



Australian Government

BUILDING OUR FUTURE



Coffs Harbour bypass

Preferred concept design summary report

Roads and Maritime Services | September 2018



Executive summary

The issue

Coffs Harbour is one of four 'regional cities' on the North Coast of NSW. Over the next 20 years, almost 77 per cent of population growth on the North Coast will be in the regional cities¹, including Coffs Harbour.

Economic growth opportunities for Coffs Harbour are linked to the accessibility of the city to the region by road for: tourism; a regionally important medical and education sector and a nationally significant blueberry industry. The existing Pacific Highway is part of the National Land Transport Network and it bisects the city's central business district (CBD) and commercial and industrial precincts.

The Coffs Harbour bypass is identified as a priority initiative in the Infrastructure Australia *Infrastructure Priority List*, needed in the short-term to address Sydney-Brisbane connectivity issues.

The existing highway through Coffs Harbour forms part of the Sydney-Brisbane freight corridor and carries up to 35,000 vehicles per day. Road users, including through and local traffic, pedestrians, cyclists and heavy vehicles, need to navigate a 12 kilometre low speed arterial road with 12 sets of traffic signals, a major roundabout and 26 other intersections. This means the area experiences:

- A motorist, cyclist and pedestrian casualty rate more than three times higher than expected of a road of this class
- Increased travel times and inefficient on-road freight operation
- Loss of economic development opportunities
- A decrease in the amenity of the heart of Coffs Harbour.

These issues will continue to worsen as traffic volumes on the existing highway increase.

The preferred solution

Roads and Maritime Services (Roads and Maritime) has been investigating a bypass of Coffs Harbour since 2001. Many options for the location of the highway were investigated, including those suggested by the community. A planning strategy was commissioned to find a preferred route. This process was led by the NSW Department of Planning and Environment and involved Roads and Maritime and Coffs Harbour City Council.

The preferred route for the Coffs Harbour bypass was selected in December 2004 and preserved in Council's Local Environmental Plan (LEP) in 2013 to provide planning certainty for Council and the local community.

In March 2015 the NSW Government committed \$200 million towards building the Coffs Harbour bypass, subject to a final business case. In May 2018 the Australian Government committed \$971 million to build the project. Including previous expenditure on planning and some land acquisition, the total cost based on the preferred concept design for the bypass is expected to be between \$1.17 and \$1.3 billion.

The proposed project will have major benefits for Coffs Harbour. Upgrading about 14 kilometres to a four lane road will improve transport efficiency and road safety for local, regional and interstate road users.

¹ North Coast Regional Plan 2036 (March 2017, NSW Government)

A bypass of Coffs Harbour will provide:

- Safer travel by reducing the number of vehicles, including dangerous goods, travelling through Coffs Harbour and the risk of motorist, cyclist and pedestrian casualties.
- Reduced travel times and improved transport efficiency – motorists on the bypass are expected to save 11 minutes.
- Improved amenity and accessibility to the Coffs Harbour CBD and surrounding areas
- More consistent and reliable travel as the existing highway is susceptible to flooding.

The preferred design

The project includes a 14 kilometre upgrade from Englands Road in the south to Sapphire in the north. It will include a narrow median between Englands Road and Korora Hill.

The preferred concept design incorporates a land bridge and cutting at Gatelys Road and a cutting at Shephards Lane. A land bridge is a covered structure which can maintain vegetation over the top, such as the one on the Pacific Highway at Bonville. Land bridges allow fauna connectivity and reduce impacts on the surrounding landform but avoid the need for a managed tunnel system.

The proposal for a land bridge at Roberts Hill remains unchanged from earlier designs.

Long managed motorway tunnels are no longer being considered to ensure all vehicles carrying dangerous goods can use the bypass and avoid residential and urban areas.

A cutting, without a land bridge, has been chosen for Shephards Lane as fauna connectivity will be maintained by the new bridge that will be built over the North Coast Railway.

The bypass will be a Class M motorway standard road between Englands Road and Korora. Access to the bypass will be via the three proposed interchanges. A one-way local access road has been included in the design at the south to provide safer access for residences and businesses along the western side of the existing highway between Lindsay Transport and Englands Road. Some individual property accesses on the eastern side of the existing highway at this location remain.

The existing Pacific Highway between Korora and Sapphire Beach is already a four lane divided road. The two kilometre section of highway upgrade between the Korora and Sapphire section may be built in stages to better use the existing dual carriageway highway. An initial stage may involve reducing individual property accesses to the new highway and closing median breaks. Investigations into possible staging options for this section are ongoing.

The bypass route is shown overleaf.

Project funding

The estimated cost of the project based on the preferred concept design is \$1.17 to \$1.3 billion. The project benefit cost ratio is 1.3.



The route of the Coffs Harbour bypass.

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Project justification

The Pacific Highway upgrade

The Pacific Highway is an important passenger and freight corridor connecting Sydney and Brisbane. The Australian and NSW governments have been jointly upgrading the Pacific Highway between Hexham and the Queensland border since 1996. Following the completion of NorthConnex by 2019 and the Pacific Highway duplication by 2020, Coffs Harbour will be one of only two locations on the entire east coast corridor linking Brisbane, Sydney, Canberra and Melbourne where the route is a heavily congested urban road with traffic signals.

The Pacific Highway upgrade aims to support regional development and provide:

- Safer, more consistent and more reliable travel
- Reduced travel times with improved freight transport efficiency to better access towns and villages on the north coast
- Improved amenity for local communities
- A more reliable route that is free of flooding.

Why does Coffs Harbour need a bypass?

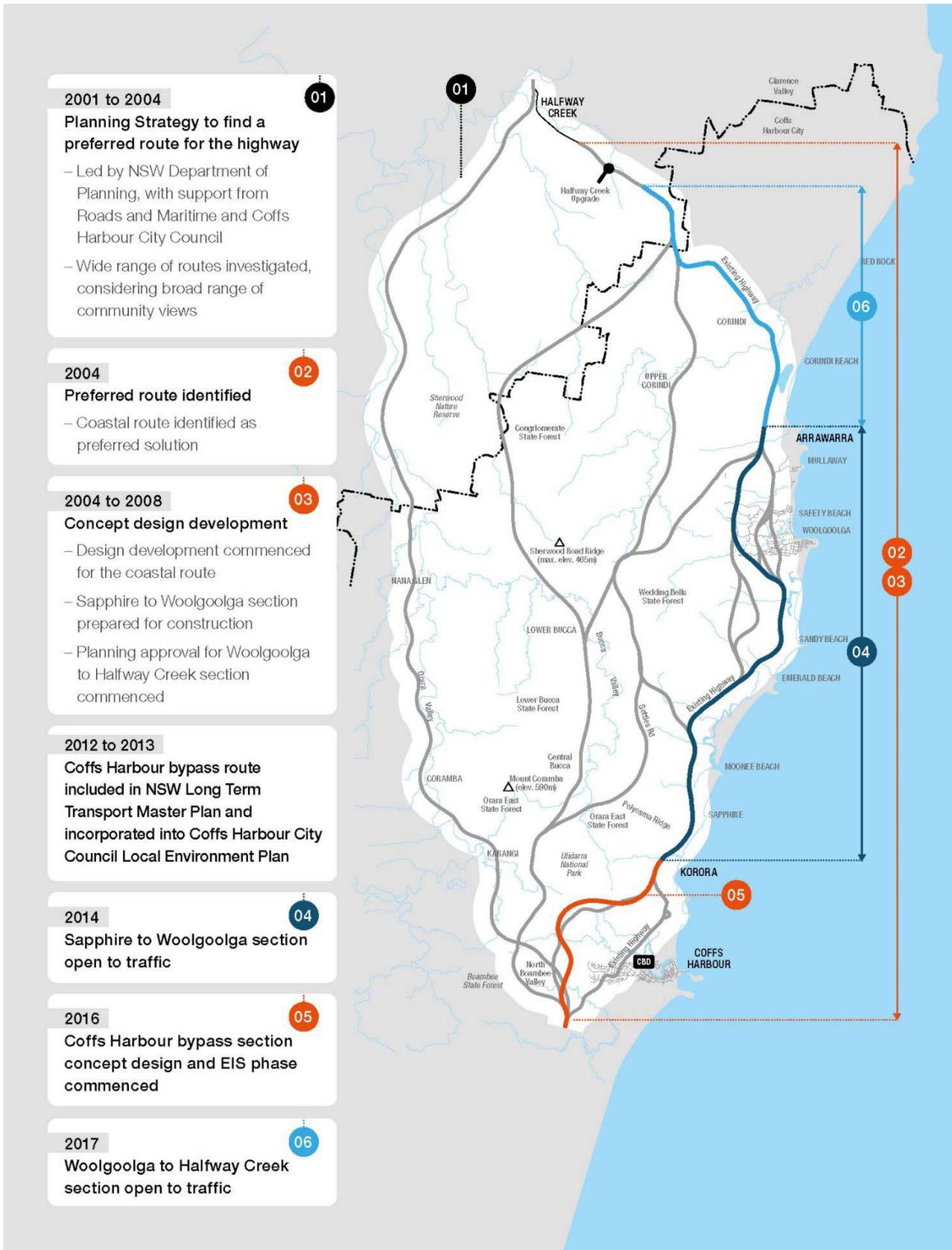
There are a number of issues along the existing Pacific Highway and within the broader Coffs Harbour road network driving the need for improvements to the Pacific Highway at Coffs Harbour.

Table 1 identified road network issues Pacific Highway, Coffs Harbour

Problem definition/issue	Comments and factors influencing problems/issues
Safer travel High crash rate along the existing Pacific Highway	<ul style="list-style-type: none">• Casualty crash rates three times higher than network average• 60% of crashes at intersections
More consistent and reliable travel Reduced travel time reliability and increased travel times expected with forecast growth in travel demand	<ul style="list-style-type: none">• 12 sets of traffic signals and one major roundabout• Localised congestion resulting in deteriorating traffic performance
Reduced travel times with improved freight transport efficiency High levels of delay on the existing highway for both regional and local traffic – less efficient movement of people and goods.	<ul style="list-style-type: none">• Traffic volumes between Sydney and Brisbane up 2% p.a. since 2007• 30,000 – 35,000 vehicles per week day• Peak period vehicle hours of delay forecast to more than double by 2044
Better access for towns and villages on the North Coast Limited ability of the road network to accommodate additional traffic demand generated by new development during peak periods – constrains economic development within Coffs Harbour	<ul style="list-style-type: none">• Tourism will continue to be an important industry for Coffs Harbour attracting 1.6 million international overnight, domestic overnight and domestic daytrip visitors annually
Improved amenity for local communities Reduced amenity of the centre of Coffs Harbour, noise and severance issues which can detract from the quality of life for residents close to the existing Pacific Highway.	<ul style="list-style-type: none">• High proportion of heavy vehicles exacerbating the congestion over recent years

Project history

Roads and Maritime has been investigating a bypass of Coffs Harbour since 2001 as part of the Coffs Harbour Highway Planning Strategy. Key decisions and milestones for the development of the bypass are outlined below.



2001 to 2004

01
Planning Strategy to find a preferred route for the highway

- Led by NSW Department of Planning, with support from Roads and Maritime and Coffs Harbour City Council
- Wide range of routes investigated, considering broad range of community views

2004

02
Preferred route identified

- Coastal route identified as preferred solution

2004 to 2008

03
Concept design development

- Design development commenced for the coastal route
- Sapphire to Woolgoolga section prepared for construction
- Planning approval for Woolgoolga to Halfway Creek section commenced

2012 to 2013

04
Coffs Harbour bypass route included in NSW Long Term Transport Master Plan and incorporated into Coffs Harbour City Council Local Environment Plan

2014

05
Sapphire to Woolgoolga section open to traffic

2016

06
Coffs Harbour bypass section concept design and EIS phase commenced

2017

07
Woolgoolga to Halfway Creek section open to traffic

Traffic and transport

The existing highway through Coffs Harbour forms part of the Sydney-Brisbane freight corridor and carries up to 35,000 vehicles per day. Up to 15 per cent of the total traffic volumes on the existing highway are heavy vehicles. The area is already experiencing high levels of congestion, and traffic volumes are expected to increase over time in line with population growth. Road users, including through and local traffic, pedestrians, cyclists and heavy vehicles, navigate a 12 kilometre low speed arterial road with 12 sets of traffic signals, a major roundabout and 26 other intersections. This means the area experiences:

- A motorist, cyclist and pedestrian casualty rate more than three times higher than expected of a road of this class
- Increased travel time and inefficient on-road freight operation
- Loss of economic development opportunities
- A decrease in the amenity of the heart of Coffs Harbour.

This congestion acts as barrier for traffic movements from the growing residential communities west of the highway into the commercial precincts east of the highway at Park Beach, Orlando Street, the Coffs Harbour CBD and Jetty Foreshore. Access to Coffs Harbour Airport, Southern Cross University, TAFE NSW and local schools are also hampered by this congestion.

Providing a bypass of Coffs Harbour consistent with current standards of the Pacific Highway upgrade program will address declining transport efficiency, urban congestion and road safety issues caused by the interaction of through and local traffic.

Traffic counts and traffic model development

Traffic modelling for the project is nearing completion and has been peer reviewed. Traffic counts, origin-destination surveys, travel time surveys, demographics (predicted growth areas), business growth and community input (from the business and community survey) have all been used to develop the model.

Information on predicted traffic flows will be considered in the preparation of a noise impact assessment for the environmental impact statement (EIS). Forecast traffic volumes have been used to assist with the development of the interchange layouts presented in the refined concept design.

Table 1 identifies in 2034, between 21,400 and 27,000 vehicles per day will use the bypass. The model also shows there is an increase in traffic on Coramba Road between the Shephards Lane roundabout and the proposed interchange of around 1000 vehicles per day (or about 12 per cent) in 2034. This occurs as a result of residents in west Coffs Harbour seeking to access the bypass at Coramba Road to travel north or south. The traffic model does not predict significant volumes of traffic will access the Coffs Harbour CBD from the bypass and along Coramba Road. Testing within the traffic model shows that the potential impact on traffic volumes using Coramba Road does not increase substantially from its current use.

Table 1 shows existing traffic volumes at key locations in Coffs Harbour and forecast traffic volumes with and without the bypass in 2034.

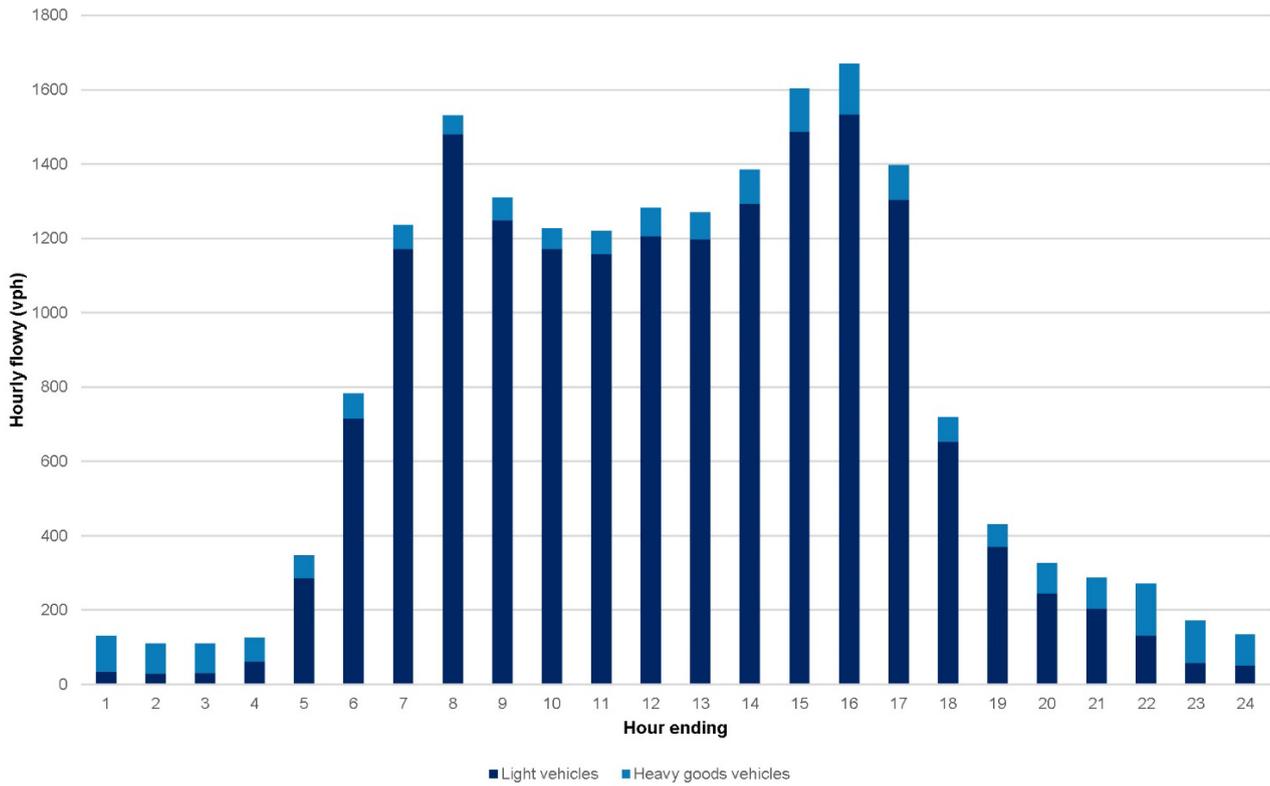
Traffic volumes on Hogbin Drive, north of Stadium Drive, are expected to drop by about 7000 vehicles a day in 2034 as a result of the bypass.

Location		Daily traffic volumes		
		Current volumes	2034 with the bypass	2034 – no bypass
Proposed bypass	North of Coramba Road	N/A	21,400	N/A
	South of Coramba Road	N/A	27,000	N/A
Existing Pacific Highway	South of Bruxner Park Road	35,500	38,800	43,200
	North of Orlando Street	41,100	36,200	49,300
	South of Albany Street	28,900	19,800	34,600
Local road network	Hogbin Drive, north of Park Beach Road	9,000	8,500	10,400
	Hogbin Drive, north of Harbour Drive	17,000	15,500	19,900
	Hogbin Drive, north of Stadium Drive	28,500	21,800	32,400

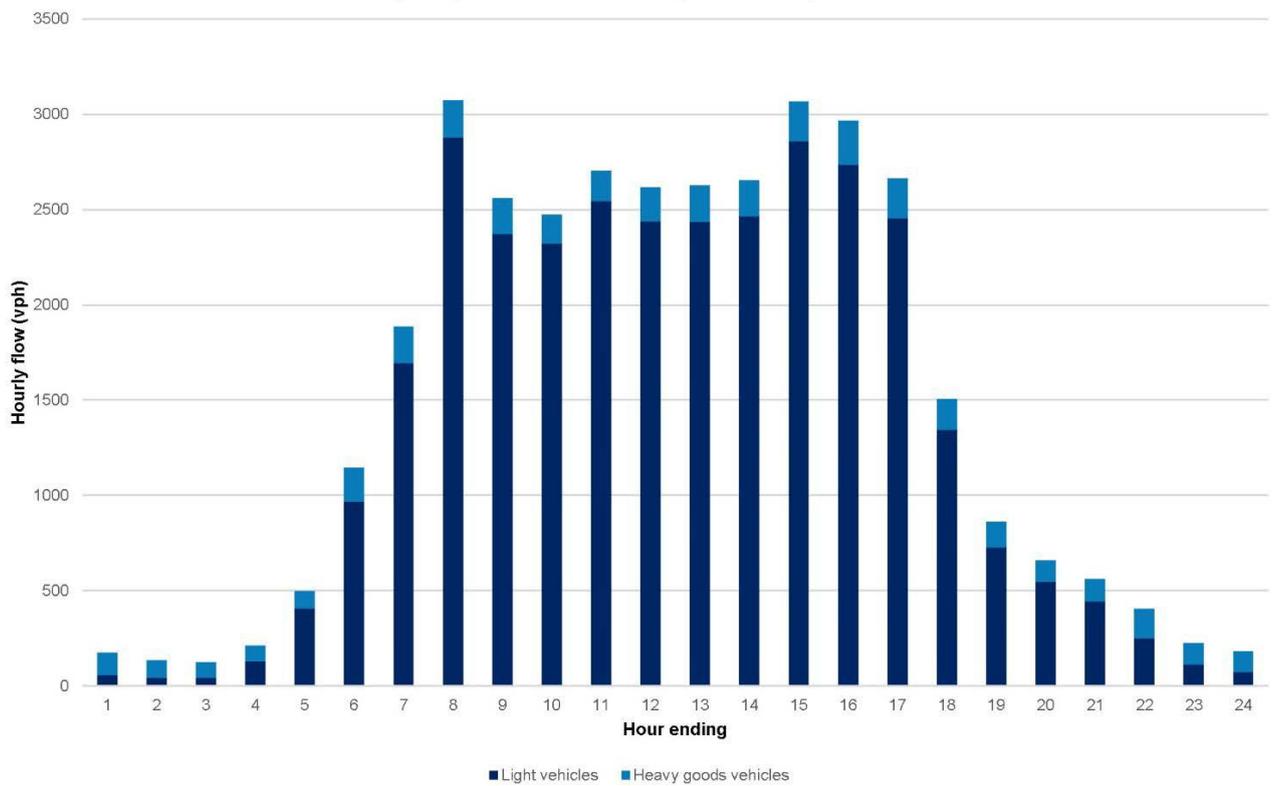
Table 1: Existing traffic volumes at key locations in Coffs Harbour and forecast traffic volumes with and without the bypass in 2034. Traffic volumes presented are subject to further refinement as part of the development of the environmental impact statement

The figures on the next page show the existing hourly traffic volumes on the Pacific Highway near Sawtell Road and at Coffs Creek near the CBD. These figures demonstrate there is a high volume of heavy vehicles on the existing Pacific Highway through Coffs Harbour that pass through the CBD. It also demonstrates that heavy vehicle volumes are around 90 vehicles per hour between midnight and 5am. These figures demonstrate volumes in the CBD area near Coffs Creek are almost double the volumes on the Pacific Highway near Sawtell Road to the south, which severely impacts travel speeds and transport efficiency in the CBD area.

Pacific Highway south of Sawtell Road - two-way volumes 2017



Pacific Highway at Coffs Creek bridge - two-way volumes 2017



Functional and performance criteria

A set of functional and performance design criteria have been developed to guide the current and future development of the Coffs Harbour bypass.

The project will include:

- A 12 kilometre bypass of Coffs Harbour from Englands Road in the south to Korora in the north. The bypass is designed to cater for all classes of dangerous goods transport.
- The bypass will be a Class M standard north of Englands Road interchange and Class A south of the Englands Road interchange. The design of the section south of Englands Road will not prevent a future upgrade to Class M.

Class M projects are designed and posted at 110km/h (freeway standard), and require alternative routes to be available for local traffic through the provision of service roads or via local arterial road networks.

Class A projects are designed as Controlled Access Roads, and must be designed and developed with a strategy for conversion to 'Class M' standard in the future. Future conversion should not require changes to the alignments, although 'Class A' projects will generally be signposted at 100 km/hr.

- Grade separated interchanges will be provided at Englands Road, Coramba Road and Korora Hill.
- Upgrading the existing Pacific Highway between Korora Hill and the southern end of the Sapphire to Woolgoolga upgrade project (The Korora to Sapphire section) may be built in stages.
- The main carriageways of the bypass will be designed free of flooding up to the one in 100 year flood levels.
- The minimum horizontal curve radius to be provided will be 750 metres.
- The maximum desirable vertical grade will be 4.5 per cent.

The preferred concept design

Since early 2018, the concept design has been refined, based on traffic modelling and field investigations. The refinements to the project since the 2016 preliminary concept design include:

- Confirmed cuttings and land bridges
- Changes to access roads, traffic lights and roundabouts
- A narrowed central median.

Cuttings and land bridges

The preliminary concept design for the bypass had options for either cuttings or tunnels where the project crosses the major ridgelines at Gatelys Road, Shephards Lane and Roberts Hill. Refinements to the design include:

- Gatelys Road, crossing by land bridge and cutting
- Shephards Lane, crossing by cutting. A cutting, without a land bridge, has been chosen for Shephards Lane as fauna connectivity will be maintained by the new bridge which will be built over the North Coast Railway.

The proposal for a land bridge at Roberts Hill remains unchanged from earlier designs.

Why are long tunnels not being built?

Long tunnels at Gatelys Road and Shephards Lane have not been included in the preferred concept design. By not including long tunnels, all dangerous goods vehicles not servicing Coffs Harbour will travel on the bypass and not through Coffs Harbour residential and urban areas.

What is a land bridge?

Land bridges allow fauna connectivity and maintain the surrounding landform but avoid the need for a managed tunnel system. A land bridge is typically less than 80 metres long with vegetation growing on top such as the one on the Pacific Highway at Bonville.

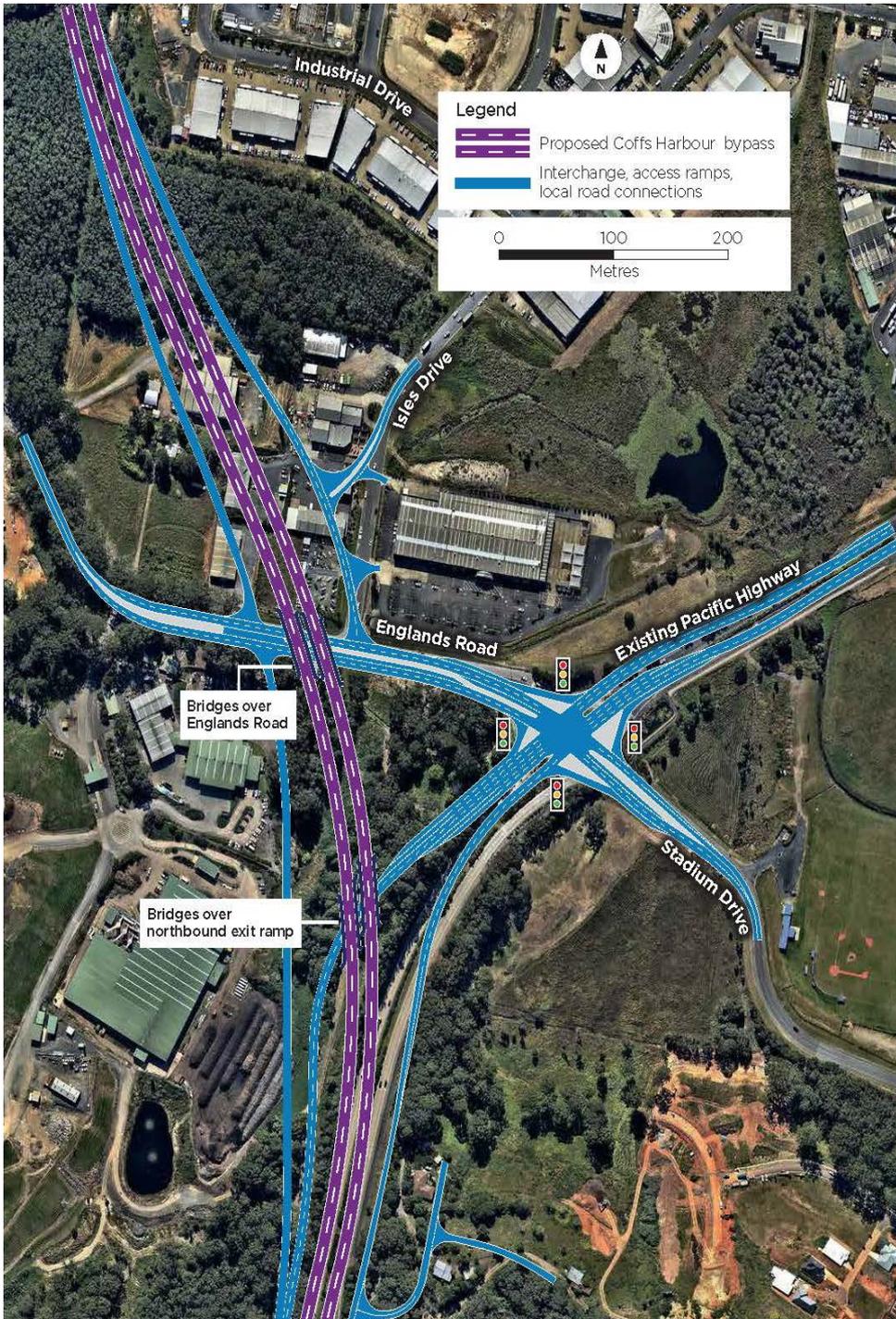
Interchanges

Interchange designs have been refined to meet future predicted traffic volumes.

Englands Road

Refinements to the interchange include:

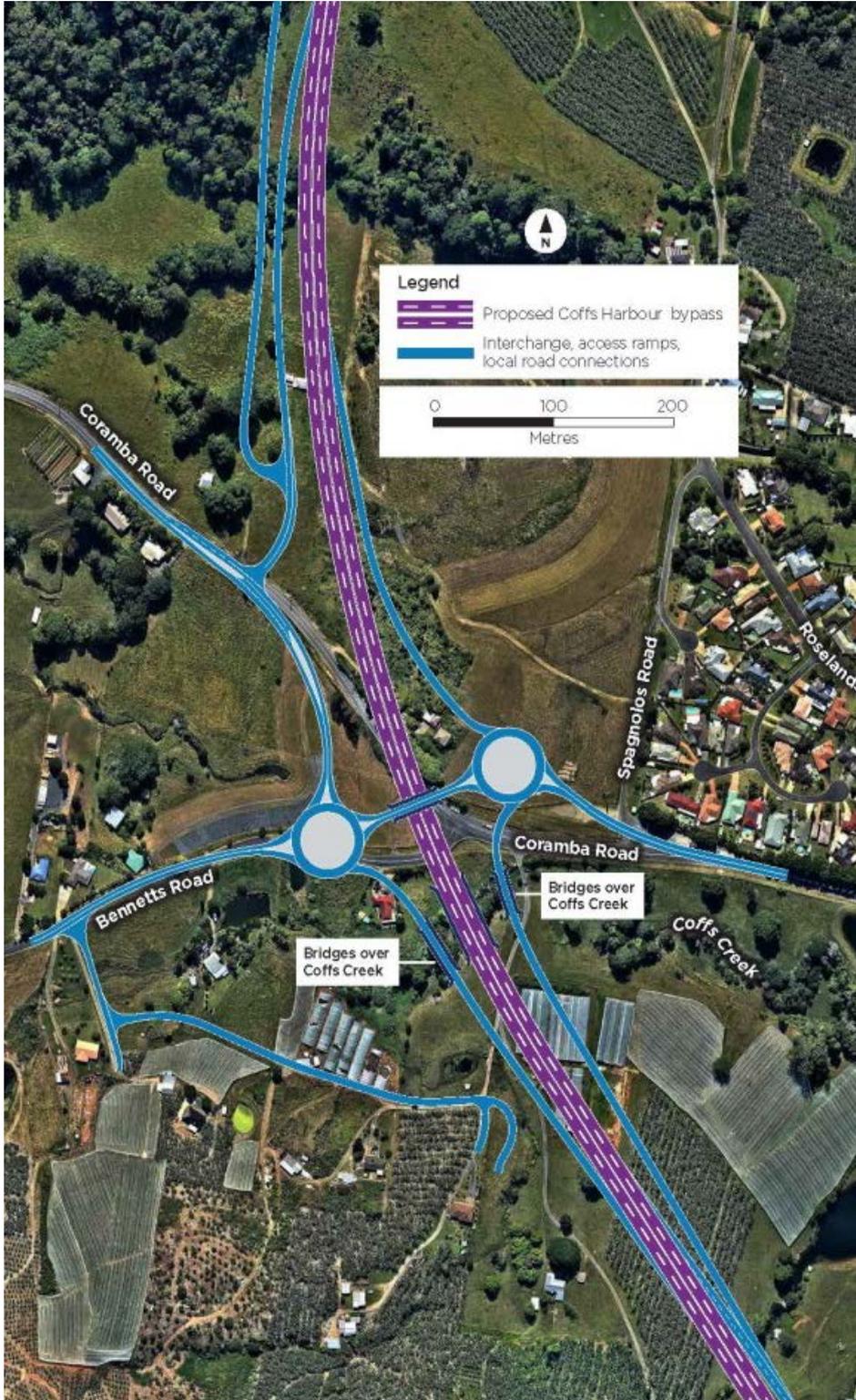
- Replacing the existing roundabout with traffic lights
- Access, on the western side of the existing highway, to the Englands Road interchange by a one-way access road. The one-way service road has been included to improve road safety at this location.



The current design for the Englands Road interchange. The design is subject to further refinement

Coramba Road

There have been no refinements to this interchange.

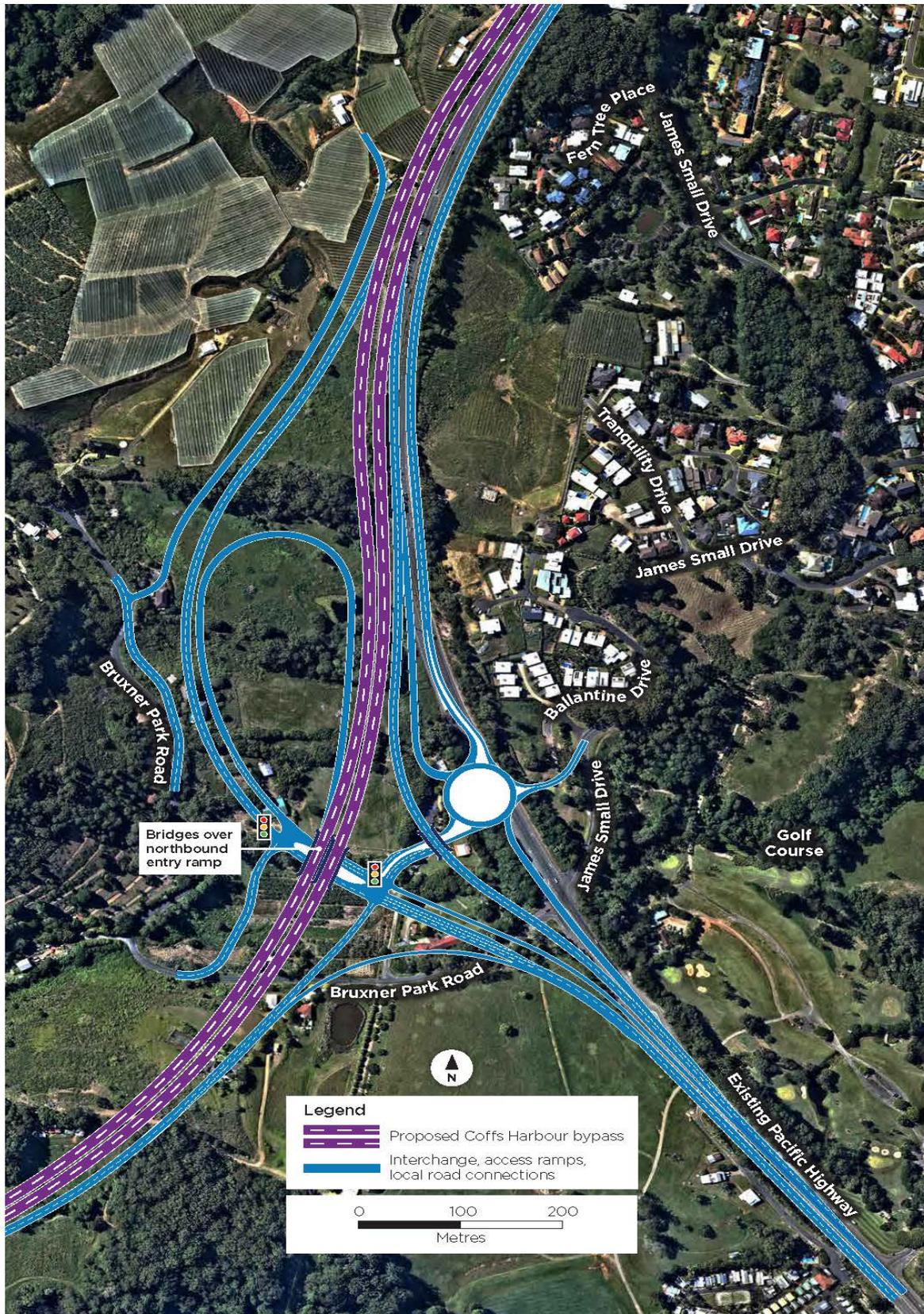


The current design for the Coramba Road interchange. The design is subject to further refinement.

Korora Hill

Refinements include:

- A single roundabout connecting James Small Drive, the local service road and the southbound exit ramp
- Traffic lights to manage traffic from the northbound exit ramp and the southbound entry ramp
- Bridging the southbound exit ramp over the connection to James Small Drive.



The current design for the Korora Hill interchange. The design is subject to further refinement.

Narrow central median

The median width has been reduced to five metres between Englands Road and Korora Hill, unless widening is required for sight distance.

The narrow median minimises the amount of land required for the bypass in this area.

The preferred concept design may be further refined in response to community comment, to reduce project impacts.

Kororo Public School and the bus interchange

Roads and Maritime has also investigated traffic and pedestrian movements around Kororo Public School and the bus interchange. As we further refine the design of the bypass over the coming months we will continue to consult with the school and bus companies to ensure we can best meet their requirements.

Artist impressions

The images shown below are possible options for the land bridges at Roberts Hill and Gatelys Road, and the viaduct over the railway at Shephards Lane. The final structures at these locations will be built in accordance with the project's functional and performance criteria. The images shown below are indicative and subject to further refinement.

Roberts Hill – land bridge



Twin arches with benching



Concrete bridge

Shephards Lane – cutting



Gatelys Road – land bridge



Twin arches

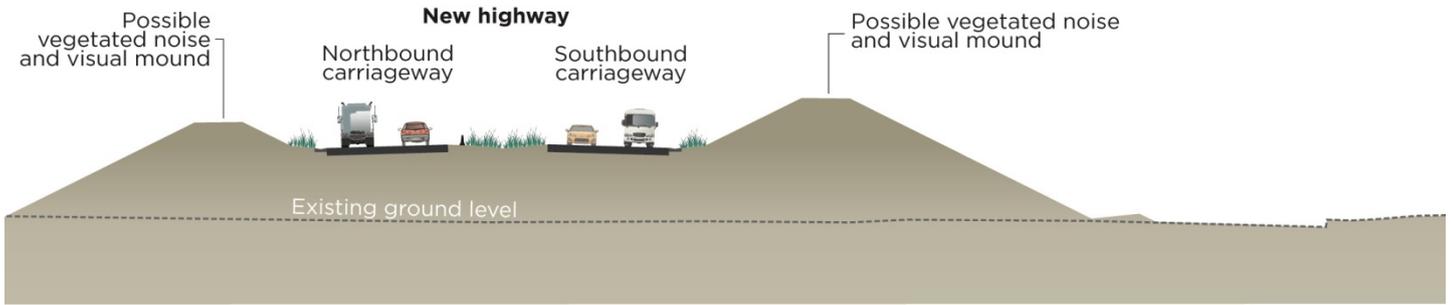


Walled abutment

Indicative cross sections

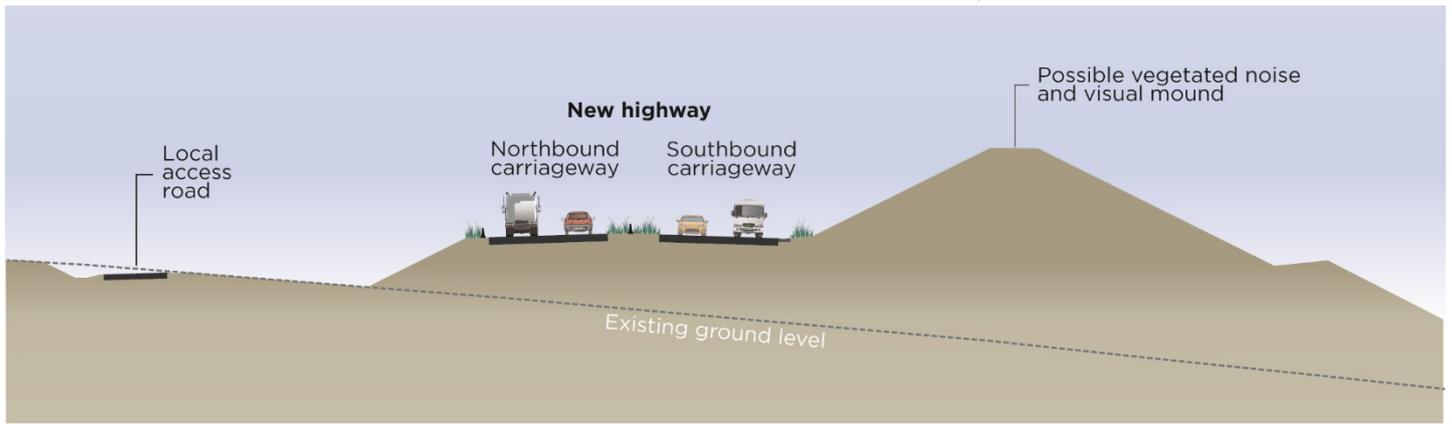
Indicative cross sections of the project at various locations have been provided. These cross sections are subject to further refinement as the development of the concept design progresses.

North Boambee



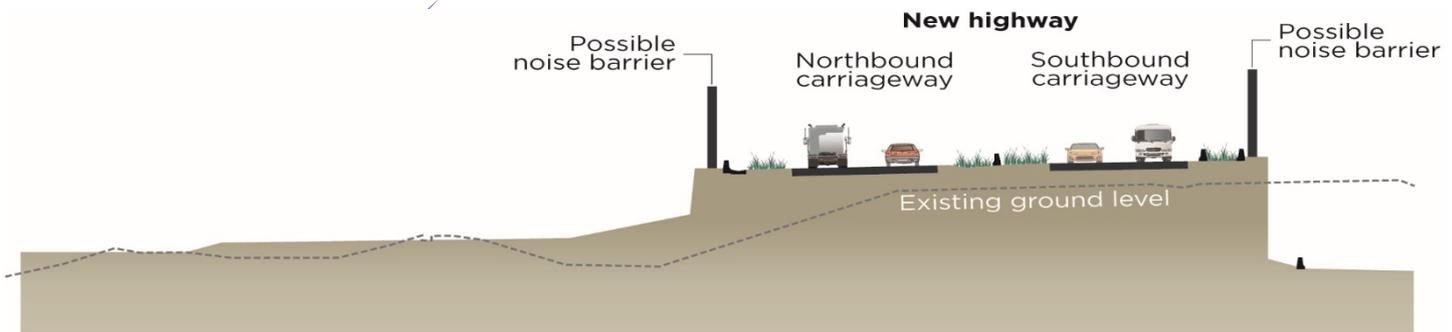
Typical cross section - north Boambee Road near Highlander Drive

Mackays Road



Typical cross section - Mackays Road

Old Coast Road



Typical cross section - Old Coast Road - south of Opal Boulevard

Key design challenges

Cuttings

Geotechnical investigations were carried out across the project alignment from late 2016 to mid-2017. These investigations have been used to inform the concept design and refine the project cost estimate.

Key outcomes of the geotechnical investigations were:

- The geology along the bypass alignment comprises hard to very hard rock
- The rock is fractured, however it is tightly holding ground water
- Processing of the rock would be required to make it suitable for use in construction of the bypass
- Extensive use of shotcrete and other stabilisation methods (e.g. rock bolts) would be required for cuttings that were steeper than 2:1 (two metre horizontal for every one metre vertical).

As a result of these investigations, the preferred concept design has incorporated cuttings with a 2:1 ratio batter profile where possible, as it reduces the future maintenance cost because it avoids the need for slope stabilisation and provides a better environment for revegetation.

A cutting, without a land bridge, has been chosen for Shephards Lane because fauna connectivity will be maintained by the new bridge which will be built over the North Coast Railway.

Earthwork balance

Road projects ideally have a balance between cut and fill to avoid the need to dispose of or import fill from sources offsite, which is an expensive process and a poor sustainability outcome. Due to the steep topography in the Coffs Harbour area along the proposed route, and because the alignment passes by the foot slopes of the coastal range, the project generates significant volumes of fill material. To balance the earthworks, the design has been slightly raised through the ridgelines to minimise the size of the cuttings. This has reduced the overall amount of earthwork required.

Vegetated earth mounds, which have visual and noise benefits, have been incorporated into the design at North Boambee and Mackays Road to reduce the volume of material to be disposed of, reducing haulage offsite and minimising the overall project cost.

Land acquisition

Since the preferred route was announced in 2004 and preserved in the Coffs Harbour LEP in 2009, property acquisitions have been carried out under the hardship policy with land owners directly impacted by the bypass route.

The latest refinements to the design will require further property acquisition than previously assessed. This is because of:

- Land required for vegetated earth mounds
- Utility connectivity, particularly at the northern end
- Increased land required due to the design of batter profiles for the cuttings.

We are currently consulting with land owners who are directly impacted by the bypass.

Field investigations and technical studies

Field investigations are being carried out to inform design and the EIS. The outcomes of these investigations will be described in the EIS. Field investigations will be used to assess the existing environment and potential impacts. The EIS will also outline the mitigation measures to be implemented to manage these impacts.

Biodiversity

Field investigations have been carried out within the project area, including:

- Vegetation surveys
- Targeted surveys for threatened flora and fauna species
- Surveys for ecological communities listed under the *NSW Threatened Species and Conservation Act* and the *Federal Environment Protection and Biodiversity Conservation (EPBC) Act*
- Aquatic habitat and threatened aquatic species surveys.

Flooding

Flood models are being developed to assess the potential impact of the project and have been used to inform the development of the preferred concept design. The EIS will include a detailed flood impact assessment.

Urban design

Roads and Maritime urban design principles will be applied to the project design to help the bypass integrate sensitively with the surrounding landscape.

Noise

Noise monitoring has been carried out and a noise model is currently being developed. The noise model is based on the background noise data collected at a range of locations along the bypass alignment and the forecast traffic volumes on the bypass.

The noise model will be used to predict future noise levels and to identify noise mitigation measures that may be required. As a first priority, we look to reduce road traffic noise at the source through measures including:

- Road design and geometry
- Quieter pavement surfaces
- Noise mounds, barriers and walls.

Aboriginal heritage

There are sites of cultural significance to the local Aboriginal community around the project alignment and archaeological test excavations have been carried out within the project boundary. A detailed cultural assessment of the project area is being done which will identify areas of importance to the Aboriginal community. Identified cultural values resulting from the assessment will form part of the overall cultural

heritage assessment. The EIS will provide further detail on the outcomes of the test investigations and cultural heritage assessment.

Community consultation

Since 2016, community engagement activities have included:

Landowner engagement:

- Property access agreements
- Acquisition information.

Key stakeholder engagement:

Meetings have been held with:

- Schools
- Chamber of Commerce
- Rotary
- Resident groups
- Coffs Harbour City Council
- State and federal government agencies.

Community engagement:

- Project updates (August and December 2016)
- Community displays (August/September 2016)
- Business and community survey (November/December 2016 and June 2018) to help further understand the community's expectations, knowledge and concerns related to the Coffs Harbour bypass. The information collected will also be used to:
 - Inform the EIS investigations
 - Refine the concept design
 - Develop further targeted community consultation
 - Assist Roads and Maritime to understand what topics are key to the community
 - Inform the transport model and social impact investigations, which feed into understanding how the bypass influences the road network.

Current key themes raised by the community include:

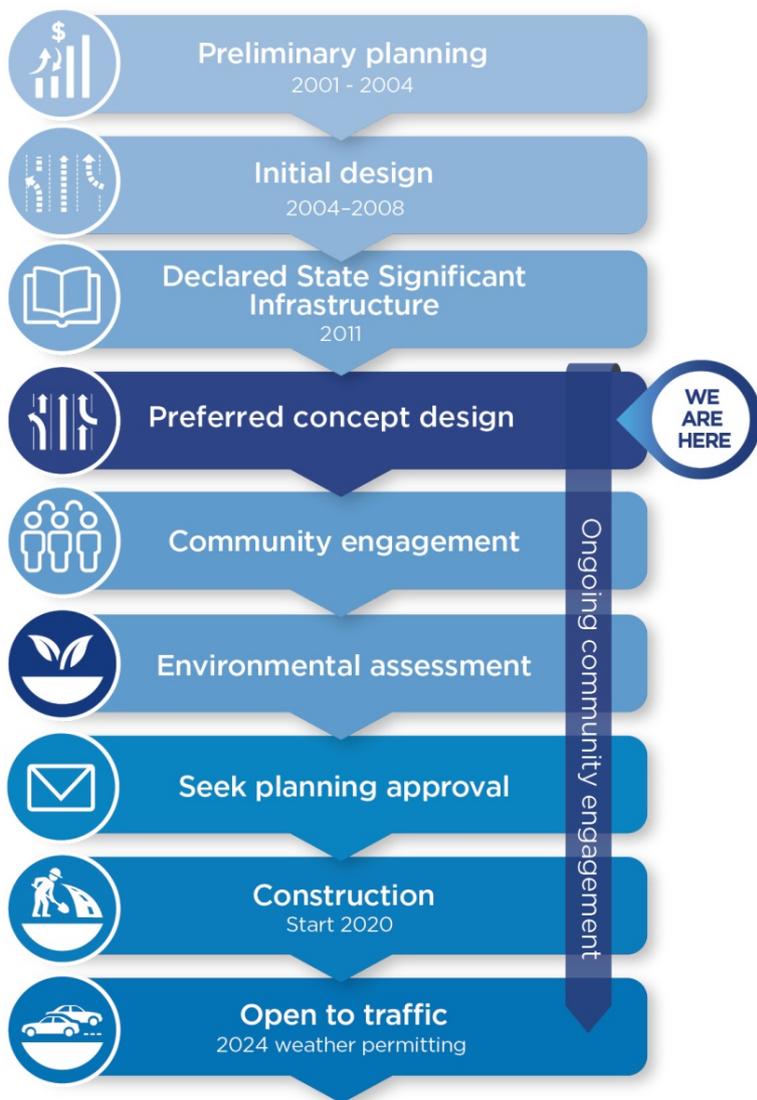
- Is the project is going ahead?
- Timing for construction
- Timing of the land acquisition process
- Impacts on property value / purchasing decisions
- Property and local road network accesses
- General amenity concerns – i.e. noise, vibration, visual.

Next steps

The preferred concept design is on display until 26 October 2018 for community comment. Community information sessions will be held so the public can ask questions about the design. Over this time we will also be meeting with directly impacted land owners to discuss the project. The preferred concept design may be further refined in response to community comment, to reduce project impacts and to further improve value for money.

The project EIS is expected to be placed on display for community comment in late 2018. A report on submissions received on the EIS will then be prepared prior to seeking planning approval from the NSW Department of Planning and Environment later in 2019.

Subject to all relevant planning and environmental approvals, construction is expected to start in 2020, and the project opened to traffic in 2024, weather permitting.



 rms.nsw.gov.au/coffsharbourbypass

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