation

Project name	North-South Corridor (Darlington Upgrade Project)
Rating	Priority Project
Date of IA Board rating	27 July 2016

Location	Adelaide, South Australia
Proponent	South Australian Government
Project timeframe	Design and Construct contract signed: December 2015 Construction: Early 2016 – late 2018 Project complete: December 2018

Evaluation Summary

The north-south corridor is one of Adelaide's most important transport corridors. It is the major route for north and south bound traffic. The North-South Corridor (Darlington Upgrade Project) ('the project') is part of a broader multi-billion dollar North-South Road Corridor upgrade for the 78 kilometre section between Gawler and Noarlunga, towards which the Australian Government has committed \$1.7 billion to 2018-19. This umbrella project has been a feature of Adelaide's planning and transport considerations for around 50 years. A number of sections of the corridor have already been completed, or have received funding.

The *Australian Infrastructure Audit 2015* (the Audit) found that, in the absence of investment, delays on the South Road corridor are expected to cost \$164 million in 2031. Demand will be driven by strong population and employment growth to Adelaide's north and south between 2011 and 2031.

The project proposes the upgrade of about 3.3 kilometres of South Road between the southern end of the existing South Road, and the northern end of the Southern Expressway. It would deliver a lowered, non-stop motorway between the Southern Expressway and the north of Tonsley Boulevard, and surface roads along either side. It would include a free-flow interchange at the current Southern Expressway / Main South Road junction, together with a two-lane overpass for northbound traffic turning right onto Ayliffes Road to travel east, and the implementation of Intelligent Transport Systems (ITS).

The benefit-cost ratio (BCR) stated by the proponent is 1.1, using a 7% real discount rate and cost estimates based on contract prices. The project would generate a net present value (NPV) of \$32.3 million over the evaluation period. The cost-benefit analysis methodology and parameters used are generally reasonable, and we are confident that the project's benefits will outweigh its costs. The completion of the project is central to realising the benefits of the entire corridor upgrade program. This project has major strategic benefits as it is a key element towards completing the motorway network around Adelaide for improved accessibility and will contribute to the more efficient working of the transport sector, and provide faster journeys. In addition, the project will facilitate better access to the Tonsley Innovation and Flinders Precincts.

The out-turn capital cost for the project is estimated to be \$620 million (based on contract prices in 2015-16).

Context and Problem Description

1. Strategic Context

The North-South Corridor has featured in Adelaide's planning and transport considerations for around 50 years. Adelaide is an elongated city, running primarily north-south, generating significant north-south traffic movements, particularly to the west of the Adelaide CBD along several parallel routes. The proponent expects the North-South Corridor will carry the majority of commuter and freight traffic, alleviating loads on the adjacent arterial road network, particularly during peak periods.

The concentration of traffic along South Road can result in significant congestion, with travel time delays and reduced reliability for road users. Adelaide is a key destination for freight which needs to access industrial areas, the airport and the port. Freight along the southern section of South Road is generally transported to and from Victoria, and south-east South Australia. Limitations in the rail network mean that road plays an important role in the north-south freight task. The North-South Corridor (including South Road) is part of the National Land Transport Network.

Transport network limitations also affect the area surrounding the project. A number of strategically important developments are located in the Darlington Precinct, including Flinders University, Flinders Medical Centre and the Tonsley Park Redevelopment. Improved access will support development in the Precinct. In May 2016, the Australian and South Australian Governments announced funding for the \$85 million Flinders Link Project. This project will include extending the existing Tonsley rail line to Flinders Medical Centre, creating new connections to the health precinct and Flinders University.

A number of sections of the North-South Corridor have been completed or have received funding.

The following sections are completed:

- Northern Expressway (Gawler Bypass, Gawler to Port Wakefield Road, Waterloo Corner)
- South Road Superway (Port River Expressway, Dry Creek to Regency Road, Regency Park)
- Gallipoli Underpass (South Road under Anzac Highway, Kurralta Park)
- Glenelg Tram Overpass (over South Road, Glandore)
- Southern Expressway Duplication (Main South Road, Bedford Park to Main South Road, Old Noarlunga).

The following sections are currently funded and underway:

- South Road Upgrade, Torrens Road to River Torrens Project (Torrens Road, Ridleyton to north of Ashwin Parade, Thebarton)
- Northern Connector Project (linking Northern Expressway at Waterloo Corner with South Road Superway/Port River Expressway at Dry Creek).

Upgrading the remaining sections of the corridor will help to realise the full benefits of the already completed sections of the North-South Corridor.

2. Problem description

The project seeks to address three key problems:

- Road congestion, resulting in delays and reduced reliability along South Road, and on parallel north-south routes, reduces local amenity and imposes significant costs on the economy
- Low accessibility reduces access for people living in Southern and Outer Adelaide to employment, and to cultural and recreational activities located in Central, Western and Northern Adelaide
- Adelaide's southern road network is typically at capacity in peak hours and any disruption (such as accidents, breakdowns or civil works) has a widespread impact across the rest of the local and arterial road network.

Sections of the north-south corridor (i.e. South Road) which have not been upgraded experience long travel times and reduced travel time reliability. For the project section of South Road, in the direction of peak hour traffic, the corridor has average speeds of between 21.1 and 29.6 km/h, while intra peak average speeds are between 29.5 and 38.9 km/h, significantly below the sign posted speed limit of 70 km/h. These results are consistent with the Audit, which found that delays on the South Road corridor are expected to cost \$164 million in 2031, in the absence of any future investment.

North-south traffic congestion is not limited to South Road. It is also evident along parallel routes, such as Marion Road (with a projected cost of delay of \$97 million in 2031) and Goodwood Road (with a projected cost of delay of \$60 million in 2031).

Demand along the corridor will be driven by strong population and employment growth at either end. The proponent expects that, to the north of Adelaide, population will grow at between 2.3% and 3.6% per annum between 2011 and 2031. Likewise, employment is projected to increase by about 3% in the same period. To the south of Adelaide, population and employment is expected to grow at 1.1% and 1.3% respectively between 2011 and 2031.

Project description

3. Project overview

The project proposes the upgrade of about 3.3 kilometres of South Road between Tonsley Boulevard and the Southern Expressway. The project would see the current four lanes in each direction increase to a total of five lanes across the surface roads and the new lowered motorway. The project includes:

- a lowered non-stop motorway running three and four lanes in each direction between the Southern Expressway and the north of Tonsley Boulevard, that passes underneath Flinders Drive, Sturt Road, Mimosa Terrace / Sutton Road, Ayliffes Road and Tonsley Boulevard
- Main South Road (at grade) surface roads, running two lanes in each direction, along both sides of the lowered motorway to provide connections to Flinders Drive, Sturt Road, Ayliffes Road and Tonsley Boulevard, as well as the surrounding community and local businesses
- a full, free-flow interchange at the current Southern Expressway / Main South Road junction with dedicated ramps providing direct access to, and from, the new motorway and Main South Road
- a two-lane overpass for northbound traffic turning right to travel east onto Ayliffes Road
- implementation of ITS to assist with traffic management and inform road users of travel conditions
- upgrades to the intersection of Main South Road and Daws Road, as well as Main South Road through Edwardstown to accommodate higher post-construction traffic volumes
- landscaping and noise barriers (where required)
- relocation of the existing water mains and reconfiguration of existing sewer mains.

The complexity of the above scope of works partly reflects the response to community concerns on potential physical separation and isolation created by the new freeway.

The key project objectives for the project are to:

- facilitate non-stop, long-distance north-south Corridor trips (Southern Expressway to Northern Expressway)
- improve overall origin-destination travel times for those using the arterial network through the Darlington Precinct (including all north, south, east and west trips)
- maintain and (where possible) improve local access to the Darlington precinct along the North-South Corridor.

Business Case and Economic Evaluation

4. Options identification and assessment

The project is part of the overall North-South Corridor upgrade. Completing the remaining sections of the corridor is important to realise the benefits of a continuous, free-flowing north-south route. The options analysis for the Darlington Upgrade Project is closely related to previous investments along the corridor.

Following the release of the State Infrastructure Plan for South Australia in 2005, the South Australian Department of Planning, Transport and Infrastructure conducted a series of investigations to consider the non-stop corridor concept. In the meantime, planning on several projects has been undertaken and several projects are either underway or completed.

For this project, the proponent investigated a range of options, which were evaluated in an innovation workshop before 11 options were shortlisted for further analysis.

The options were evaluated using a range of tools including multi-criteria analysis (MCA), traffic performance appraisal, rapid cost-benefit analysis, a constructability assessment, a road safety audit, and the extent to which each option would address the stated problems.

The options selection process implemented by the proponent is thorough and well documented. The options analysis was also conducted in parallel with planning for the adjoining section of the North-South Corridor to ensure the option selected delivers an integrated corridor solution.

The preferred option has been further refined following the completion of the options analysis. During the tender process (which included competitive contractor involvement), opportunities to realise further benefits for the project, within the project budget of \$620 million, were identified. This included extending the non-stop road further along South Road to north of Tonsley Boulevard – the proponent has evaluated this enhanced project in their submission to Infrastructure Australia.

The proponent has also indicated that various non-infrastructure initiatives were considered as part of the assessment process, with a number of these forming part of the planning and design stages of the project. These include the better use of existing assets (in particular changes to traffic signalling), relocation of utilities away from roads, systems to afford freight and public transport higher priority on roads, using ITS to encouraging commuter traffic to use alternate routes during critical times, and encouraging the use of high productivity vehicles (such as freight vehicles) along the corridor.

5. Economic evaluation

The proponent's economic evaluation indicates a net present value of \$32.3 million and a BCR of 1.1, using a 7% real discount rate and cost estimates based on contract prices (2015-16) and exclusive of wider economic benefits. Parameters used in the economic evaluation are appropriate.

Traffic modelling has been conducted to examine the impact the project would have against a 'do–minimum' base case. Demand has been estimated using a fixed matrix strategic model, which does not allow for induced demand and may overstate the benefits if the corridor reaches full capacity before the end of the evaluation period. The traffic modelling results have been incorporated into the cost-benefit analysis using standard approaches to estimate the benefits.

The completion of the project is central to realising the benefits of the corridor upgrade program. While the economic case for the project would have benefited from a program business case with a NPV and a BCR for the whole program of works at the outset, the proponent has undertaken substantial detailed planning for the corridor over the last decade. Furthermore, the proponent has defined both the base case and the option appropriately for this project. In particular, the 'do-minimum' base case correctly reflects the existing network, and committed and funded works in the absence of the project. The cost estimates included the contract prices for the construction of the project, improving the reliability of the cost estimate, and adding to confidence that the project's benefits will outweigh its costs.

Major cost items

The following items are the key cost items:

- Capital costs: \$457.4 million (present value at 7% discount rate, estimates based on contract prices)
- Operating cost savings: \$4.3 million (PV).

Total capital cost (nominal, undiscounted)	\$620 million (cost estimate based on contract prices in 2015-16)
Proponent's proposed Australian Government funding contribution (nominal, undiscounted)	\$496 million (80:20 Commonwealth to State Government split) (estimate based on contract prices in 2015-16)
Other funding (source / amount / cash flow) (nominal, undiscounted)	\$124 million State Government (based on contract prices in 2015-16)

Major sources of benefit (discounted)

The following items are the key benefits:

- Travel time savings: \$464.6 million (PV)
- Crash cost savings: \$11.5 million (PV)
- Residual value of the project: \$25.8 million (PV).

Major sources of disbenefit (discounted)

The above economic benefits are offset by the following disbenefits:

- Increased vehicle operating cost: \$4.9 million (PV); and
- Increased environmental externalities: \$11.6 million (PV).

The key benefits from delivering the project will be savings in travel times and crash costs to South Australian passengers and road freight users. These are offset by higher vehicle operating costs and environmental costs such as emissions.

Deliverability

Delivery of the project is relatively well advanced. In May 2014, the proponent released a concept design for public comment and in March 2015 began the procurement process for the major design and construct contract for the project. Preliminary works have since commenced.

The proponent has provided a comprehensive risk analysis which outlines control measures for identified project risks. Risks for the project appear to be well-managed by the risk management framework and the contract arrangements for the design and construction contract, which sees costs risks borne by the preferred tenderer.

We recommend the proponent conduct a post-completion review of the project to accurately understand the benefits realised.

While the proponent has not investigated opportunities for direct user funding of the project, Infrastructure Australia would encourage the proponent to consider network-based road user charging as part of its funding options assessment.

This evaluation summary was considered by the Infrastructure Australia Board in July 2016.

Following Infrastructure Australia's process of fact checking the evaluation summary prior to publication, the brief was amended to clarify the number of lanes travelling in each direction between the Southern Expressway and the north of Tonsley Boulevard, and that contract prices were used as the basis for cost estimates.