Final Business Case Evaluation Summary

Newcastle Inner City Bypass – Rankin Park to Jesmond

July 2022

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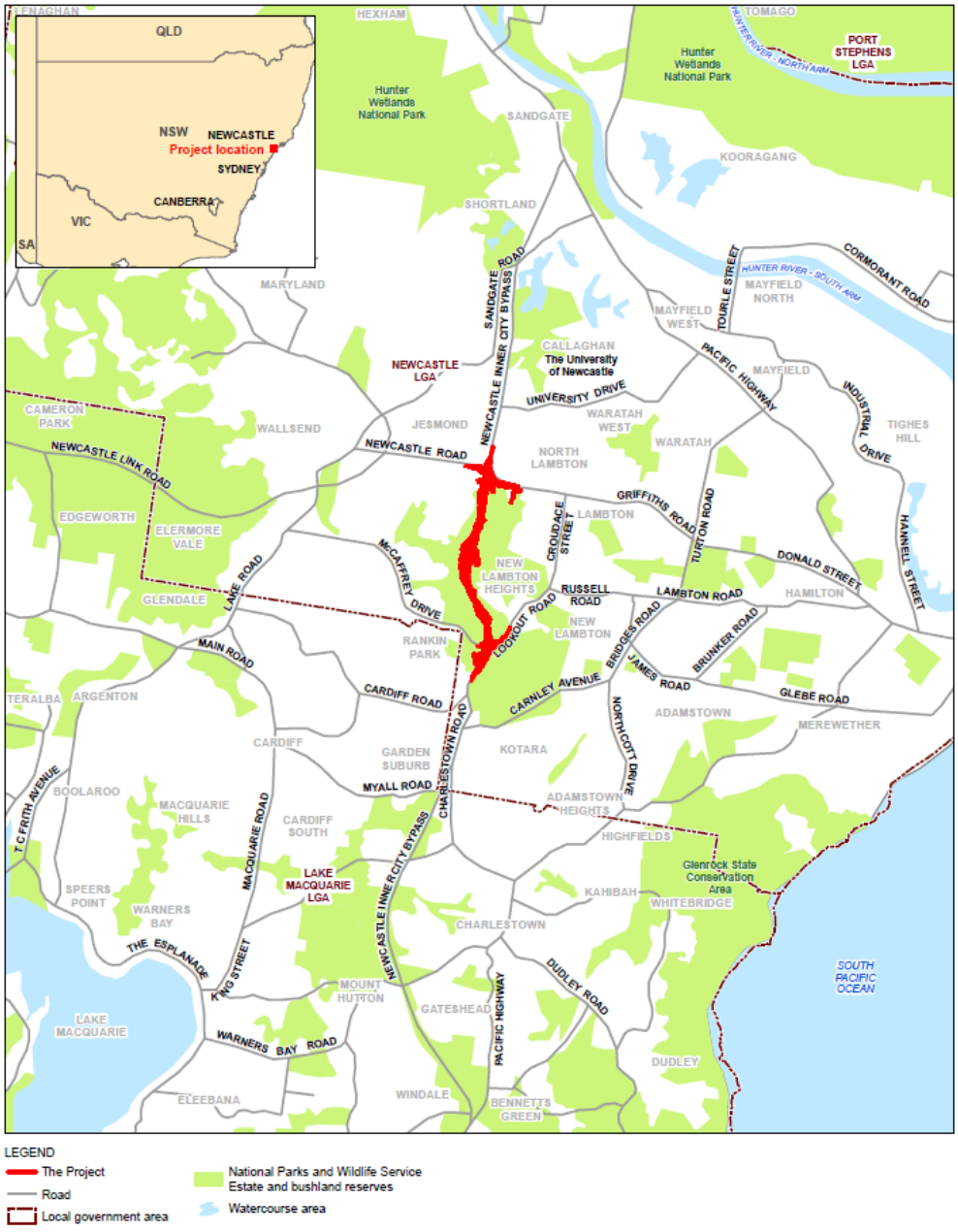
About this report

The Newcastle Inner City Bypass between Rankin Park to Jesmond project is a proposed 3.4km new 4-lane divided road, west of existing Lookout Road and Croudace Street, forming the fifth and final section of the Newcastle Inner City Bypass to connect the Pacific Highway at Bennetts Green and the Pacific Highway at Sandgate (Figure 1). The project is part of Transport for NSW's long-term strategy to provide an orbital road within Newcastle's inner road network.

Figure 1: Project Location



Source: Transport for NSW 2018, Newcastle Inner City Bypass Final Business Case.

The Final Business Case for the project was prepared by the then Roads and Maritime Services (now part of Transport for NSW) in 2018. This Business Case Summary has been prepared by Infrastructure NSW, the NSW Government's independent infrastructure advisory agency.

Strategic context

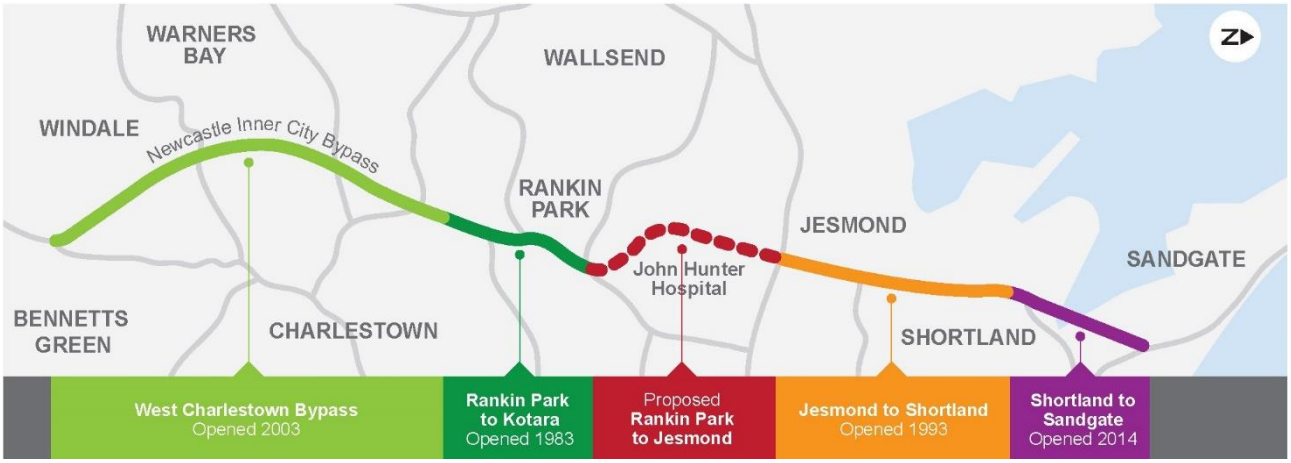
Providing the missing link

The bypass was first planned in the 1950s and incorporated into the Northumberland County Planning Scheme in 1957. Four sections of the Newcastle Inner City Bypass have been progressively completed over the last 40 years as follows (north to south):

- Shortland to Sandgate (opened 2014).
- Jesmond to Shortland (opened 1993).
- Rankin Park to Kotara (opened 1983).
- West Charlestown Bypass (opened 2003).

The project will provide the missing link between Rankin Park and Jesmond (see Figure 2) and continuity for road users travelling along the Newcastle Inner City Bypass.

Figure 2: Proposed project location



Australian and NSW Government commitments

The NSW Government announced funding support for the project in 2014.

Alignment to government strategic plans

The project either contributes to or aligns with several government strategies and plans. Some of these strategies and plans include *Future Transport 2056,*[1] the *Hunter Regional Plan 2036*[2] and *Greater Newcastle Future Transport Plan.*[3]

Key areas of alignment include improving travel times, transport reliability and reducing accidents.

[1] Transport for NSW 2016, *Future Transport Strategy 2056. Note, an updated version was released in 2020.*

[2] NSW Department of Planning, Industry and Environment 2016, *Hunter Regional Plan 2036.*

[3] Transport for NSW 2018, *Greater Newcastle Future Transport Plan.*

Project need

The project's need for investment is driven by the following findings of the Final Business Case:

The existing road network is prone to congestion, resulting in slow travel times

Around 40,000 to 60,000 vehicles use the road network surrounding the project area each day. The network is not designed to manage high traffic volumes as it features 11 sets of traffic lights, 16 uncontrolled intersections, driveways to private properties and schools.

As a result, travel on key roads around the project area is subject to delays and variability due to congestion, particularly during the morning and afternoon peak periods. The average peak hour travel speed on Newcastle Road (between Douglas Street and Morehead Street) is 27km/h while, on sections of the north-south route (Lookout Road and Croudace Street), it averages 28km/h. The sign-posted speed is 60km/h on all roads.

Traffic volumes are expected to increase

Daily traffic volumes along sections of the existing route are projected to increase by up to 43% by 2040, with traffic reflecting a mix of local, regional and freight vehicles. Further, road network challenges are anticipated to be enhanced due to increasing activities at the John Hunter Hospital precinct and Newcastle University.

There is insufficient capacity for the current road network to cater for the projected growth, which will likely result in worsening congestion and delays.

There is a need to improve road safety

Between 2010 and 2014, there were 315 crashes on the existing route of Lookout Road, Croudace Street and Newcastle Road. Approximately 43% of crashes occurred at intersections, reflecting a large number of conflict points for traffic flow along the existing route. The project would contribute to improving road safety by relieving traffic congestion on the surrounding road network.

Project objectives and design

Objectives

The project has the following objectives:

- Reduce travel times and congestion on the Newcastle Inner City Bypass.
- Provide traffic relief on key parts of the surrounding road network.
- Improve road safety on key parts of the road network.

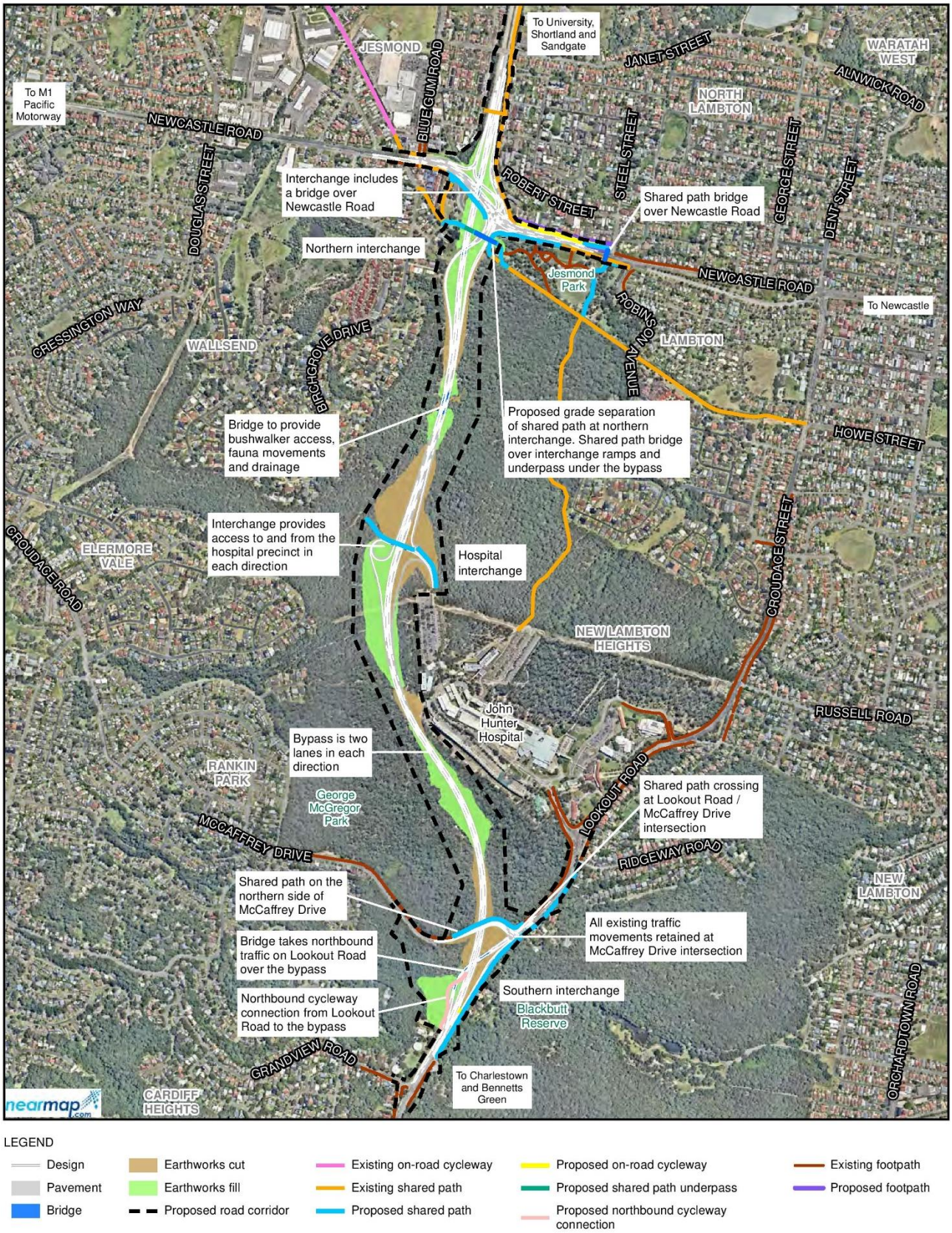
Design

The project involves the construction of a 3.4km 4-lane divided road between Lookout Road at New Lambton Heights and Newcastle Road at Jesmond.

The project design (outlined in Figure 3) include the following features:

- A new road with 2 lanes in each direction, separated by a median.
- Three interchanges, including:
    - a northern interchange providing access to Newcastle Road and the existing Jesmond to Shortland section of the Newcastle Inner City Bypass. The full interchange provides all movements to/from the bypass and Newcastle Road
    - John Hunter Hospital western access interchange providing access between the John Hunter Hospital precinct and the bypass. The full interchange provides all movements to/from the bypass and the hospital precinct
    - a southern interchange providing access to Lookout Road and the existing Kotara to Rankin Park section of the Newcastle Inner City Bypass. The bypass would travel under McCaffrey Drive. The half interchange provides connection in both directions on Lookout Road.
- Pedestrian and cycling facilities, including a shared path bridge over Newcastle Road and grade separation of east/west shared path at the northern interchange (Jesmond Park).

Figure 3: Project design

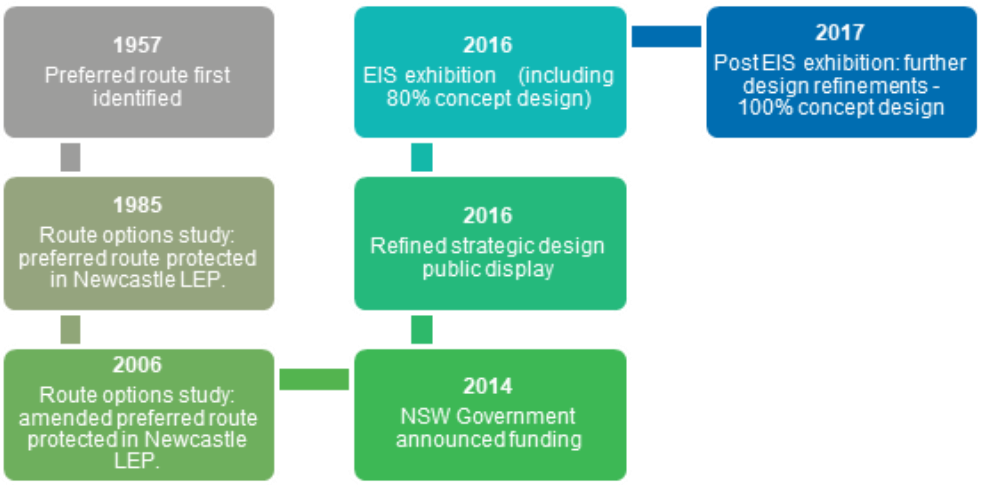


Source: Transport for NSW 2018, Newcastle Inner City Bypass Final Business Case.

Options identification and assessment

The preferred corridor for the Newcastle Inner City Bypass was identified in 1957. Since then, the preferred option presented in the Final Business Case has been refined through 3 broad stages illustrated in Figure 4.

Figure 4: Project timeline and options development history



Source: Transport for NSW 2018 Newcastle Inner City Bypass Final Business Case.

Route options development (1985 and 2007)

A study was completed in 1985 to explore alternative corridor alignments to avoid impacting the future development of the John Hunter Hospital. An alignment west of the proposed hospital was the preferred route.

Four additional routes were explored in 2007, including the refinement of the preferred option from 1985. A new preferred route was identified west of the John Hunter Hospital and reserved in Newcastle City Council's Local Environmental Plan (LEP).

Refined strategic design (2016)

In 2016, Roads and Maritime Services carried out a comprehensive review of the 2007 strategic design for the preferred route. The options development and assessment process involved field investigations, engineering designs, key stakeholder consultation and technical workshops.

Two options were shortlisted, including:

- Alignment option 1 – developed in 2007, where the alignment curves north-west traversing a series of steep gullies and creek lines, running parallel to the hospital's southern car park.
- Alignment option 2 – based on a refined design from 2007, where the alignment initially curves further west than alignment 1, before passing close to the western extent of the hospital, with a relatively flat grade through this section.

Preferred option

Alignment option 2 was selected as the preferred option due to its strong environmental, community and technical advantages.

Economic evaluation

A Cost Benefit Analysis (CBA) of the project options was completed in the Final Business Case. The CBA followed Transport for NSW's economic appraisal guidelines and review processes.

Costs

Key elements of the cost estimates include:

- construction costs, including materials and labour
- cost contingency and nominal escalation
- operating and maintenance costs over 30 years.

Benefits

The project is expected to deliver a range of quantifiable benefits to local and regional road users, including:

- travel time savings for light and heavy vehicles
- vehicle operating cost savings including fuel, maintenance and depreciation
- improved road safety
- residual value of motorway assets.

Environmental externality cost savings (e.g. airborne pollution and noise) were not identified due to additional traffic volumes on the Newscastle Inner City Bypass.

Qualitative benefits have also been identified, including improved access to jobs and John Hunter Hospital precinct, higher levels of active transport, community amenity from the separation of traffic and improved flood immunity.

The outcomes of the analysis

A discount rate of 7% was used to calculate the present value of future costs and benefits over a 30-year evaluation period. All costs and benefits are presented in 2017-18 dollar terms (June 2018).

The preferred project option has a positive Net Present Value (NPV) of $994 million and a Benefit Cost Ratio (BCR) of 5.0, demonstrating the project benefits are expected to exceed the costs. This supports the rationale for investment by the Australian and NSW governments.

Sensitivity analysis

Sensitivity tests were completed to account for risk and uncertainty in the CBA and road network assumptions. Key sensitivity tests included an increase in delivery costs, a decrease in anticipated benefits and delays in the opening year.

For all scenarios, the NPV was positive and the BCR was above one.

Deliverability

The project will be delivered by Transport for NSW and its design and construction partners.

Procurement and timeframe

The project will be delivered in 3 packages respectively procured under separate design and construction contracts:

- Detailed design of the Shared Path Bridge Early Works Package procured via a single Professional Services Contract (PSC), followed by a single Construct Only contract.
- Detailed design of the Main Works and the Southern Utility Relocations Early Works package procured via a single PSC, followed by a single Construct Only contract.
- Detailed design of the Main Works package procured via a single PSC, followed by a single Design and Construct contract.

Early Works were to commence in 2020 with the installation of the Shared Path Bridge and the Main Works by the end of 2021. Final delivery timeframes will be known following engagement with the construction industry to determine the best delivery strategy and construction timeframes.

Governance

The governance structure includes project development and delivery managers that are responsible for the PSC and construction contractors, with oversight through regular reporting to the Hunter Project Steering Committee.

Key risks and mitigation

Key risks have been identified by the project team and stakeholders through a series of workshops. These risks include:

- approvals of the proposed mine void treatments from Subsidence Advisory NSW
- the current limited geotechnical information of the site
- the use of John Hunter Hospital internal road network for the mass haul of material
- the additional infrastructure required for flooding issues associated with the Northern Interchange
- project delays to the commencement of construction resulting in subsequent increases in costs.

Transport for NSW's risk management process has been applied to manage and mitigate risks.

The Infrastructure NSW view

In September 2018, Infrastructure NSW undertook a review of the Newcastle Inner City Bypass, Rankin Park to Jesmond Final Business Case..

In Infrastructure NSW's view, the Final Business Case demonstrated:

- a strong case for investment. The economic analysis concluded with a positive NPV of $994 million and a BCR of 5.0, showing that the project's expected benefits will significantly exceed its costs
- given the significant benefits of the project for the John Hunter Hospital, key stakeholders such as Hunter New England Local Health District and Health Infrastructure should be involved as key stakeholders or part of the governance structure to ensure the successful delivery of the project and its benefits
- upon completion of the project, the synergies of all 5 sections of Newcastle Inner City Bypass will be activated, presenting the opportunity for better amenity on local streets along the route, including the main Newcastle Road which leads to Newcastle CBD. There are also potential opportunities to significantly enhance connectivity across the east/west bushland corridor for cyclists and pedestrians,and improve access and amenity.