

Business case evaluation summary

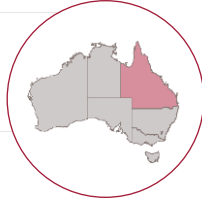
Coffs Harbour bypass

Location

Coffs Harbour, NSW

Geography

Smaller Cities and
Regional Centres



Category

National Connectivity

Capital cost

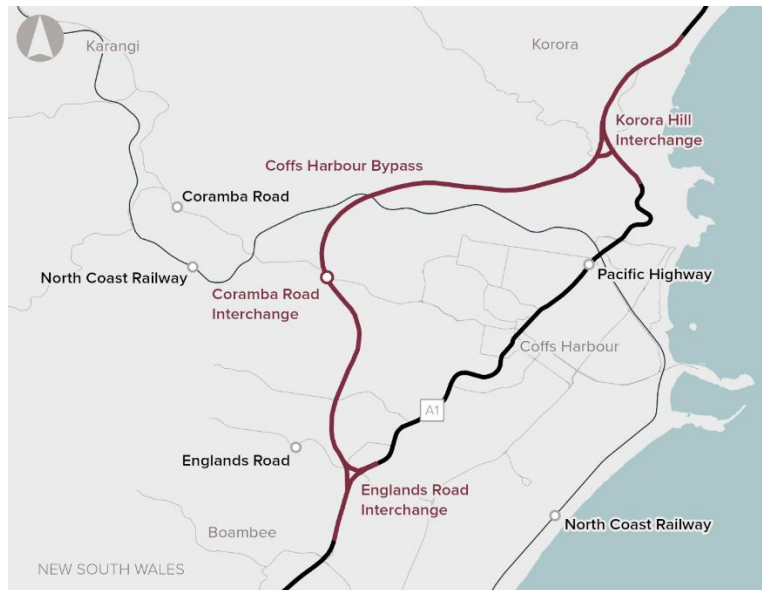
Pending (see endnote)\$

Indicative timeframe

Construction start: 2022
Project completion by: 2027

Proponent

NSW Government



Evaluation date

August 2021

1. Evaluation Summary

Infrastructure Australia evaluated the **Coffs Harbour bypass** business case in accordance with our Statement of Expectations, which requires us to evaluate project proposals that are nationally significant or where Australian Government funding of \$250 million or more is sought. The Coffs Harbour bypass is a solution to a nationally significant problem that is subject to an existing Australian Government funding commitment of \$1,462 million. Due to the proposal's Australian Government funding status, it has not been considered for inclusion on the *Infrastructure Priority List*.

Coffs Harbour is a regional city located on the Mid North Coast of New South Wales. Connecting Sydney and Brisbane, the Pacific Highway is a major passenger and freight corridor and is part of the National Land Transport Network (NLTN). Currently, vehicles on the Pacific Highway must travel through the Coffs Harbour Central Business District (CBD).

This route through Coffs Harbour includes 12 sets of traffic signals, a major roundabout and 26 other intersections. The stop-start nature of the current route, combined with increasing traffic volumes, increases freight and passenger vehicle travel times and vehicle operating costs. Heavy freight vehicles travelling through the CBD create safety issues and reduces amenity for pedestrians, cyclists, local residents and businesses along this section of the highway.

The Coffs Harbour bypass proposal will address the identified problems by allowing traffic to bypass the Coffs Harbour CBD. The proposed project includes a 12 kilometre four-lane divided highway bypass with a posted speed limit of 110 km/h, which is expected to reduce through trip travel times by 11 minutes and remove 12,000 vehicles per day from the CBD by 2036. The project also includes a 2 kilometre upgrade of the existing Pacific Highway.

The proponent's business case states that the net present value (NPV) of the project is \$384 million with a benefit-cost ratio of 1.26. We agree with the proponent's analysis that the project will enable network-wide travel reliability, efficiency and safety benefits to be realised on the NLTN by removing the second-last section of the highway between Sydney and Brisbane that includes traffic signals. If the assumed demand on the bypass is realised, we agree that the benefits of the project should outweigh its costs.

OFFICIAL

We agree with the proponent's rationale for a proposed single design and construct delivery model as it provides the best chance of delivering the project on time and within the approved funding envelope.

Delivering the project within the approved funding envelope and meeting environmental conditions are key delivery risks for the project. We note that the proponent's value engineering exercise identifies cost savings which should help alleviate the cost and funding risks. Overall, we are satisfied with the proponent's detailed plan to minimise project delivery risk. However, a combination of project cost risk, proposed changes in project design as part of the value engineering exercise and inherent uncertainty in traffic demand for a greenfield bypass means there is a risk that actual benefits may not exceed the costs. Therefore, we encourage the proponent to further assess the long-term traffic and economic implications of design changes proposed in the value engineering exercise.

2. Context

Coffs Harbour is a regional city located on the Mid North Coast of New South Wales. The Pacific Highway currently runs through the Coffs Harbour CBD. The Pacific Highway is the primary Sydney–Brisbane freight corridor. Following the completion of NorthConnex and the Pacific Highway duplication between Woolgoolga and Ballina in late 2020, Coffs Harbour and Hexham/Heatherbrae are the only two locations on the entire east coast corridor linking Brisbane, Sydney, Canberra and Melbourne where the route is an urban road with traffic signals.

The section of the Pacific Highway through Coffs Harbour carries approximately 37,000 vehicles on a typical weekday. Heavy vehicles account for approximately 12 to 15 per cent of these vehicles.

Traffic congestion on the highway is predicted to increase due to population growth, a rising freight task and tourism growth. The Coffs Harbour Local Government Area (LGA) population is projected to increase at an average annual rate of 0.9 per cent between 2011 and 2044, which is 35 per cent higher than the average rate of growth for regional NSW. By 2036, the Coffs Harbour LGA population is projected to increase by more than 22 per cent from 2016 levels to 92,650 people.

Planned residential developments in North Boambee Valley and Korora Hill are expected to provide housing for over 2,000 persons when fully developed. These new residential developments as well as industrial development at the Isles Drive and Cook Drive estates are forecast to generate more traffic in the region. Other key traffic growth generators include the Coffs Harbour Health Campus, the airport and the hospital.

Without intervention, total vehicle demand on the existing Pacific Highway during the AM peak 1-hour and PM peak 1-hour periods is expected to increase from around 19,000 vehicles in 2016 to 21,000, 23,000 and 24,000 in 2026, 2036 and 2046 respectively. This demand growth on the existing highway is expected to increase congestion, safety and amenity problems.

3. Problem description

The problem identified in the business case relates to the *Pacific Highway (A1) – Coffs Harbour bypass* proposal currently included on the *Infrastructure Priority List*.

The current Pacific Highway route runs through the Coffs Harbour CBD. Road users, including through and local traffic, pedestrians, cyclists and heavy vehicles, travel along a 12 kilometre low speed arterial road with 12 sets of traffic signals, a major roundabout and 26 other intersections. The key problems as a result of existing and forecast traffic movements and network characteristics include:

- Traffic congestion and travel time delays through the Coffs Harbour CBD caused by traffic signals and intersections along the existing highway
- Traffic congestion on the broader Coffs Harbour arterial road network; particularly arterial roads that cross or feed traffic to the Pacific Highway through the Coffs Harbour CBD.
- Poor safety performance which is driven in part by conflict between passenger and freight vehicles, cyclists and pedestrians
- Lack of capacity on adjacent local and regional roads across and parallel to the existing highway, which impacts congestion and constrains residential and commercial growth

OFFICIAL

- Low flood immunity on the existing highway around Bray Street, Orlando Street, Harbour Drive and North Boambee Road, with short duration, high rainfall volume storm events resulting in closure of the current corridor
- Congestion and physical restrictions on heavy vehicle movement due to congestion and width constraints at the southern and northern end of the existing Pacific Highway section
- The stop-start nature of the existing route is not consistent with the objectives and desired performance of the NLTN
- Noise and amenity issues associated with heavy vehicles travelling through the CBD and residential areas.

In 2016, the annual cost of the problem was estimated to be approximately \$55 million. Population growth and an increasing freight task would mean the cost of the problem will rise if the bypass is not built.

4. Options identification and assessment

The Coffs Harbour bypass proposal has undergone extensive planning and optioneering through a staged process spanning more than 15 years. A 'do nothing' option was considered as part of the 2004 Coffs Harbour Highway Planning Strategy Options Report. Doing nothing would not address the problem and was discarded as an option. A 'do minimum' option was investigated and discarded as an option in 2016. The 'do minimum' option included implementing two clearway sections on the existing Pacific Highway through the Coffs Harbour CBD. Overall, a 'do minimum' option was not supported because of the low traffic benefits and the impact on parking and amenity within Coffs Harbour. We are satisfied that a 'do-minimum' option is not practical and would not materially address the problem.

With a 'do nothing' and 'do minimum' being ruled out, the options assessment process focused on a bypass route. Bypass options were initially considered within three geographic corridor groups being far western, coastal and inner west. The preferred route has been selected based on extensive consultation and a staged design process. Key steps included:

- Between 2016 and 2018, a concept design process was conducted to assess project features. A suite of options and staging opportunities were considered through multi-criteria analysis against four criteria: (i) value for money; (ii) ensuring all vehicles could use the bypass; (iii) sustainability from an operating and maintenance perspective; and (iv) ensuring delivery in line with publicly stated timeframes. The key output from this process was to present a refined concept design to the community before finalising and exhibiting the environmental impact statement (EIS) in late 2018.
- Separate multi-criteria options assessment processes using function, environment, socio-economic and cost criteria were conducted to consider:
 - Interchange locations: the focus was to identify the number of interchanges needed and where interchanges should be located to best provide access to and from Coffs Harbour, considering functional, environmental and socio-economic factors, while providing value for money.
 - Major ridge crossings: for each of three major ridge crossings, cuttings, tunnels and land bridges were considered. Tunnels were ultimately selected based on community feedback which favoured tunnels over cutting options.
 - Design standards: options for the number and width of lanes on the bypass were considered to balance cost with levels of service. A narrow median width for four lanes was selected on value for money and environmental performance criteria.
 - Staged delivery: Staged delivery primarily relates to the northern extent of works and was initially not preferred. However, the proponent is now considering the potential for delayed delivery around the northern project extents.

We consider the options identification and assessment process to be broadly appropriate. The options have been considered in detail and the preferred option is expected to address the problem. The refinements in response to community and stakeholder feedback aim to reduce

OFFICIAL

environmental and social impacts and alleviate community concerns. The tunnels increased project costs relative to other options.

A value engineering study was undertaken to further refine the preferred option to reduce costs. Changes include reducing entry ramp lengths, shifting carriageway locations, simplifying bridge structures and reducing the cross-sectional area of the tunnels by 20 per cent by removing a third lane.

As the analysis supporting the value for money assessment of alternative options was not provided, we could not ascertain if the preferred option is the optimal one. However, the process to select the preferred option started over 15 years ago and the standards outlined in the Infrastructure Australia Assessment Framework did not apply at the time.

5. Proposal

The Coffs Harbour Bypass Project will provide a 12 kilometre four-lane divided highway with a posted speed limit of 110 km/h that bypasses Coffs Harbour to the west, passing through the North Boambee Valley, Roberts Hill and north to Korora Hill. The project also includes a 2 kilometre upgrade of the existing Pacific Highway. The key features of the project include:

- Four-lane divided highway from south of Englands Road roundabout to the dual carriageway highway at Sapphire
- Bypass of the Coffs Harbour urban area from south of Englands Road intersection to Korora Hill
- Upgrade of the existing Pacific Highway between Korora Hill and the dual carriageway highway at Sapphire
- Grade-separated interchanges at Englands Road, Coramba Road and Korora Hill
- Three tunnels through ridges at Roberts Hill (around 190 metres long), Shephards Lane (around 360 metres long), and Gatelys Road (around 450 metres long)
- Structures to pass over local roads and creeks as well as a bridge over the North Coast Railway
- Modifications to the local road network to enable local road connections across and around the alignment
- Pedestrian and cycling facilities, including a shared path along the service road tying into the existing shared path on Solitary Islands Way, and a new pedestrian bridge to replace the existing Luke Bowen footbridge with the name being retained
- Relocation of the Kororo Public School bus interchange
- Noise attenuation, including noise barriers, low noise pavement and at-property treatments as required
- Fauna crossing structures including glider poles, underpasses and fencing
- A local access road and a service road
- Ancillary work to facilitate construction and operation of the project, including:
 - Adjustment, relocation and/or protection of utilities and services
 - New or adjusted property accesses as required
 - Operational water quality measures and retention basins

The project could also provide opportunities to revitalise the CBD and enhance open space amenity along the existing Pacific Highway corridor.

6. Strategic fit

The project has strong strategic merit. The project is part of the broader Pacific Highway Upgrade Program and aligns with national, state and local policies, strategies and plans, including contributing to:

- **National Land Freight Strategy** which identifies the Pacific Highway as a key strategic corridor in the national land freight network. A key objective of the project is to provide travel

OFFICIAL

time savings for business vehicles and freight and to provide a road which supports and integrates with the broader transport network.

- **NSW Future Transport Strategy 2056:** the project's objectives to improve road safety, road freight efficiency for heavy vehicles and ease congestion all aligns with the NSW Government's Future Transport Strategy 2056.
- **NSW State Infrastructure Strategy** which states that the final sections of the Pacific Highway are being upgraded to dual carriageway, although two significant pinch points at Coffs Harbour and Hexham/Heatherbrae remain and should be addressed as a priority in partnership with the Commonwealth Government.
- **NSW Road Safety Plan 2021** which includes six priority areas to reduce crashes and fatalities in NSW. By removing through traffic from Coffs Harbour CBD, reducing conflict between through and local traffic, cyclists and pedestrians, and improving road safety, the project will directly contribute to five of the priority areas: saving lives on country roads, liveable and safe urban communities, using the roads safely, building a safer community culture and building a safe future. Road safety is also a priority in the **National Road Safety Strategy 2011 – 2020**.
- **The Coffs Harbour Local Growth Management Strategy 2020** has been prepared by Coffs Harbour City Council to achieve the directions and actions contained within the North Coast Regional Plan and to align with the Settlement Planning Guidelines endorsed by the NSW Government. The Strategy is the mechanism to support effective and integrated planning across the Coffs Harbour Local Government Area. The growth strategy considers challenges and opportunities that the Coffs Harbour Bypass project will present.

The project integrates effectively with the existing network, enabling travel reliability and efficiency and safety benefits to be realised on the NLTN by removing the second-last section of the highway between Melbourne and Brisbane that includes traffic signals.

The project has demonstrated stakeholder endorsement by engaging community stakeholders through the EIS process, incorporating several significant design changes, and engaging across the three levels of government. Community and stakeholder feedback has been incorporated throughout the option analysis process to select the preferred alignment, interchange locations and the decision to use tunnels.

7. Social, economic and environmental value

The proponent's business case states that the net present value (NPV) of the project is \$384 million with a benefit-cost ratio of 1.26, using a 7 per cent real discount rate and P50 capital cost estimates in 2021 prices. We have considered the sensitivity of the appraisal to the discount rate and note that:

- Using a 4% discount rate results in a NPV of \$1,705 million and a BCR of 2.0.
- Using a 10% discount rate results in a NPV of -\$219 million and a BCR of 0.8.

Estimates indicate annual, nationally significant benefits in excess of \$100 million in 2027 - the first full calendar year the bypass is expected to be operational.

The economic appraisal methodology aligns with our Assessment Framework, except for the traffic model risks noted below:

- The base traffic data that informed the economic appraisal was 2016 data. Updates to the traffic models to incorporate recent demographic and population data did occur. While the traffic models were recalibrated, contemporary traffic survey data was not used to validate the traffic models. While this is understandable as the base data is from 2016, understanding how the traffic model performs relative to current observed traffic is a critical quality control check as the traffic model underpins most of the benefit calculations. We encourage proponents to cross-check and confirm demand using observed data wherever possible.
- The proponent prepared the business case with information collected prior to the COVID-19 pandemic. The impact of the pandemic was not specifically considered by the proponent in the business case.

OFFICIAL

Overall, our review concurred with the business case and found that if the project is delivered within the estimated cost and the traffic demand forecast in the business case is realised, we agree that the benefits of the project should outweigh its costs.

Tangible modelled benefits include a travel time saving of approximately 11 minutes for each through trip, removing approximately 12,000 vehicles per day from the Coffs Harbour CBD and reducing the casualty crash rate on the existing Pacific Highway by 25 per cent. Removing freight vehicles from the CBD will reduce noise and improve safety and amenity for pedestrians, cyclists, residents and businesses.

The following table presents a breakdown of the benefits and costs stated in the business case.

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m,2020/21) @ 7% real discount rate	% of total
Benefits		
Travel time cost savings (continuing users)	\$1,124.9	60.3%
Travel time cost savings (new users)	\$84.2	4.5%
Reliability improvements	\$15.5	0.8%
Vehicle operating cost savings	\$74.1	4.0%
Vehicle stop costs	\$239.8	12.8%
Crash cost savings	\$45.0	2.4%
Reduced vehicle-related environmental externalities	\$69.9	3.7%
Pedestrian amenity	\$97.6	5.2%
Cycling amenity	\$33.4	1.8%
Residual value of asset	\$81.8	4.4%
Total Benefits¹	\$1,866.1	(A) 100%
Total capital costs (P50)	\$1,396.6	94.2%
Operating costs	\$85.6	5.8%
Total Costs^{1 2}	\$1,482.2	(B) 100%
Net benefits - Net present value (NPV)³	\$383.9	n/a
Benefit-cost ratio (BCR)⁴	1.26	n/a

Source: Proponent's business case

(1) Totals may not sum due to rounding.

(2) Offset costs to mitigate environmental impacts are included in the capital cost estimate

(3) The net present value is calculated as the present value of total benefits less the present value of total costs (A – B).

(4) The benefit-cost ratio is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

The proponent's reported capital costs and funding is presented in the following table.

Capital costs and funding	
Total capital cost	Pending (see endnote)
Australian Government funding contribution	To be confirmed
Other funding (NSW Government)	To be confirmed

The Australian Government has committed up to \$1,461.6 million towards the project.

OFFICIAL

8. Deliverability

Transport for New South Wales is leading the delivery of the project. The proponent has extensive demonstrated experience in delivering similar projects. Construction will be delivered under a single design and construct contract package. A single contract is advantageous over multiple packaged contracts in that it reduces interface risks and provides flexibility for tenderers to bring innovation to reduce project costs. However, a single package places all reliance on a single contract, which the proponent has noted.

The key delivery risks, which the proponent has developed tailored management strategies for are:

- Funding arrangements were not finalised at the time of evaluation.
- Delivering the project within budget: the project is complex and design elements such as tunnels present a risk that the project budget will be exceeded. We note that the proponent's value engineering exercise identifies cost savings which should help alleviate the cost and funding risks.
- Addressing conditions of the environmental approval prior to and during project delivery: the project has conditional environmental approval under the NSW Environmental Planning and Assessment Act 1979. We note that plans to mitigate noise, vibration and biodiversity impacts will be completed by the Principal Contractor once they are engaged. Other conditions of the environmental approval, including managing koala habitat and Aboriginal and Cultural heritage impacts, are also being actively managed. At the time of our assessment, the proponent did not foresee cost or delivery risks associated with meeting environmental approval conditions.

Overall, we are satisfied with the proponent's detailed plan to minimise project delivery risk. However, a combination of project cost risk, proposed changes in project design as part of the value engineering exercise, inherent traffic demand uncertainty for a greenfield bypass and the marginal benefit cost ratio means there is a risk that actual benefits may not exceed the costs. We therefore encourage the proponent to further consider the long-term traffic and economic implications of design changes proposed in the value engineering exercise. For example, the long-term traffic and economic implications of reducing the cross-sectional area of the tunnels by removing a third lane should be examined closely to ensure the project can accommodate forecast demand and the design does not preclude potential future road widening.

The project will be funded jointly by the Australian Government and the NSW Government. Tolling was rejected by the proponent as tolling would be inconsistent with the broader Pacific Highway Upgrade Program and the NSW Tolling Principles.

The proponent's business case includes a benefits realisation plan for the project. The benefits realisation plan outlines the measures, targets, baseline, data source, and reporting responsibility for each key performance indicator. We encourage the proponent to conduct and publish a Post Completion Review to assess the extent to which the project benefits and costs set out in the business case are realised.

OFFICIAL

Consideration of COVID-19

The COVID-19 pandemic has significantly affected the use of infrastructure. Infrastructure Australia has been working collaboratively with the Australian Government to provide advice on a staged response for managing, and recovering from, the impacts of the COVID-19 pandemic.

One critical element of our advice is to maintain a pipeline of nationally significant infrastructure investments. Nationally significant infrastructure projects are long-term investments, typically considering a 30-year view of the project's social, environmental and economic impacts. In undertaking this evaluation, Infrastructure Australia continues to take a long-term view and has also considered the sensitivity of key planning assumptions using the best data available to us.

As noted in the 2019 Australian Infrastructure Audit, we must continue to evolve the way we plan for Australia's infrastructure to embrace uncertainty. There are still many uncertainties regarding the long-term impact of the COVID-19 pandemic on infrastructure use.

We will continue to collaborate with industry, the community and governments at all levels to understand the impacts of the COVID-19 pandemic on infrastructure decisions in Australia.

This evaluation summary currently excludes the estimated capital cost (nominal, undiscounted) as the project is currently in active procurement. It will be updated once this information is publicly available.