PACIFIC HIGHWAY UPGRADE – WARRELL CREEK TO NAMBUCCA HEADS

North Macksville Ramps – Modification Environmental Assessment

MARCH 2016

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Document Control

Document description

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General Description	Modification Environmental Assessment Report relating to the North Macksville Ramps and associated refinements in the vicinity of Old Coast Road, Letitia Close and the Pacific Highway near North Macksville that are not deemed consistent with the Approved Project.	

Document development

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Issue summary

Revision	**Date**	**Issue description**	**Distribution**
01	06-11-2015	First Draft	RMS and AFJV review
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Contents

List of figures

Page number

List of tables

Page number

Appendices

Glossary

AADJV	Arup Aurecon Design Joint Venture
AADT	Annual average daily traffic
AFJV	Acciona-Ferrovial Joint Venture
AHIMS	Aboriginal Heritage Information Management System
Approved Project	The Approved Project represents the scope of works as originally approved, including realignment of Old Coast Road to pass above the upgraded highway but not including north facing ramps at North Macksville
ASS	Acid sulfate soils
Consistency Assessment	A report undertaken to assess whether design refinements or minor changes to a project
dB; Decibel	A relative unit of measurement widely used in acoustics, electronics and communications. The dB is a Logarithmic unit used to describe a ratio between the measured level and a reference or threshold level of 0dB. The ratio may be Sound Power, Sound Pressure, voltage or Sound Intensity etc
EA	Environmental Assessment
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process
LEP	Local Environmental Plan
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers
Modification	An environmental impact assessment undertaken in terms of Section 75 W Act to seek approval to an additional element of a project that has been approved under Part 3A of the EP&A Act
PAD	Potential archaeological deposit
PAS	Potential archaeological sensitivity
RMS	NSW Roads and Maritime Services
Roads and Maritime	NSW Roads and Maritime Services
RoTAP	Rare or Threatened Australian Plants
SEPP	State Environmental Planning Policy
WC2NH	Warrell Creek to Nambucca Heads

1. Introduction

1.1 Background

Roads and Maritime has engaged Pacifico, an Acciona and Ferrovial Joint Venture, to design and build the 20 kilometre Warrell Creek to Nambucca Heads section of the Pacific Highway upgrade. The Approved Project involves upgrading the highway to a four lane divided road between the Allgomera deviation, south of Warrell Creek and Nambucca Heads, just south of the railway line (the project).

Roads and Maritime Services (Roads and Maritime) completed an environmental assessment of the Warrell Creek to Urunga Pacific Highway upgrade (the Project EA) in January 2010. The Project EA identified a range of environmental, social and planning issues associated with the design, construction and operation of the Pacific Highway Upgrade between Warrell Creek and Urunga and proposed measures to mitigate or manage the potential impacts. The project was designated critical infrastructure, under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and was formally approved on 19 July 2011. Following the approval of the Project EA, seven modifications to the Project EA have been approved.

For the purposes of this document, the concept design described and assessed in the Project EA and modifications, and approved by the Minister is referred to as the Approved Project.

Following approval of the project, representations from Nambucca Shire Council and the Macksville Chamber of Commerce were considered which has resulted in a modification to the Approved project being proposed at North Macksville. The design, construction and operation of the proposed modification is the subject of this modification environmental assessment (the proposed modification).

The proposed modification would generally include a northbound on ramp onto the upgraded Pacific Highway, a southbound off ramp from the upgraded Pacific Highway, connection of the ramps to local roads, an upgraded intersection at Old Coast Road and the existing Pacific Highway (existing highway) and a median cross-over facility to enable emergency vehicles (including ambulances stationed at North Macksville) to travel north and south on the upgraded highway. **Section 2.2** provides a full description of the proposed modification.

Three options for the design of the proposed modification were investigated and developed by Roads and Maritime. An Options Assessment workshop was held by Roads and Maritime to compare and assess the three options using a Value Management methodology. From this workshop Option 2 was selected as the preferred option.

The Preferred Option Report was displayed from 16 September to the 12 October 2015. Community comment was invited and in consideration of submissions received some refinements were made to the proposed modification. Community consultation is discussed further in **Section 4**.

This modification environmental assessment would be submitted to the NSW Department of Planning and Environment in order to request planning approval as part of a Modification under Section 75W of the EP&A Act.

The modification environmental assessment may be displayed by the NSW Department of Planning and Environment and public comment invited. In this instance, a Submissions Report would be prepared on the basis of submissions received during public display and the concept design and environmental assessment may be further refined in response to public feedback.

Following the NSW Department of Planning and Environment approval of the modification, construction would proceed subject to meeting any approval conditions.

1.2 Purpose of this report

This modification environmental assessment provides an overview of:

- The process leading to the selection of the preferred design for the proposed modification
- The community consultation activities and outcomes undertaken in relation to the proposed modification
- An assessment of the potential impacts of the proposed modification and the measures proposed to mitigate or manage the potential impacts.

The modification environmental assessment builds upon work already undertaken in the Warrell Creek to Urunga Pacific Highway upgrade environmental assessment, the Warrell Creek to Urunga Pacific Highway upgrade environmental assessment submissions report, the North Facing Ramps Options Assessment Report (May 2015), North Facing Ramps Preferred Option Report (Sep 2015) and the North Macksville Ramps submission report (Dec 2015).

This modification environmental assessment seeks planning approval for the proposed modification as a modification to the Approved Project under Section 75 W of the EP&A Act.

1.3 Benefits of the proposed modification

The proposed modification would provide improvements to the Warrell Creek to Nambucca Heads Pacific Highway upgrade. Benefits of the proposed modification would include:

- Improved connectivity between Macksville and areas to the north, and in particular the proposed modification would provide improved connectivity between Macksville and Nambucca Heads
- Improved connectivity to Macksville - While Macksville is not identified by Roads and Maritime as a Service Centre, the addition of the proposed modification and appropriate signage would, in conjunction with the Bald Hill Road interchange to the south, allow both northbound and southbound vehicles using the upgraded highway to stop at Macksville more easily
- Improved utilisation of the upgraded highway between Macksville and the Nambucca Heads interchange by providing north facing ramps at North Macksville
- Safer and faster travel onto the upgraded highway for Macksville traffic travelling north
- Improved access to and from Macksville by emergency services and reduced emergency response times
- Improved heavy vehicle access between the existing highway and Old Coast Road.

1.4 Project objectives

Specific project objectives were developed for the Warrell Creek to Nambucca Heads upgrade. These objectives align with and relate to the overall objectives for the wider Pacific Highway Upgrade Program. These project objectives were reviewed for the proposed modification. The project objectives that are relevant to the proposed modification are:

- Develop solutions for the ultimate grade separation of the Pacific Highway and local road intersections including consolidation of accesses by the use of service roads
- Provide rest areas within the investigation area
- Achieve safe driving conditions on the highway for travel speeds of 110 km/h in rural areas and 80 km/h in urban areas
- Have acceptable roadway capacity for traffic volumes 30 years after opening
- Develop a dual carriageway road that accommodates all vehicles up to and including B-Doubles
- Provide acceptable access to properties
- Maintain highway access during flood conditions
- Integrate input from local communities into the development of the proposal
- Provide connections from the upgraded highway to the key centres of Macksville, Nambucca Heads and Urunga
- Develop delay management strategies to minimise disruption to local and through traffic and maintain access to affected properties and land during construction
- Provide transport infrastructure that is complementary with surrounding land use
- Ensure the project outcomes achieve value for money
- Develop solutions that facilitate the staged construction of the project.

2. Description of the proposed modification

2.1 The Approved Project

The Approved Project consists of the upgrade of about 42 kilometres of the Pacific Highway. The upgrade commences at the northern end of the existing Allgomera deviation of the Pacific Highway, south of Warrell Creek and ends at the existing Waterfall Way interchange to the north. The Approved Project was divided into two sections for construction:

- Nambucca Heads to Urunga Pacific Highway upgrade: A 22 kilometre long project which involves upgrading the highway to a four lane divided road between Nambucca Heads, just south of the railway line and the existing waterfall Way interchange at Raleigh
- Warrell Creek to Nambucca Heads Pacific Highway upgrade: A 20 kilometre project which involves upgrading the highway to a four lane divided road between the Allgomera deviation, south of Warrell Creek and Nambucca Heads, just south of the railway line.

The proposed modification is located within the Warrell Creek to Nambucca Heads Pacific Highway upgrade section of the Approved Project.

The Approved Project includes two grade separated interchanges at:

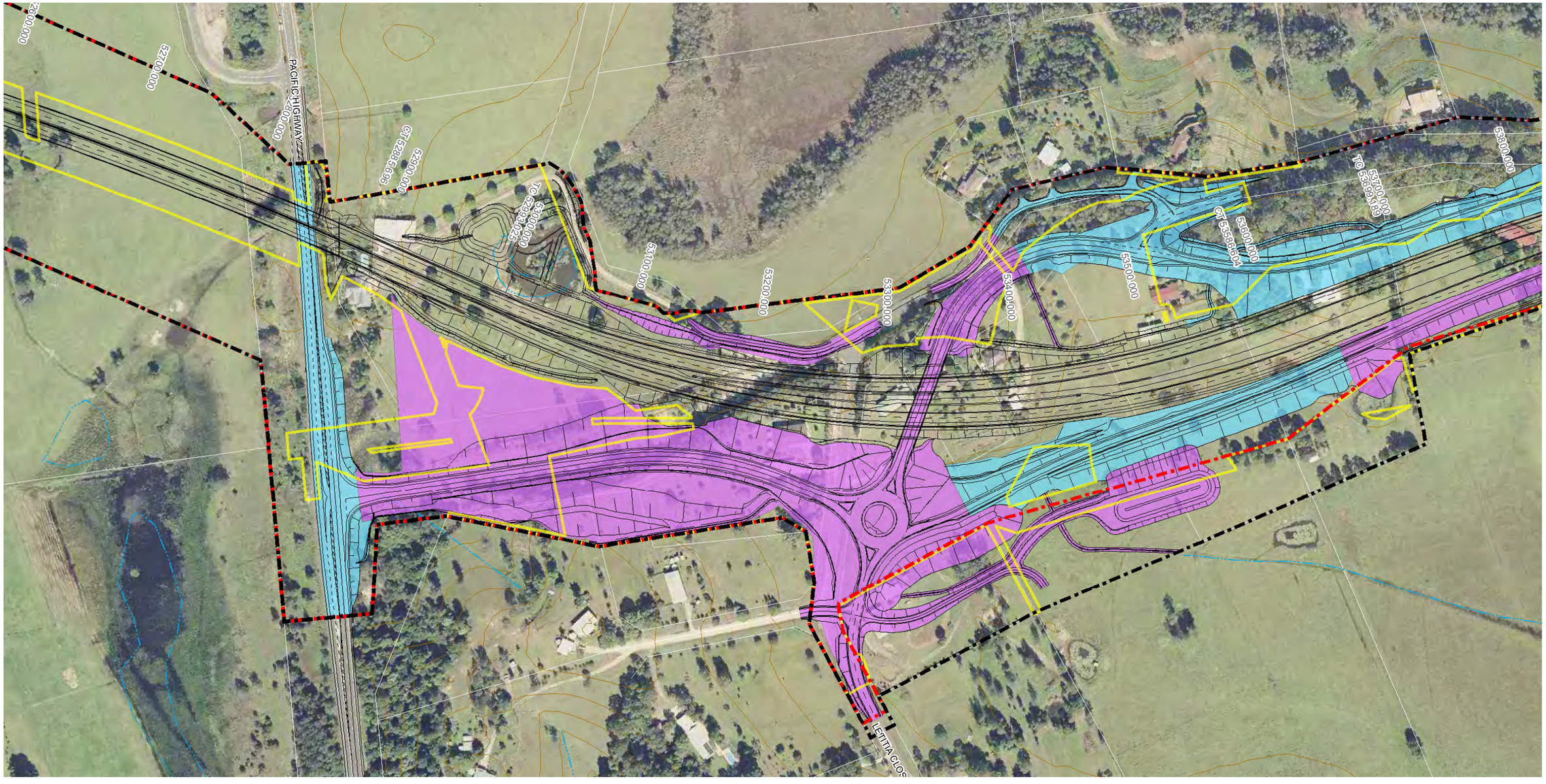
- South Macksville at Bald Hill Road
- Warrell Creek at Browns Crossing Road.

In response to representations received from Nambucca Shire Council and the Macksville Chamber of Commerce, Roads and Maritime announced, in September 2014, that north facing ramps would be included at North Macksville. This new interchange would be provided in addition to the two approved interchanges. This was not part of the Approved Project.

2.2 Description of the proposed modification

This modification environmental assessment addresses the introduction of the North Macksville Ramps. The proposed modification is located at North Macksville to the north of the Pacific Highway and east of Old Coast Road. The concept plan for the proposed modification is shown in **Figure 2-1**. The proposed modification generally includes:

- Construction of North Macksville Ramps at the site of the Old Coast Road overbridge. New ramps would include a northbound on ramp onto the upgraded highway and a southbound off ramp from the upgraded highway
- Connection of the ramps to local roads including:
  - The northbound on ramp connects to the realigned Old Coast Road South with a T-intersection where the priority has been reversed, with access onto the northbound on ramp given priority over traffic from Old Coast Road
  - The southbound off ramp connects with Old Coast Road south and Letitia Close at a new roundabout.
- Upgrade of the existing channelised intersection where Old Coast Road south connects to the existing Pacific Highway
- Relocation of an emergency U-turn facility
- Property access adjustments.



Subject to modification
Subject to consistency review
Approved project boundary (including design refinements)
North Facing Ramps proposed project boundary (03/09/2015 including Design refinements)
Approved clearing limit (including design refinements, MaCR, MiCR) inside proposed boundary only
Design under modification

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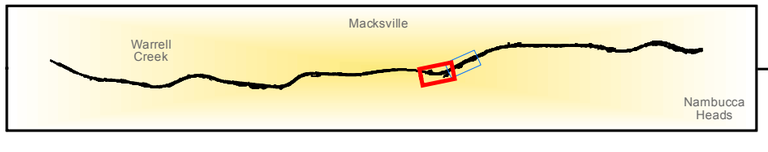

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Assessment reviews (Map 1 of 2)

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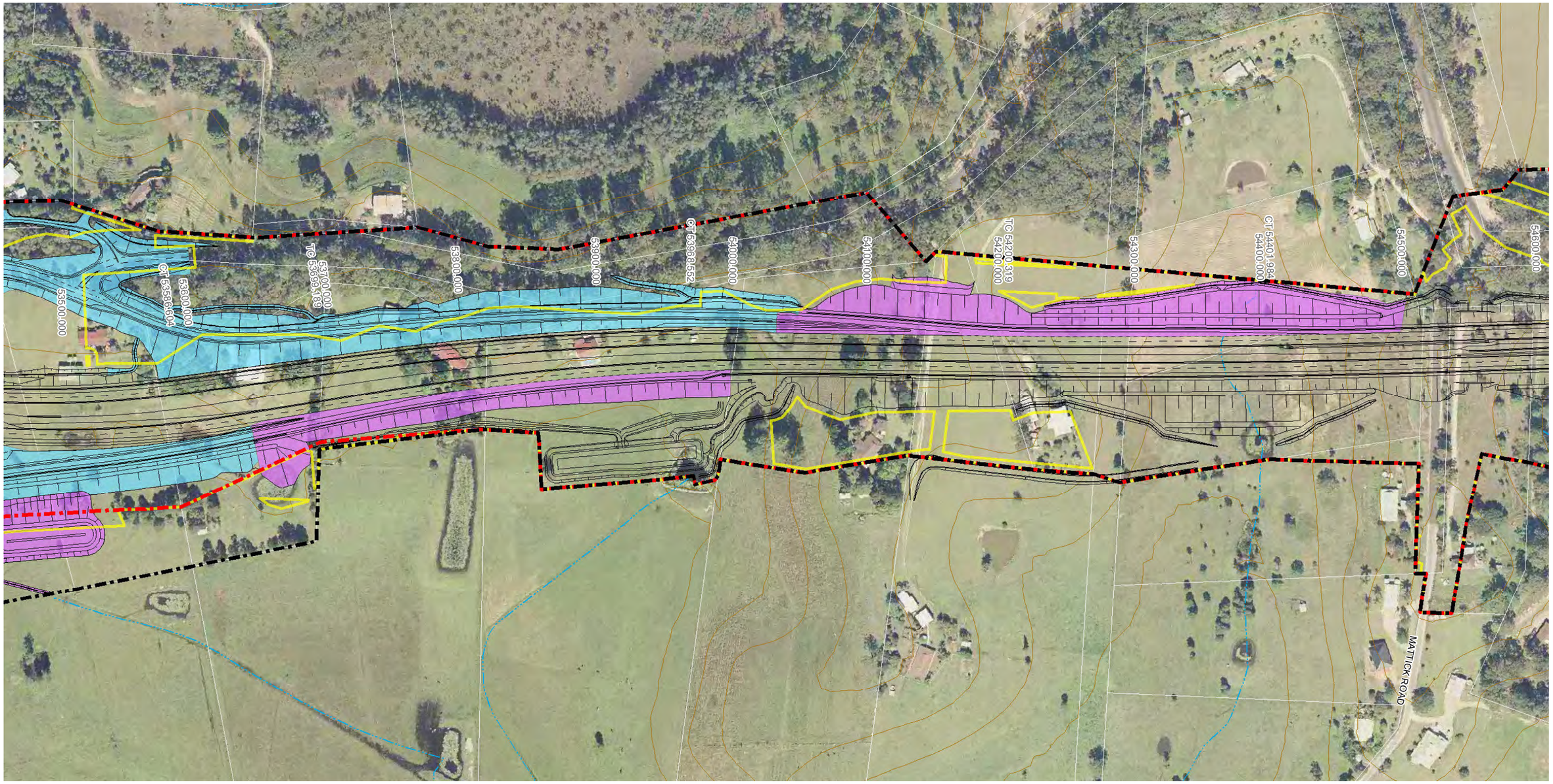

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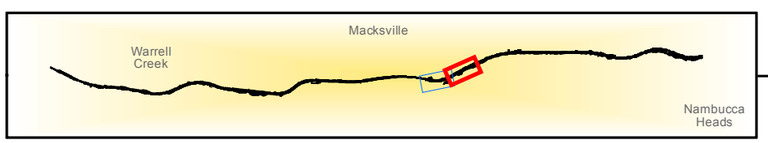

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Assessment reviews (Map 2 of 2)

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2.2.1 Northbound ramp

The northbound on ramp is about 500 metres long from the intersection with the realigned Old Coast Road to the connection to the merge taper (chainage 53,550 to 54,050) as shown in **Figure 2-1**. The cross section of the ramp consists of a 3.5 metre lane with a two metre left hand side shoulder and a one metre right hand side shoulder. The ramp has a 0.9 per cent down-grade which would assist with acceleration for merging with the upgraded highway. The length of the on ramp achieves a truck speed of 75 km/h at the start of the 110 metre merge length.

The northbound on ramp would connect with a section of realigned Old Coast Road as a T-intersection. The proposed Old Coast Road ties-in with the existing Old Coast 100 metres north of the T-intersection. To the south, the proposed Old Coast Road connects in with the Approved Project before crossing the highway at an overbridge. The batters on the western side of road have been designed to reduce vegetation clearance in this area.

The majority of traffic using the ramps would approach from the existing Pacific Highway and the intersection has been designed to give priority to traffic as they enter the ramp. The intersection is T-intersection with priority given to northbound on ramp traffic over southbound traffic from Old Coast Road. Due to the comparatively low turning traffic volumes of southbound traffic on Old Coast Road, for this intersection, no channelised left turn lane is provided. One light would be installed to light the intersection and additional signage would be installed. Current pedestrian and cyclist access would remain unchanged.

2.2.2 Southbound ramp

The southbound off ramp is about 350 metres long from the realigned Old Coast Road to the connection to the exit taper (chainage 53,300 to 53,650) as shown in **Figure 2-1**. The cross section of the ramp consists of a 3.5 metre lane with a two metre left hand side shoulder and a one metre right hand side shoulder. The ramp has a three per cent climbing grade which would assist with deceleration.

A roundabout would connect the southbound off ramp to Old Coast Road and Letitia Close. The T-intersection of the Old Coast Road and Letitia Close, as outlined in the Approved Project, would be modified through line marking and batter refinements. Four additional lights (one light is currently approved) and signage relating to the roundabout and ramps would also be installed. Current pedestrian and cyclist facilities would be upgraded to provide access for crossing Old Coast Road on the southern side of the roundabout and Letitia Close.

The roundabout would control speeds, improve visibility and allows safe and convenient access to Letitia Close from all directions. The roundabout has an 11 metre radius central island and a 20 metre radius inscribed circle, and is designed for B-Double access to and from the ramps.

This proposed modification retains the visual mound on the east side as described in the Approved Project. With the ramp in place the mound extends from chainage 53,425 to 53,650, with the ramp itself effectively extending the visual barrier to the upgraded highway where it is on fill as it climbs to the Old Coast Road roundabout.

2.2.3 Upgrade of existing highway intersection

Upgrade of the existing channelised intersection where Old Coast Road connects to the existing Pacific Highway would be retained and upgraded to allow for heavy vehicles to use the ramps. The lower volume of traffic on the existing highway means that the existing layout with two lanes northbound and separate right and left turn lanes off the highway would meet capacity requirements. The proposed line marking along the existing highway has been revised to allow for the safe merging of southbound traffic along the existing Pacific Highway after exiting Old Coast Road south.

An increase in heavy vehicles using Old Coast Road would require the replacement of an existing culvert about 40 metres north of the intersection.

2.2.4 Emergency U-turn facility

A combined median cross-over, emergency U-turn and heavy vehicle stopping bay was located at Chainage 54,000 in the Approved Project. This would coincide with the location of the proposed modification creating an operational safety issue. In order to future-proof the design for the possible addition of North Macksville Ramps it was agreed prior to the 85% detailed design issue of the Approved Project that the facility would be relocated to Chainage 54,750, which is just north of Mattick Road. The design and construction of the facility is the same as the Approved Project, however the location has changed.

The revised location of the median crossover facility is 500 metres north of the ramp merge and diverge and creates the opportunity for improved emergency vehicle access in the area. In the event of a major incident south of the Nambucca River, the median cross-over would provide quick access to the incident from the north side of the river.

It should however be noted that additional measures beyond the standard signage may need to be taken at the cross-over to prevent illegal (and unsafe) usage of the cross-over by other traffic.

2.2.5 Property access adjustments

As a result of the proposed modification, property accesses would require relocation or adjustments.

A new property access, for four properties, would be constructed at chainage 53,550, on the northern section of the realigned Old Coast Road. The new paved property access, would be constructed to tie into the existing access roads while minimising established tree removal. A hardstand area would provide space for eight garbage bins and four letter boxes and a nearby single street light, would provide a visual cue to provide safe access to the four properties.

3. Legislative and planning framework

3.1 Environmental Planning and Assessment Act 1979

3.1.1 Approved Project context

On 5 December 2006, the Minister for Planning under 75B(1) of the EP&A Act ordered 13 components of the Pacific Highway upgrade, including the Warrell Creek to Urunga Pacific Highway upgrade, to be a project to which Part 3A of the Act applies.

The EP&A Act also provides that any project to which Part 3A applies can be declared to be a Critical Infrastructure project if it is of a category that, in the opinion of the Minister for Planning, is essential for the State for economic, social or environmental reasons. On 5 December 2006, the Minister for Planning also declared the same 13 components of the Pacific Highway upgrade to be essential for the State for economic and social reasons. The Warrell Creek to Urunga Pacific Highway upgrade was therefore deemed to be a Critical Infrastructure project under Section 75C of the Act.

The order and declaration were gazetted in the NSW Government Gazette No.175 on 8 December 2006.

The project (excluding the proposed modification) was approved by the Minister for Planning under Part 3A of the EP&A Act on 19 July 2011. Any refinements to the project which are not consistent with the Approved Project must be approved by the Minister for Planning under Section 75W(2) of the Act.

3.1.2 Proposed modification

The Roads and Maritime considers that the proposed modification outlined in this modification environmental assessment is not consistent with the approval for the Warrell Creek to Urunga Pacific Highway upgrade project. Accordingly, the Roads and Maritime propose to seek a modification of the Minister's approval under Section 75W(2) of the EP&A Act.

This modification environmental assessment to the Approved Project has been prepared for the purposes of seeking approval for the proposed North Macksville Ramps as a modification to the Warrell Creek to Urunga Pacific Highway upgrade project.

3.1.3 Director General's requirements

As part of the Part 3A approvals process, the Minister for Planning issues Director General's requirements (DGRs) also known as environmental assessment requirements. The DGRs identify the key issues for the project which are to be addressed within the environmental assessment.

Additional DGRs were not issued for this modification environmental assessment, and as such, the Roads and Maritime has adopted the DGRs from the Warrell Creek to Urunga Pacific Highway upgrade environmental assessment as the key issues for this modification environmental assessment. This modification report addresses the relevant DGRs.

3.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The project was referred to the Commonwealth Minister for the Environment in accordance with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC

Act). The Minister's decision (2013/7101) was received on 11 December 2014 subject to a number of conditions being met.

There have been two modifications of the approval since 11 December 2014. Modification 001 related to the revision numbers of the Koala and Spotted-tail Quoll Management Plans. Modification 002 was approved on 11 May 2015 and revised the wording of condition 1 to include additional area of Freshwater Wetland endangered ecological community.

A description of the likely impacts of the proposed modification against the Minister's conditions is discussed in **Section 6.6**.

3.3 Other environmental legislation

Other environmental legislation which would be relevant to the proposed modification has been reviewed. The review confirmed that there are no additional requirements over and above those already identified in the Warrell Creek to Urunga Pacific Highway upgrade environmental assessment.

4. Consultation

4.1 Community consultation

The North Macksville Ramps Preferred Option Report (Sep 2015) (Preferred Option Report) was placed on public display between 16 September and 12 October 2015.

Roads and Maritime prepared the Preferred Option Report to present and describe the three short-listed ramp options, report on potential impacts, compare the options, and outline how the Preferred Option was selected.

A total of 144 submissions were received in response to the display of the Preferred Option Report comprising one government agency and 143 from the community.

A Submissions Report was prepared (**Appendix B**) and each submission was examined individually to understand the issues being raised. The issues raised in each submission were extracted and collated, and corresponding responses to the issues provided. Where similar issues were raised in different submissions, only one response was provided.

From the submission topics, five main categories were identified regarding the North Macksville Ramps. These include:

- Project development process
- Design change suggestions
- Landscape and visual amenity
- Community consultation
- Noise and vibration.

Comments were considered and where appropriate further refinements were made to the design. These refinements include:

- Realignment of Old Coast Road bridge approach and the road immediately west of the upgraded highway to maximise the distance from private properties, minimise vegetation clearing, and maximise revegetation areas
- The realignment of Letitia Close to improve the safety at the roundabout
- An additional section of visual screening along the southbound off-ramp to reduce the impacts of headlight intrusion
- Addition of a vegetated visual mound on Letitia Close near the south east corner of the roundabout to reduce the impacts of headlight intrusion
- Increased shoulder width on Old Coast Road to accommodate cyclists
- Selection of specialised road lighting to reduce light spillage into adjacent properties
- Relocation of the school bus stop into Letitia Close
- Refinements to Old Coast Road pavement surface to reduce noise.

A more detail description of the refinements are available in **Appendix B**.

5. Options development

5.1 Option development

The introduction of the proposed modification required the examination of alternatives as to how the ramps could be incorporated to ensure that a range of project objectives were best realised. In August 2014, Pacifico developed a number of potential arrangements for review, from which Roads and Maritime selected three options for further investigation.

These three options were further developed and are outlined below. More detail on each option can be found in the Roads and Maritime North Macksville – North Facing Ramps Options Assessment (May 2015).

5.1.1 Option 1

Option 1 was closely aligned to the Approved Project layout which included realignment of Old Coast Road to pass over the upgraded highway. Option 1 was a comparatively simple addition to the Approved Project by adding north facing ramps which connected as T-intersections to the realigned Old Coast Road. At the new intersections priority would have been given to through traffic on the Old Coast Road.

The existing channelised intersection where Old Coast Road connects to the existing Pacific Highway would be retained. With the lower volume of traffic on the existing highway, the existing layout with right and left turn lanes off the highway would meet capacity requirements.

5.1.2 Option 2

Option 2 was a relatively minor variation on Option 1 which aimed at overcoming some of the alignment difficulties in Option 1. It still included realignment of the Old Coast Road to pass over the upgraded highway, and the north facing ramps connecting to the realigned Old Coast Road. The main difference was that the Letitia Close and off ramp intersections connected at a roundabout east of the upgraded highway, allowing the alignment of the bridge over the upgraded highway to be straightened. The other change was that west of the upgraded highway, the priority had been reversed, with access onto the northbound on ramp given priority over traffic from Old Coast Road central.

The existing channelised intersection where Old Coast Road connected to the existing Pacific Highway would be retained. As with Option 1, the lower volume of traffic on the existing highway meant that the existing layout with right and left turn lanes off the highway would meet capacity requirements.

5.1.3 Option 3

Option 3 was quite different from Options 1 and 2. Rather than realigning Old Coast Road onto a new bridge over the upgraded highway, a new connection for Old Coast Road was provided on the west side of the upgraded highway. This connection also provided access between the existing Pacific Highway and the existing Old Coast Road to the north. The proposed treatment of this intersection is a priority T-intersection with channelised right turn and left turn lanes on the highway.

On the eastern side of the ungraded highway, the off ramp connected to the redundant section of Old Coast Road and an intersection allows for connectivity to Letitia Close to be retained. The existing intersection where the redundant section of the Old Coast Road connected to the existing Pacific Highway on the east would be retained with two lanes northbound and separate

right and left turn lanes off the existing highway. Letitia Close would have connected as a T-intersection with priority given to traffic from the off ramp.

This option required the construction of a new connecting road to the existing highway on the west side of the upgraded highway, close to the existing intersection on the east side. This would have avoided the need to construct a bridge for Old Coast Road over the upgraded highway.

5.1.4 Emergency U-turn facilities

The proposed location of the emergency U-turn facility was the same for each option and was about 500 metres north of the ramp merge and diverge.

5.2 Selection of the preferred option

5.2.1 Options assessment workshop

A detailed Options Development Report was prepared by Pacifico in consultation with Roads and Maritime. The three options presented then underwent an assessment by Roads and Maritime to test their performance against a range of agreed criteria.

To determine the preferred option, an Options Assessment Workshop, using a Value Management methodology, was held on 20 May 2015.

The agreed purpose of the workshop was to:

- Obtain an understanding of the project and the planning to date
- Identify, discuss and agree to criteria to be used to assess the options
- Review and then assess the options against the agreed options assessment criteria
- Draw conclusions, select a preferred option and agree to key actions arising.

5.2.2 Options assessment criteria

The purpose of the assessment was to differentiate between the options rather than undertake an absolute assessment of all project criteria for each option. Therefore, only those criteria that highlighted differences were considered in the options assessment workshop.

An assessment criteria to comparatively assess these differences was developed. The assessment criteria was divided into four key perspectives including: constructability and timing, functionality, community impacts and environmental impacts. Each criterion had a number of key descriptive aspects to help assess points of difference between the ramp options.

Scoring for each of the options was undertaken relative to the Approved Project. The scoring scale was from —5 to +5, to acknowledge that some factors, for certain options had negative impacts rather than positive impacts compared to the Approved Project.

5.2.3 The preferred option

The weighted assessment concluded that Option 1 and Option 2 both scored 95 and Option 3 scored a negative 225. Each option was scored relative to the Approved Project and generally for each criteria the results were:

- Constructability and timing: Option 1 and 2 scored highest
- Functionality (traffic efficiency and road user safety): Option 2 scored highest
- Community impacts: Option 1 scored highest
- Environmental impacts: Option 1 scored highest.

As Option 1 and 2 scored equally in the assessment, the workshop then looked at each criteria and descriptive aspects in more detail to determine the preferred option. Option 2 was chosen as the preferred option as:

- It was assessed as better than Option 3 for the constructability and timing criteria and equal to Option 1
- It was assessed as the best option for the Functionality criteria (traffic efficiency and road user safety). In particular it was the preferred option as:
  - It scored highest in road user safety
  - It best caters for traffic growth and long term functionality.
- It was assessed as having less community impacts than Option 3 but more noise and light impacts (due to the roundabout) than Option 1
- It was assessed as having less environmental impacts that Option 3 however it has slightly greater environmental impacts than Option 1 due to additional clearing of native vegetation.

In summary Option 2 was chosen as the preferred option as it is the safest option and improves functionality and road alignment, and is the best option for the long term performance of the North Macksville Ramps.

5.2.4 Refinement of the preferred option

During the option assessment workshop a number of improvement opportunities were identified for the preferred option. Option 2 was compared to Option 1 and the criteria where Option 2 scored less were identified, these were:

- Traffic / accessibility disruptions
- Noise impacts
- Light impacts and intrusion
- Vegetation clearing.

These criteria were examined and discussed in more detail and a number of specific opportunities and design refinements, that could be investigated and adopted in the design and construction phases, were identified for the preferred option. These opportunities and mitigation measures include:

- Extra earth mounds and screenings – would help to address headlight intrusion; eg use surplus soil to create a mound between the roundabout and residences
- Review the design alignment, including the skew angle of the bridge to reduce vegetation clearing
- Put plantings on top of the mounds to increase natural screening.

As part of the concept design development process these opportunities were investigated and a refined preferred option (see **Section 2.2**) was designed. Preliminary property accesses were

also considered and included in the refinement of the design. The refinements that were made included:

- The bridge location was moved about 10 metres to the north and the skew angle increased from 15 degrees to 21 degrees. This allowed for the Old Coast Road, on the western side of bridge, to be realigned and reduce the vegetation clearing required for the Moist Open Forest-White Mahogany-Grey Gum vegetation community which is listed as potential habitat for the Koala, Grey-headed Flying Fox, Spotted-tail Quoll and Milky Silkpod these are federally protected in terms of the EPBC Act. This also moved the road further away from three residences on the western side of Old Coast Road reducing their noise impacts (compared to the Option 2 design). The change in skew angle in the bridge caused the location of the roundabout to move about 12 metres to the south east to maintain sight distance and achieve design criteria
- Moving the roundabout and lowering and realigning the south section of Old Coast Road on the eastern side of the bridge. This increased the depth of the cutting between chainage 53,000 and 53,150, providing some needed additional material, however this does increase vegetation removal of the Regrowth Swamp Oak vegetation community in this area. There would be no change in noise impacts for nearby properties
- Plantings for the approved design were reviewed and these could be incorporated into the landscaping and urban design reports and further refined during detailed design.

6. Environmental assessment

6.1 Context and scope of modification environmental assessment

The Warrell Creek to Urunga Pacific Highway upgrade project environmental assessment (Project EA) details the potential environmental impacts of the project and provides proposed mitigation and management measures.

The Project EA was publicly exhibited and following public exhibition, submissions from stakeholders were received and addressed by Roads and Maritime in the Submissions Report which was lodged with the Director-General in November 2010.

After consideration of the Project EA and Submissions Report, the then Minister for Planning approved the Warrell Creek to Urunga Pacific Highway upgrade under Section 75J Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) on 19 July 2011 subject to the Minister's Conditions of Approval (CoA) being met.

Subsequent to the EP&A Act approval, Roads and Maritime submitted a referral to the Australian Government Department of the Environment under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). On 23 January 2014, the project was declared to be a controlled action, and assessment and approval under the EPBC Act was required before the project could proceed.

After consideration of the referral and additional information provided by Roads and Maritime, approval under the EPBC Act was granted on 11 December 2014 subject to conditions being met. There have been two modifications of the EPBC approval.

Mitigation and management measures for the Approved Project are also outlined in the Minister's Conditions of Approval.

As this modification environmental assessment focuses specifically on the addition of north facing ramps, only the potential environmental impact over and above those assessed and approved in the Project EA associated with this proposed modification are assessed. Additional mitigation and management measures (to those identified for the Approved Project) are identified where required and feasible.

The scope of the modification environmental assessment is to assess the potential environmental impacts that would result from the construction and operation of the proposed modification and to identify proposed measures to mitigate these potential impacts. In assessing the potential impacts, the issues identified in the Director General's Requirements (as mentioned in **Section 3.1.3** of this report) are the key issues in this environmental assessment. The modification environmental assessment builds on the Warrell Creek to Urunga Pacific Highway upgrade environmental assessment, submissions report, the federal referral and the Preferred Option Report (**Appendix A**) and subsequent Submissions Report (**Appendix B**).

The following sections of this modification address the key issues for the proposed modification, assessing both construction and operational impacts.

6.2 Traffic and transport

6.2.1 Introduction

This section addresses the traffic and transport impacts for the proposed modification. Traffic and transport impacts for the whole of the Approved Project were addressed in Chapter 17 of

the Project EA and a traffic and transport assessment report was included in Appendix G (Working Paper 6). A specialist traffic assessment report was undertaken as part of the options development assessment. The information in the section below was obtained from that assessment.

6.2.2 Methodology

The traffic assessment used a SIDRA intersection analysis (SIDRA is software used for intersection modelling), using outputs from the traffic assessment presented within the *"Pacific Highway Upgrade, Warrell Creek to Urunga, Traffic Modelling Final Report"* dated May 2012. This ramp traffic assessment is based on the same Transcad assignment model that was used for the Project EA.

The process for determining traffic volumes for the proposed modification included:

- Reviewing preliminary outputs from sensitivity tests using the Transcad assignment model
- A check comparing modelled traffic volume estimates at the Bald Hill Road interchange ramps both with and without the North Macksville Ramps, and comparing these to reported estimates at the North Macksville Ramps and Bald Hill Road interchange
- Review by comparing modelled traffic volume estimates with the matrix demands between origins / destinations in proximity to the proposed modification.

Sensitivity tests were performed using the Transcad assignment model and the model was found to be capable of replicating the estimated volumes around the proposed modification.

6.2.3 Existing environment

The roads in the area around the proposed modification provide both regional and local access. Regional roads are sealed and provide access between urban areas, and connections to other centres outside the proposed modification area. The existing Pacific Highway is the main regional road and is predominantly a two-lane single carriageway with a general speed limit of 100 km / h, except where it passes through built-up areas such as Macksville. Local roads (Old Coast Road and Letitia Close) are sealed and provide access to local residences.

Using the methodology described above, traffic volumes on the main links have been estimated as shown in **Table 6-1**. These volumes are the outputs from the Transcad model that was shown to perform closest to the origin destination matrix and to best correlate with the Bald Hill Interchange volumes and the sensitivity checks applied.

Table 6-1 2036 AADT Transcad model volume outputs

Location	Section	Direction	AADT* Approved Project			AADT* with ramps		
			LV	HV	Total	LV	HV	Total
North Macksville Ramps	On ramp	Northbound	N/A	N/A	N/A	424	5	429
	Off ramp	Southbound	N/A	N/A	N/A	391	55	446
Macksville Bridge		Northbound	2,104	110	2,215	2,371	114	2,485
		Southbound	1,738	158	1,896	1,962	192	2,154
Bald Hill Interchange	Off ramp	Northbound	652	1	653	652	1	653
	On ramp	Northbound	4,191	1,218	5,408	3,905	1,214	5,119
	Off ramp	Southbound	5,717	903	6,620	5,478	870	6,348
	On ramp	Southbound	288	5	293	288	5	293
Existing Highway	West of North Macksville Ramps	Northbound				1,903	44	1,947
		Southbound				1,503	106	1,609
	East of North Macksville Ramps	Northbound				1,479	39	1,518
		Southbound				1,112	51	1,163
New Highway	South of Upper Warrell Creek Interchange	Northbound	5,059	1,040	6,099	5,059	1,040	6,099
		Southbound	4,447	1,155	5,602	4,443	1,155	5,597
	Upper Warrell Creek Interchange to Bald Hill Interchange	Northbound	4,044	592	4,636	4,044	592	4,636
		Southbound	3,001	623	3,624	2,997	623	3,619
	Bald Hill Interchange (between Off and On ramps)	Northbound	3,392	591	3,983	3,392	591	3,983
		Southbound	2,713	618	3,331	2,709	618	3,326
	Bald Hill - North Macksville Ramps	Northbound	7,583	1,809	9,391	7,297	1,805	9,102
		Southbound	8,430	1,521	9,951	8,187	1,487	9,674
	North of North Macksville Ramps	Northbound	7,583	1,809	9,391	7,721	1,810	9,531
		Southbound	8,430	1,521	9,951	8,578	1,542	10,120

* AADT: Annual Average Daily Traffic

For traffic capacity calculations the 100th Highest Hourly Volumes have been derived from the modelling as shown in the following **Table 6-2** below.

Table 6-2 2036 AADT and 100th highest hourly volumes

Road	Section	Direction	100th Highest Hourly Volumes		
			Light Vehicles	Heavy Vehicles	Total
North Macksville Ramps	On Ramp	Northbound	40	0	40
	Off Ramp	Southbound	37	5	42
New Highway	Bald Hill to Macksville	Northbound	686	170	856
		Southbound	770	140	909
	North of North Macksville Ramps	Northbound	726	170	896
		Southbound	806	145	951
Existing Highway	West of North Macksville Ramps	Northbound	179	4	183
		Southbound	141	10	151
	East of North Macksville Ramps	Northbound	139	4	143
		Southbound	105	5	109

6.2.4 Impact assessment

6.2.4.1 Construction traffic impacts

The proposed modification area is included in the Project EA and therefore potential impacts were considered in the approved environmental assessment. Construction traffic impacts for the project (including the proposed modification area) were considered in Chapter 17 of the Project EA. Additional construction impacts could include a minor increase of construction vehicles within the proposed modification area and depending on construction staging some increase in duration. These would be temporary and impacts would be considered negligible as the area would be managed through the Approved Project Traffic Management Plan.

6.2.4.2 Operational traffic impacts

An operational traffic analysis has been carried out for the proposed modification. While some discrepancies were found in adapting the model to incorporate the ramps, the forecast volumes on the ramps are relatively low and would be unlikely to change significantly using a different traffic model. The forecast volumes are considered low and impacts to existing local traffic would be negligible to minor.

The traffic analysis shows that the vast majority of traffic that would use the proposed modification has an origin or destination west towards Macksville on the existing Pacific Highway.

The predicted traffic volumes for the proposed modification are provided in **Table 6-1**. As the proposed modification would not generate any additional traffic, but rather would be used by traffic already on the highway, the annual average daily traffic volumes identified would not increase from traffic volumes for the Approved Project.

The proposed modification would:

- Improve connectivity between Macksville and areas to the north, and in particular the proposed modification would provide improved connectivity between Macksville and Nambucca Heads
- Improve connectivity to Macksville as the addition of the proposed modification, in conjunction with the Bald Hill Road interchange to the south, would allow both northbound and southbound vehicles using the upgraded highway to stop at Macksville more easily
- Improve utilisation of the infrastructure proposed between Macksville and the Nambucca Heads interchange by providing the proposed modification
- Result in safer and faster travel onto the upgraded highway for Macksville traffic travelling north
- Improve access to and from Macksville by emergency services and reduced emergency response times
- Improve heavy vehicle access between the existing highway and Old Coast Road.

6.2.4.3 Intersection analysis

An analysis of the future intersection performance during the morning and afternoon peak hour periods has been undertaken for the proposed modification using SIDRA. Level of Service (LoS) is a qualitative measure that is used to assess the traffic efficiency of a road or intersection. LoS ranges from 'LoS A' which generally indicates free flowing traffic conditions to 'LoS F' which typically indicates fully congested traffic conditions. The LoS was modelled to be a LoS A at all intersections for the proposed modification.

The design hourly turning volume at the new intersection located with the northbound ramp is about 29 vehicles per hour and low through volume (42 vehicles per hour). Due to these comparatively low turning traffic volumes, no channelised left turn lane is needed.

The intersection of Old Coast Road South and the Existing Pacific Highway adopts a similar layout to the existing configuration with some localised widening and new line marking.

6.2.5 Mitigation/ management measures

Mitigation measures that have been identified in the Project EA are sufficient to address potential construction impacts from the Approved Project and the proposed modification. No additional mitigation measures are proposed.

6.3 Noise and vibration

6.3.1 Introduction

A noise assessment has been undertaken for the potential noise impacts from the proposed modification.

This noise assessment is based on the same approach and methodology adopted for the Approved Project in the Project EA. An additional operational noise assessment report was prepared to comply with the conditions of approval, that document (Warrell Creek to Nambucca Heads Operational noise modelling and assessment, Roads and Maritime Services, March 2015) has been used as the comparison base. This assessment addresses the same items that were addressed in the Project EA.

6.3.2 Methodology

The proposed modification was incorporated into the Detail Design acoustic model. As the assessment was to compare against the Project EA, the superseded Environmental Criteria for Road Traffic Noise was used to determine the appropriate noise criteria. Criteria for sensitive receivers around the proposed modification area are detailed in the following section.

6.3.2.1 Noise criteria

Under the Environmental Criteria for Road Traffic Noise (ECRTN), road developments are classified as either “new road” or “redevelopment of an existing road”. The relevant criteria set out in **Table 6-3** will apply.

Table 6-3 ECRTN Criteria for operational traffic noise – residences

Type of development	Noise level criteria		Where criteria are already exceeded
	Day (7.00am-10.00pm)	Night (10.00pm-7.00am)	
New freeway or arterial road corridor	LA_{eq},15hr 55dB(A)	LA_{eq},9hr 50dB(A)	The new road should be designed so as not to increase existing noise levels by more than 0.5dB.
Redevelopment of existing freeway/arterial road	LA_{eq},15hr 60dB(A)	LA_{eq},9hr 55dB(A)	In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2dB.

Sensitive receivers that would be affected by noise from the proposed modification are either affected by a new road or a redevelopment. Based on this criteria, a target noise goal was identified for each sensitive receiver.

6.3.2.2 Traffic volumes

Traffic volumes for local roads and the proposed ramps have been sourced from the 2026 traffic volumes. For the purposes of the noise modelling the AADT traffic volumes for the year 2026 were split into estimated daytime 15 hour and night-time 9 hour volumes using the same day/night splits that were adopted in the Project EA. Traffic volumes used for the night-time criteria assessment are shown in **Table 6-4**.

Table 6-4 2026 Traffic volumes used for the acoustic assessment

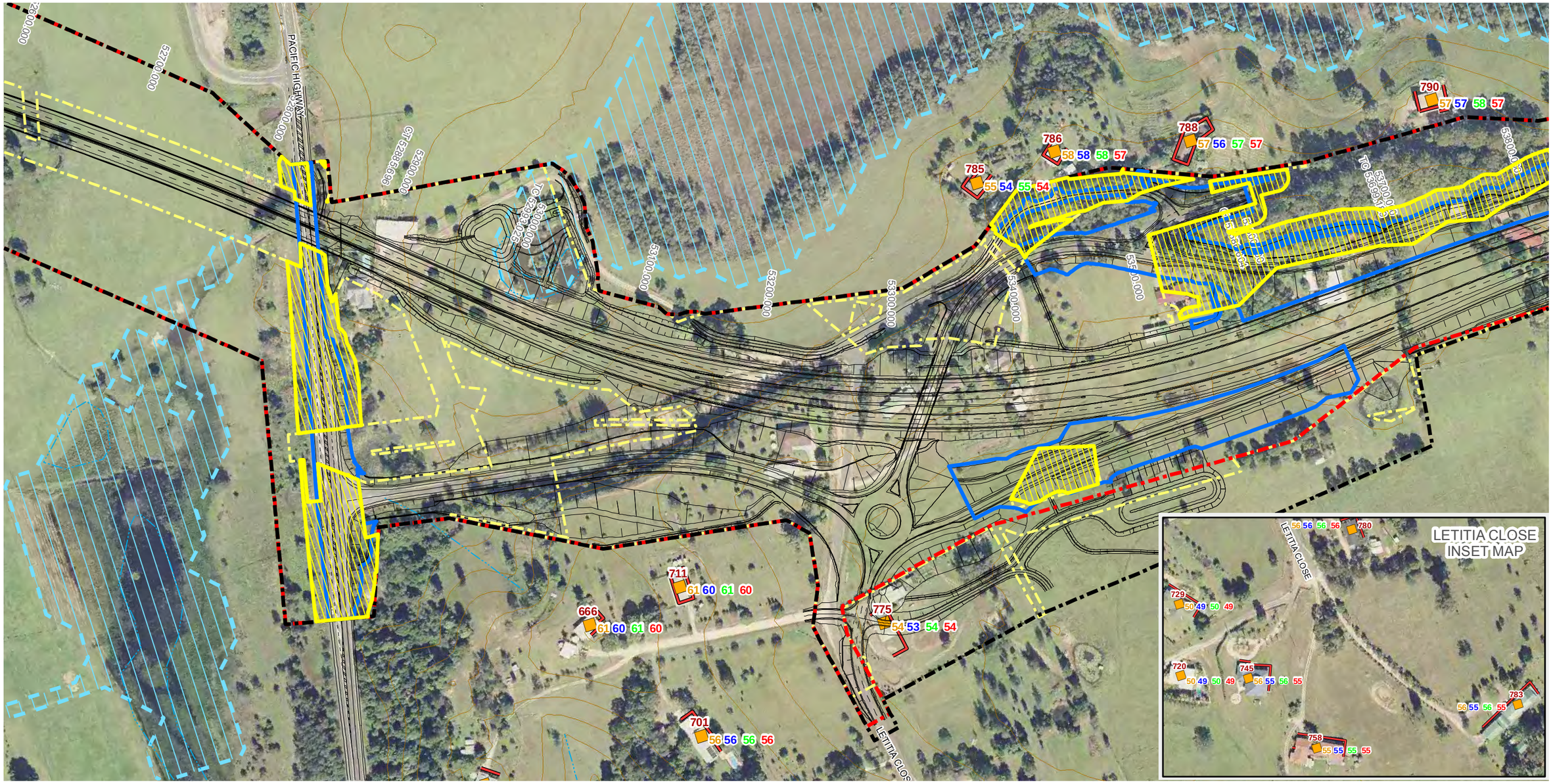
Location	Section	Direction	Day – 7am to 10pm (15hr)			Night – 10pm to 7am (9hr)		
			Total vehicles	% Heavy vehicles	Speed	Total vehicles	% Heavy vehicles	Speed
Proposal	On Ramp	Northbound	235	1	80	34	6	80
	Off Ramp	Southbound	239	10	80	47	36	80
Upgraded Highway	Bald Hill to Macksville	Northbound	4,796	16	115	1,122	50	120
		Southbound	5,145	13	115	1,091	43	120
	North of Macksville Interchange	Northbound	5,031	16	115	1,156	49	120
		Southbound	5,384	13	115	1,139	42	120
Existing Highway	West of Macksville Interchange	Northbound	1,306	1	50/70/100	192	8	50/70/100
		Southbound	1,063	4	50/70/100	175	20	50/70/100
	East of Macksville Interchange	Northbound	1,017	2	50/70/100	151	9	50/70/100
		Southbound	774	3	50/70/100	121	14	50/70/100
Old Coast Road	North of Interchange (excluding ramp traffic)	Northbound	230	7	60	43	37	60
		Southbound	230	7	60	43	37	60

6.3.3 Impact assessment

6.3.3.1 Construction noise

The proposed modification would result in additional construction activities being undertaken near Letitia Close and Old Coast Road. These activities could result in an increase in construction noise and vibration impacts, with increased personnel and truck movements involved. However, as the works would be undertaken within the Approved Project boundary, there is not expected to be an increase in the number of sensitive receivers that would be subject to noise levels that exceed the construction noise criteria.

The closest sensitive receivers are shown in **Figure 6-1** and are within about 20 metres of the proposed modification. The receivers west of the Upgraded Highway along Old Coast Road would experience the largest impact. It is unlikely that construction of the proposed modification would be undertaken at the same time as the realignment of Old Coast Road and construction of the main line. The proposed modification would extend the construction phase and therefore the time that receivers would be exposed to construction noise.



Additional clearing required under Modification for North Facing Ramps
Area of design subject to modification
Approved clearing limit (including design refinements, MaCR, MiCR) inside proposed boundary only
North Facing Ramps proposed project boundary (03/09/2015 including Design refinements)
Approved project boundary (including design refinements)
5m contours
20yr ARI flood
Natural drainage

Acoustic

Facade treatments to noise receivers
Sensitive noise receiver

Sensitive Noise Receiver Labels

5 1 Day without North Facing Ramps
5 1 Night without North Facing Ramps
5 1 Day with North Facing Ramps
5 1 Night with North Facing Ramps

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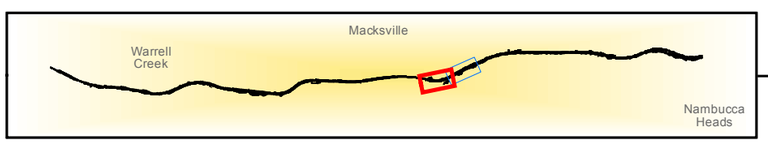

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Noise
(Map 1 of 2)

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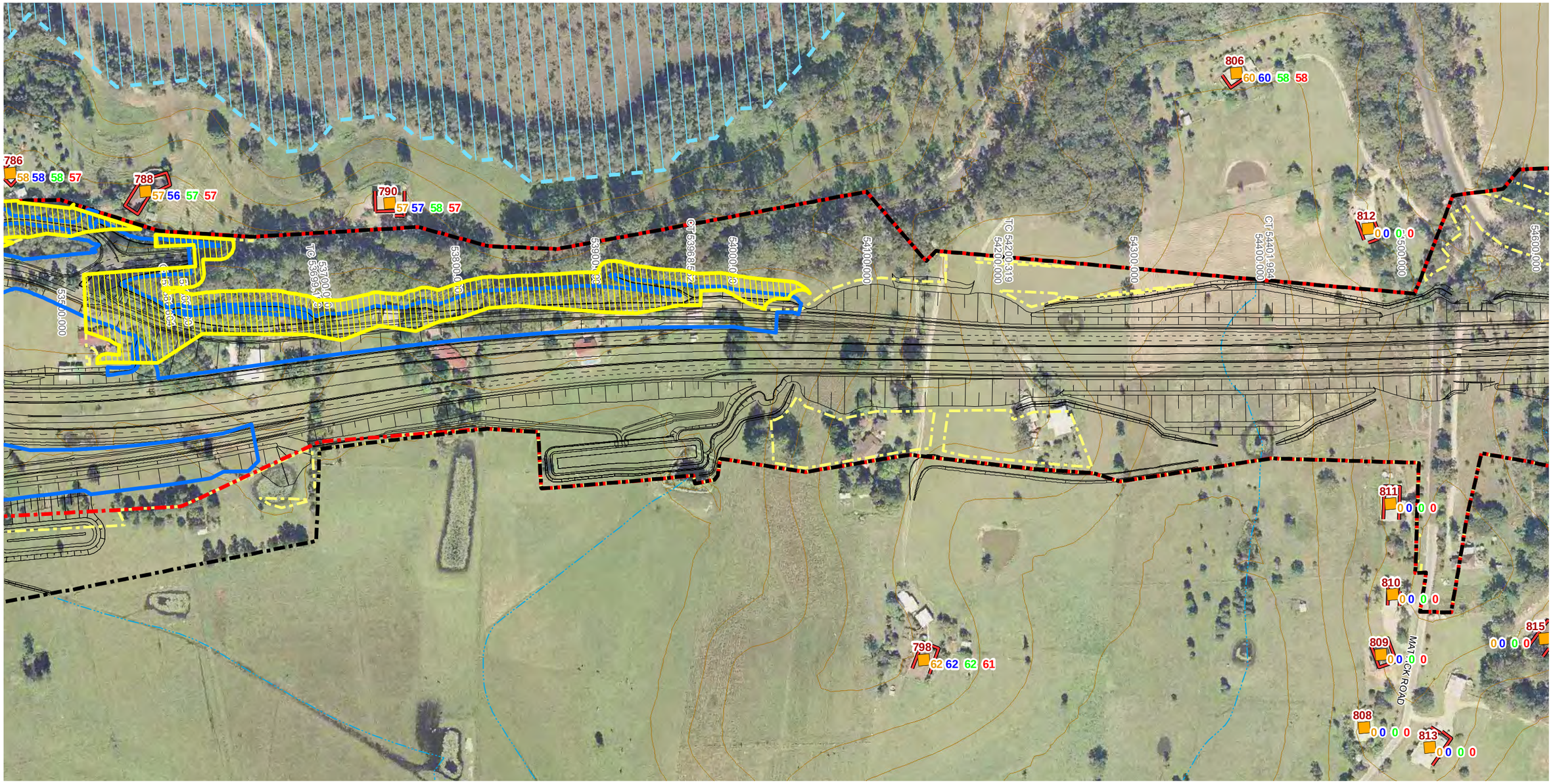

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Acoustic

Facade treatments to noise receivers
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Sensitive Noise Receiver Labels

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5 1 Night without North Facing Ramps
5 1 Day with North Facing Ramps
5 1 Night with North Facing Ramps

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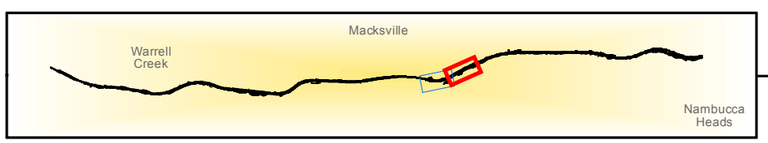

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Noise
(Map 2 of 2)

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6.3.3.2 Operational noise

External noise predictions were made at one metre from facades most affected by traffic noise for daytime LAeq(15hr) and night-time LAeq(9hr) periods, comprising future existing (2016), opening year (2016) and design year (2026) operational scenarios. Only the properties that are potentially affected by the Macksville Interchange were assessed. As the period of greatest noise impact was found to be the design year (2026) night time period, this has been the focus of the assessment. The results of the loudest facade noise levels for each receiver are shown in **Table 6-5** and **Figure 6-1**. Noise levels marked in bold are where noise levels have increased (nearest whole number) due to the proposed modification.

Table 6-5 Comparison of noise levels between the Approved Project and the proposed modification

Receiver ID	Target criteria[1]		Approved project (March 2015 assessment)		Proposed modification	
	Day	Night	Day	Night	Day	Night
639	55	50	54	54	54	54
666	55	50	61	60	61	60
701	55	50	56	56	56	56
711	55	50	61	60	61	60
720	60	55	50	49	50	49
729	55	50	56	55	56	55
745	55	50	55	55	55	55
758	55	50	54	53	54	54
775	55	50	56	56	56	56
780	55	50	56	55	56	55
783	55	50	55	54	55	54
785	55	50	58	58	58	57
786	55	50	57	56	57	57
788	55	50	57	57	58	57
790 Ground floor	55	50	62	62	62	61
790 First floor	55	50	63	63	64	63
798	55	50	55	55	55	55
801	55	50	54	54	55	54
806	55	50	60	60	58	58

[1] *Due to the influence of the Existing Highway the target noise criteria was determined as "Redevelopment of an existing freeway" for some areas of the Approved Project. These properties use the daytime criteria of 60 dB(A) and night-time criteria of 55 dB(A).*

Table 6-5 shows that when compared to the Approved Project, only slight noise level increases are predicted at receiver IDs 758, 786, 788, 790 and 801. On average, noise levels have remained unchanged and have not increased by more than 1 dB(A) at any facade for any receiver.

All the properties above, with the exception of receiver ID 720, have been identified as requiring at house noise treatment as part of the Approved Project. As receiver ID 720 is within the noise criteria, with no additional increase in noise levels anticipated due to the proposed modification, no at-property treatment is required.

6.3.4 Mitigation/ management measures

Mitigation measures that have been identified in the Project EA are sufficient to address the noise impacts from the Approved Project and the proposed modification. No additional mitigation measures are proposed.

6.4 Aboriginal and non-Aboriginal heritage

6.4.1 Introduction

Aboriginal and non- Aboriginal heritage impacts and significance were discussed in the Project EA in Chapter 15 and Section 19.3.

A specific Heritage due diligence assessment (Jacobs, 2015) was undertaken as part of the ramp options development process in April 2015. This assessment surveyed the area of the proposed modification including a 50 metre buffer measured from the footprint of the ramp options.

6.4.2 Methodology

The desktop assessment for Aboriginal and non- Aboriginal heritage included:

- A search and review of the Aboriginal Heritage Information Management System (AHIMS)
- A search and review of the Nambucca Local Environmental Plan (LEP) 2010, the NSW State Heritage Register, Australian Heritage Database, the Roads and Maritime Section 170 Heritage and Conservation Register, National Heritage List, Commonwealth Heritage List, Register of the National Estate and World Heritage List
- Use of the ArcGIS system established for this assessment to analyse:
  - Updated data from AHIMS and the relevant historic heritage registers
  - Heritage data from earlier assessments, including areas of potential archaeological deposits (PAD) and potential archaeological sensitivity (PAS), Aboriginal heritage sites and Aboriginal cultural places and historical heritage sites
  - Aerial imagery.
- The proposed modification area was subsequently considered in relation to the Aboriginal and historical heritage data identified above. The following types of intersects were identified:
  - Any intersects between the proposed modification area with heritage data were examined in greater detail
  - Any heritage items within 100 metres of the proposed modification area.

- Archaeological sensitivity of the proposed modification area and the need for any further assessment or consultation was then determined by considering the following factors:
  - Location of the proposed modification area
  - The proximity to known Aboriginal or non-Aboriginal heritage sites. An indicative distance of 100 metres was used to identify areas where the proposed modification area may be in conflict with heritage sites
  - The archaeological potential and archaeological sensitivity of the landforms contained within the proposed modification area, based upon predictive modelling.
- Review of previous cultural heritage assessments including:
  - Mills (2004) Pacific Highway Upgrading Program, Options Investigation Phase, Macksville to Urunga, Preliminary Options Assessment: Heritage Assessment. Prepared for SKM on behalf of Roads and Traffic Authority (RTA)
  - SKM (2008) Warrell Creek to Urunga, Upgrading the Pacific Highway Historic Heritage Desktop Assessment. Prepared for the RTA
  - Brooke (2009) Warrell Creek to Urunga, Upgrading the Pacific Highway. Working Paper No.4 Aboriginal Cultural Heritage. Prepared for the RTA
  - Collard et.al. (2012) Warrell Creek to Urunga Pacific Highway Upgrade Archaeological Salvage Works. Prepared for Roads and Maritime Services
  - Brooke and Collard (2014) Warrell Creek to Urunga Pacific Highway Upgrade: Utilities Relocation Cultural Heritage Assessment Report. Prepared for Roads and Maritime Services, Melbourne, Sinclair Knight Merz
  - Collard and Goldfarb (2014) Warrell Creek to Nambucca Heads Pacific Highway Upgrade Ancillary Area Cultural Heritage Assessment Report Prepared for AFJV.

6.4.3 Existing environment

The proposed modification area is located on the mid-upper slopes of a rise overlooking Newee Creek, on mid-lower slopes, or on low-lying swampy floodplain. Areas of the proposed modification are also heavily disturbed by property access tracks and a former quarry.

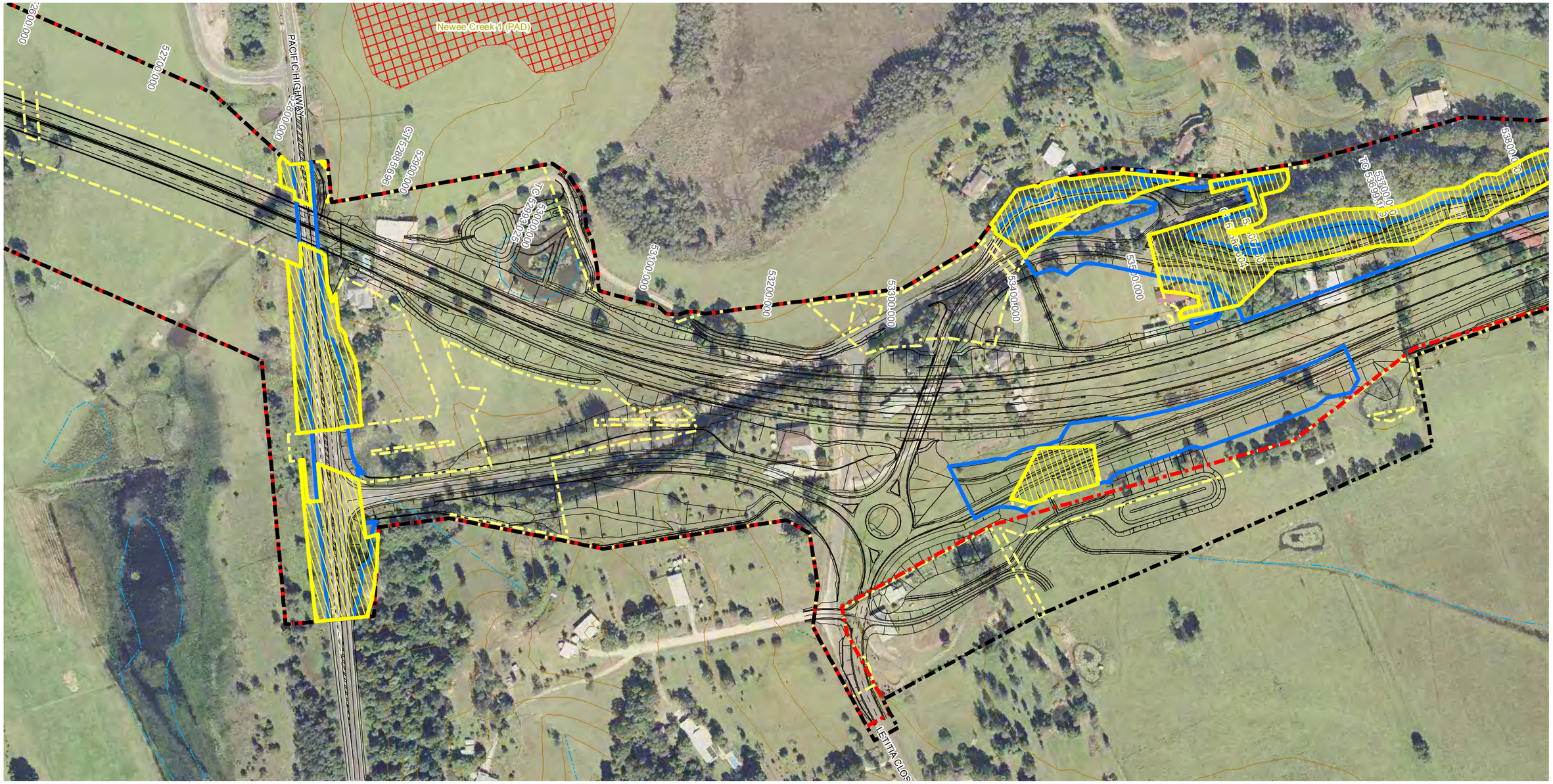
No non-Aboriginal heritage items were identified from the database searches within the proposed modification area.

One unlisted non Aboriginal heritage item, originally identified during the Project EA, is located within the proposed modification area. An assessment of this is detailed in **Section 6.4.4**.

Aboriginal cultural heritage datasets relevant to the proposed modification area derived primarily from previous assessments conducted for earlier stages of the Approved Project. A summary of these areas and the assessments are detailed in **Section 6.4.4**.

6.4.4 Impact assessment

The proposed modification area as show in **Figure 6-2** contains some heritage items both within the Approved Project area as well as within previously assessed ancillary or utilities refinement areas.



Additional clearing required under Modification for North Facing Ramps

Area of design subject to modification

Approved clearing limit (including design refinements, MaCR, MiCR) inside proposed boundary only

North Facing Ramps proposed project boundary (03/09/2015 including Design refinements)

Approved project boundary (including design refinements)

5m contours

Natural drainage

Heritage

Archaeological PAD/Site

Heritage item

 # denotes: Project boundary based on WC2NH_Approved_Project_Boundary_20141202_V2.shp received 02/12/2014, and adjusted to suit survey accurate cadastre (edited at Northern end)

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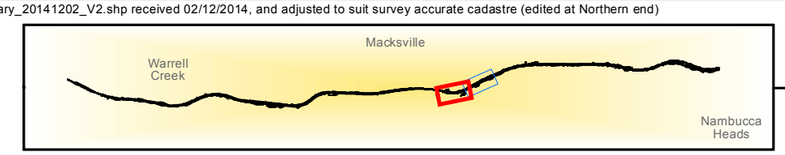

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56

Source: RMS, AADJV, Geolink, Benwell

FIGURE: Heritage (Map 1 of 2)

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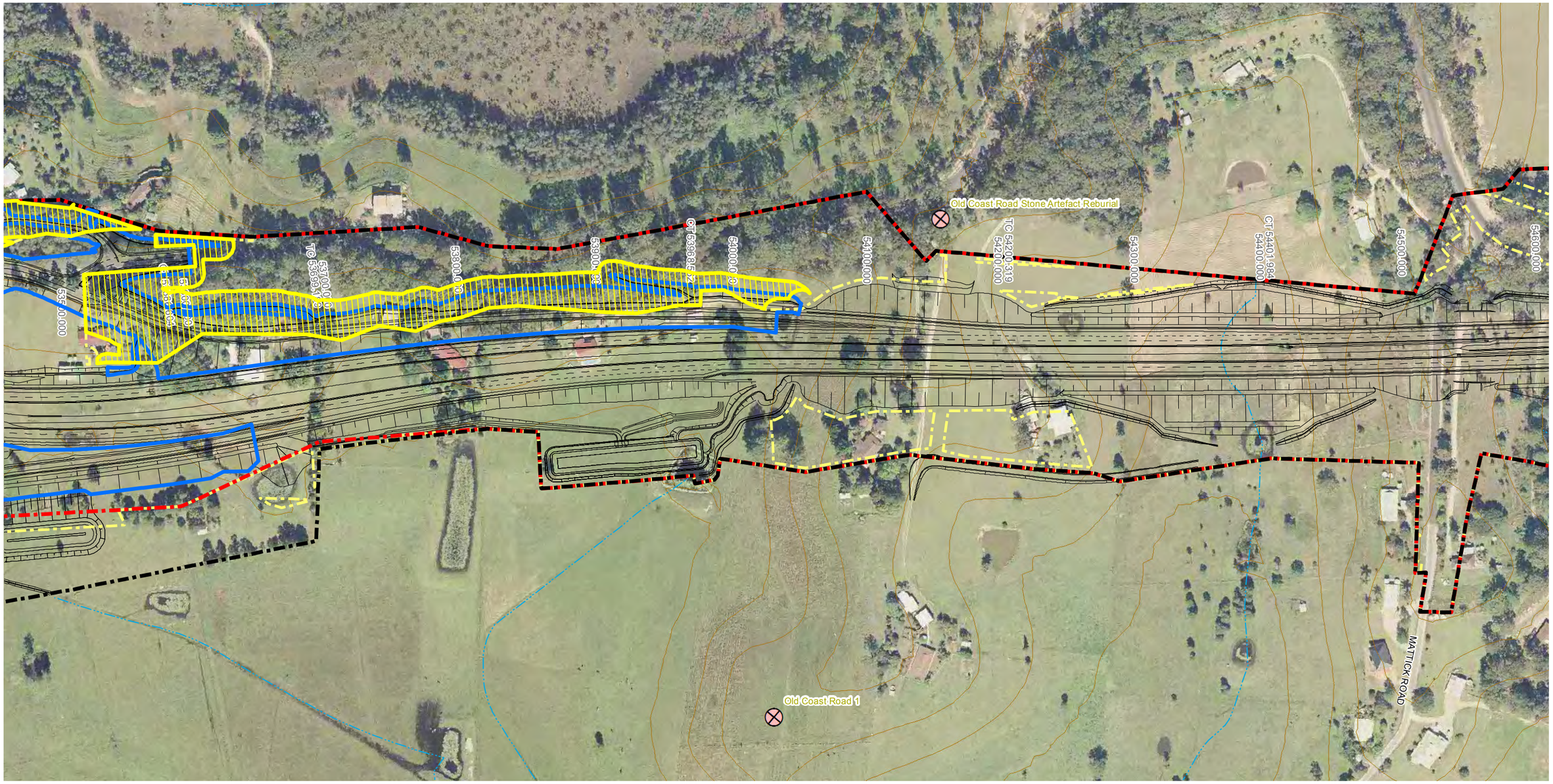

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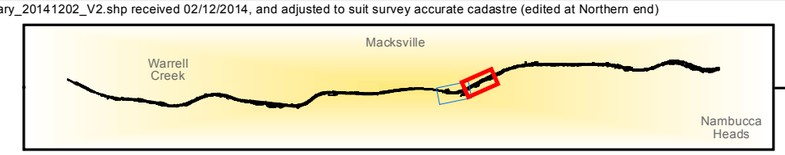

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North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
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FIGURE: Heritage
(Map 2 of 2)

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The results of the cultural heritage desktop assessment for the proposed modification areas are summarised in **Table 6-6**.

Table 6-6 Heritage items identified in the heritage survey area

Historical heritage place and Chainage	Desktop assessment	Heritage significance and recommendations
Farmhouse – North Macksville Chainage 52,800-53,300, West side of upgraded highway	One historical heritage item (Farmhouse - North Macksville) is within 100 m. This item was demolished in accordance with Condition of Approval B20.	No further assessment required.
Newee Creek 1 (21-6- 0402) PAD Chainage 52,800-53,300, West side of upgraded highway	One area of PAD is located within 100 m, but not intersected by the heritage survey area and therefore the proposed modification would not impact on this PAD.	An exclusion zone to be established prior to construction to avoid damage to PAD. The exclusion zone must be located at least 20 m away from the recorded extent of Newee Creek 1 (21-6-0402). This must consist of fencing such as would exclude entry by people or plant not authorised by the WC2NH Environmental Manager (eg high visibility construction webbing). No further assessment required.
Old Coast Road Stone Artefact (Reburial) (21-6-0288) Chainage 54,125-54,240 West side of upgraded highway	One Aboriginal heritage site (isolated artefact reburial) located within the heritage survey area. This site is some 75m from the proposed modification footprint. This area has low potential archaeological sensitivity.	The exclusion zone previously recommended for Old Coast Road Stone Artefact (Reburial) (AHIMS 21-6-0288) (Collard and Goldfarb 2014) must be maintained. This must remain at a distance of at least 5 m away from the recorded site extent and consist of fencing such as would exclude entry by people or plant not authorised by the WC2NH Environmental Manager (eg high visibility construction webbing). No further assessment required

The assessment of the area affected by the proposed modification identified that impacts to cultural heritage values are unlikely with mitigation measures that have already been identified in previous assessments for the Approved Project. No further assessment is required.

Overall, there are no known Aboriginal heritage items, potential archaeological deposits or non-Aboriginal heritage sites directly impacted by this proposed modification.

6.4.5 Mitigation/ management measures

Mitigation measures that have been identified in the Project EA are sufficient to address known and unexpected heritage sites and impacts associated with the proposed modification. No additional mitigation measures are proposed.

6.5 Landscape and urban design

6.5.1 Introduction

This section addresses the landscape and visual impacts of the proposed modification. These impacts for the Approved Project were addressed in the Project EA in Chapter 13 (landscape, visual and urban design) and *Working Paper 2 – Visual amenity and design*. As per the Project

EA, the visual impact of the proposed modification considers both the visual effect of the proposed works and the visual sensitivity of the surrounding areas.

6.5.2 Existing environment

To the south of the proposed modification area is the Nambucca River, the river valley and rural areas are situated on the flood plain that follows the river as it bends east and then north towards Nambucca Heads. The existing highway follows the river, providing a highly scenic journey with frequent views over the river.

The area around Old Coast Road, Letitia Close, Mattick Road and Florence Wilmont Drive are associated with semi-rural and rural residential areas with scattered residences. The houses in Letitia Close and Mattick Road are located on a hill to take advantage of the views over the rural landscape. The area to the north is forested and undulating, particularly along the Old Coast Road and areas east of the road in the Nambucca State Forest.

6.5.3 Impact assessment

Potential impacts from the proposed modification relate to cut batters and fill embankments, over bridge structures and associated local road realignment. The Project EA assessed these impacts as having a high to very high visual impact for the Approved Project.

The proposed modification footprint of the proposed modification would be contained within the existing Approved Project boundary, with little visual impact outside of the immediate vicinity.

The introduction of a roundabout on the eastern side of the upgraded highway would increase the visual impact along Old Coast Road from the Pacific Highway and along Letitia Close.

The proposed modification would, in compliance with the requirements of relevant Authorities, including local councils, need to include additional lighting from that already approved under the Approved Project. Lighting would be provided at:

- Lighting at the roundabout connecting Letitia Close, the off ramp, and the realigned Old Coast Road
- Flag lighting at the on ramp intersection with the realigned Old Coast Road
- Flag lighting at the Old Coast Road intersection with the existing Pacific Highway.

6.5.4 Mitigation/ management measures

Management measures identified in the Project EA included the preparation of an Urban design and Landscape plan. This plan was completed in October 2015.

The mitigation measures that have been developed for the proposed modification area as part of the Approved Project include:

- A visual mound on the east side of the upgraded highway from chainage 53,425 to 53,650
- Regularly spaced tree planting along local road connections
- Clustered tree planting along the highway and at ends of cuttings
- Tree and shrub planting on embankments
- A suite of mitigation measures for Old Coast Road overbridge.

These measures are relevant for the proposed modification and would be implemented in the updated Urban design and landscape strategy for the Approved Project.

No further management measures are required for the proposed modification.

6.6 Biodiversity

6.6.1 Introduction

This section addresses the biodiversity impacts of the proposed modification. The impacts for the Approved Project were addressed in the Project EA in Chapter 10 (Flora and fauna) and Working Paper 1 – Flora and fauna. This section evaluates the impacts and mitigation required for biodiversity.

An additional report, *Biodiversity Assessment, North Facing Ramps – Warrell Creek to Nambucca Heads Pacific Highway Upgrade (GeoLINK 2016)* (see **Appendix C**) (the biodiversity report) was undertaken in November 2015 by GeoLINK to assess the potential impacts of the addition of the proposed modification to the Approved Project. The biodiversity report assessed all additional areas that encompass the North Macksville Ramps project. However some areas have been approved in a Major Consistency Assessment Report. This section summarises the biodiversity report assessment sections that only apply to the proposed modification.

6.6.2 Methodology

The methodology used to assess the proposed modification is summarised as:

- Desktop review of:
  - Environmental websites, databases and registers
  - Relevant reports and documents, including previous environmental assessments of the Approved Project
  - Previous data and mapping.
- Undertake additional flora and fauna field surveys
- Assess the habitat value
- Assess the ecological impacts
- Outlined mitigation measures to be implemented to reduce potential impacts.

The assessment covers the proposed modification area as shown in **Figure 2-1**. Detailed methodology for the assessment is provided in the biodiversity report in **Appendix C**.

6.6.3 Existing environment

6.6.3.1 Threatened species database searches

A summary of the threatened species database search results is listed below for the full North Macksville Ramps project. A search area about 10 km surrounding the proposed modification (study area) was used for database searches. Marine species were excluded from the assessments as no suitable habitat occurs on or adjacent to the proposed modification area. The full results and potential occurrence assessments are attached in the biodiversity report in **Appendix C**.

- OEH BioNet Atlas of NSW Wildlife: 33 threatened species (seven flora and 26 fauna species) listed under the TSC Act
- EPBC Protected Matters Report: 65 threatened species (11 flora and 18 fauna species) listed under the EPBC Act that are 'likely to occur' or 'may occur' within the search area or have habitat that is 'likely to occur' or 'may occur' within the search area
- Migratory Species: 60 migratory species listed under the EPBC Act. Seven are listed as migratory terrestrial species, 15 are listed as migratory wetland species and the remainder are listed as migratory marine species
- Threatened Ecological Communities: Three threatened ecological communities Littoral Rainforest and Coastal Vine Thickets of Eastern Australia, Lowland Rainforest of Subtropical Australia and Subtropical and Temperate Coastal Saltmarsh are listed under the EPBC Act and were identified as likely to occur within the search area by the Protected Matters Search Tool.

6.6.3.2 Critical Habitat

A search of the Register of Critical Habitat (6/11/2015) indicated that the proposed modification does not contain or adjoin any areas of listed Critical Habitat.

6.6.3.3 SEPP14 Coastal Wetland

No occurrences of SEPP 14 Coastal Wetlands or SEPP 26 Littoral Rainforest are within the study area. The closest area of SEPP 14 Coastal Wetland is associated with the Nambucca River floodplain and Newee Creek to the west of the study area.

6.6.3.4 Review of Project Environmental Reports

Threatened fauna species identified as potential occurrences and needing consideration for impact assessment were identified through review of the Project EA with additional species identified through the updated EPBC Act Protected Matters Search Tool and OEH BioNet database searches.

The Project EA confirmed 14 threatened species and considered a further 13 threatened species as potential occurrences within the Approved Project study area (refer to Table 10-7 in Section 7 of the Project EA). The EPBC Act Protected Matters Search Tool and OEH BioNet database searches identified a further 24 threatened fauna species or species habitat that are known or likely to occur within 10 km of the Approved Project footprint, excluding marine species. Refer to the potential occurrence assessment for these species in the biodiversity report in **Appendix C**.

Threatened flora species identified as being potential occurrences and needing consideration for impact assessment were based on the list of species identified in the Approved Project Threatened Flora Management Plan (Ecos Environmental 2013). Twenty known or potentially occurring threatened flora species were identified as target species for threatened flora surveys of the Project construction footprint (plus 10 metres) undertaken by Ecos Environmental (2013). No additional species were identified in the EPBC Act Protected Matters Search Tool and OEH BioNet database search.

6.6.3.5 Field Surveys

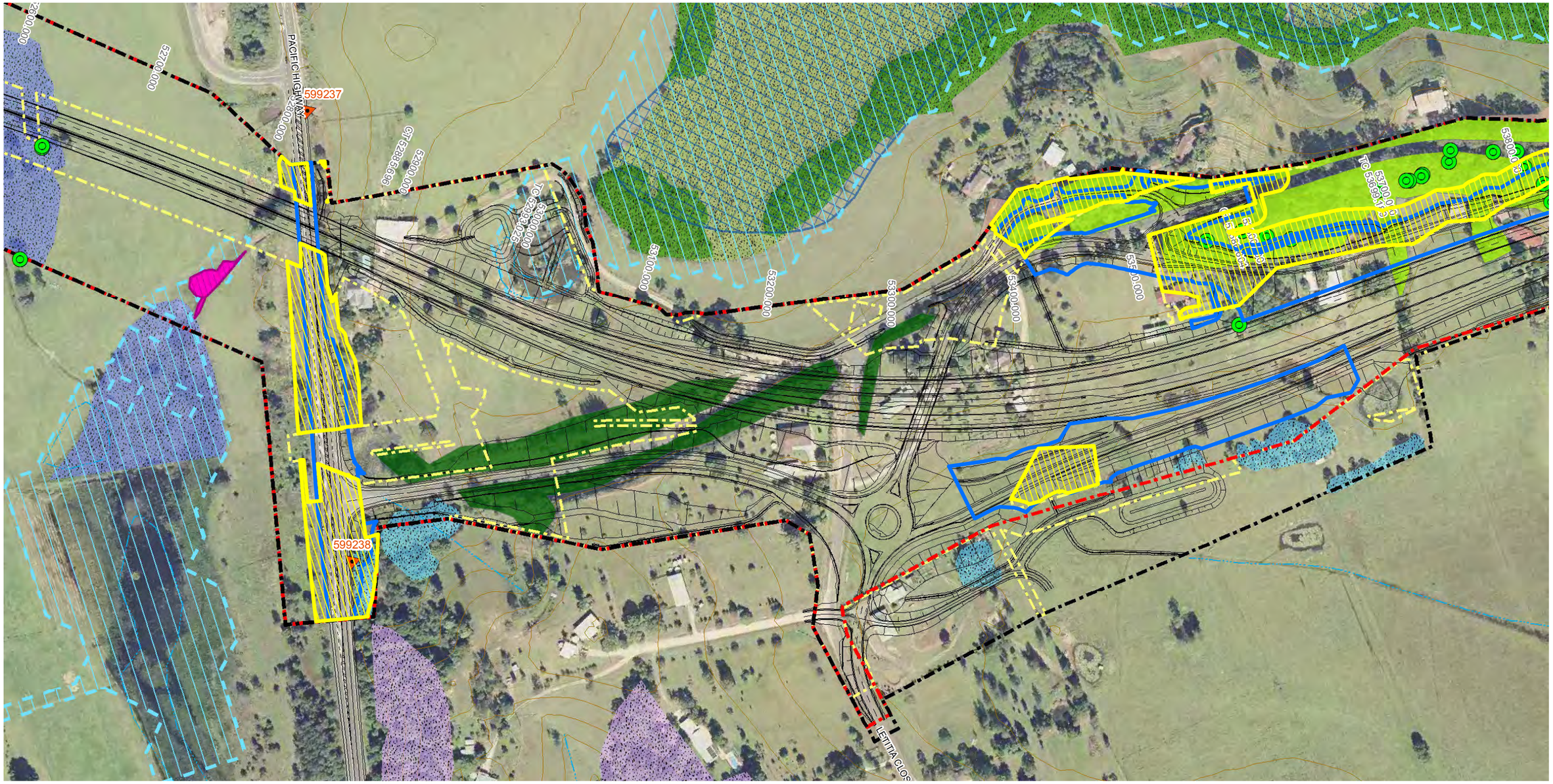
In general the areas surveyed comprised of largely cleared and modified lands which have been historically used for agricultural pursuits. Native vegetation on the sites is represented by isolated paddock trees and some small areas comprising the following native vegetation communities:

- Moist Open Forest – White Mahogany – Grey Gum
- Swamp Oak regrowth
- Dry Open Forest – Blackbutt
- Swamp Mahogany/ Paperbark Forest (Swamp Sclerophyll Forest Endangered Ecological Community (EEC)).

A summary of the field survey results are shown in **Table 6-7**. Ecological constraints associated with the sites are shown in **Figure 6-3** and discussed in the sections below.

Table 6-7 Summary of field survey results

Area	Vegetation Description	Fauna Habitats Present
Existing Highway intersection with Old Coast Road	A small area of *Swamp Mahogany/ Paperbark Forest (Swamp Sclerophyll Forest EEC)* occurs in the south eastern corner of the site directly adjacent to the existing Pacific Highway. The inundated portion of the site supports a number of common Freshwater Wetland species dominated by *Blechnum* Fern with nearby forested Swamp Forest EEC. Weed species such as Lantana, Camphor Laurel and Morning Glory also occur in this portion of the site.	The inundated area would provide habitat for aquatic fauna and locally occurring/ migratory wetland birds.
Northbound on-ramp and Old Coast Road (west of the over bridge)	This area is predominantly cleared pasture land dominated by Broad-leaved Paspalum with a remnant stand of mature *Moist Open Forest – White Mahogany Grey Gum* occurring in the western portion of the site, which runs parallel to Old Coast Road on both the eastern and western sides of the road. This vegetation contains a high density of hollow-bearing trees with a number of trees supporting multiple hollows. This area was nominated as *Nest Box Replacement Zone 'S'*, within the WC2NH Nest Box Management Plan. A total of 25 nest boxes have been installed (with a further 24 nest boxes prescribed for installation in this area) to compensate for hollow bearing trees cleared for highway construction. Scattered paddock trees also occur on cleared areas of the site including Swamp Turpentine, Tallowwood and conifer species.	Hollows within mature trees/ stags would provide nesting/ denning or roosting habitat for hollow dependant fauna species. This area also supports known records of Slender Marsdenia nominated for insitu roadside monitoring as the plants are outside of the current approved clearing limits. Areas of Moist Open Forest representing potential Koala habitat occur within the Moist Open Forest within the site and would be impacted by the proposal. Potential habitat for locally occurring arboreal mammals including Koala, Glider and Possums as part of the surrounding forested areas of the Nambucca State Forest.
Southbound off-ramp	Predominantly cleared pasture land surrounds a residential property which supports Swamp Forest EEC and adjacent low lying areas in the eastern part of the site. This stand includes some ephemeral wetland elements and has a small dam and drainage line which runs through the property.	A number of small farm dams occurs on the site and would provide habitat opportunities for aquatic fauna and locally occurring migratory/ wetland birds. Wetland areas surrounding the site provide potential habitat for locally occurring migratory/ wetland birds. A small area of Swamp Forest EEC provides potential roosting/ nesting habitat for locally occurring/ migratory bird species. One Nest box installed by the landowner and two active bird nests are present within the stand.



Additional clearing required under Modification for North Facing Ramps
Area of design subject to modification
Approved clearing limit (including design refinements, MaCR, MiCR) inside proposed boundary only
North Facing Ramps proposed project boundary (03/09/2015 including Design refinements)
Approved project boundary (including design refinements)
5m contours
20yr ARI flood
Natural drainage
SEPP14 wetland

Contamination
Potential contaminated site

Biodiversity - Flora
Alexfloydia repens
Artanema fimbriatum
Goodenia fordiana
Marsdenia longiloba
Maundia triglochinoides
Niemeyera whitei
Tylophora woollsii
Pseudovanilla foliata
Caladenia (Spider Orchid)
Parsonia dorrigoensis
Hollow-bearing tree/Habitat tree
Microbat roost site/habitat
Green-thighed frog breeding pond
Green-thighed frog habitat
Likely Green-thighed frog habitat
Giant Barred frog habitat
Flying Fox camp (Jan 2015)
Location of Maundia
Persicaria elatior
Floyd's Grass habitat
Translocation receival site

DPI Fisheries
Mangrove and pneumataphores
Salt marsh

Vegetation Community (EEC)
Freshwater Wetlands (EEC)
Mixed Floodplain Forest (EEC)
Swamp Forest - Swamp Mahogany/ Paperbark EEC
Swamp Oak Forest (EEC)
Saltmarsh EEC

Vegetation Community
Mangrove Forest
Moist Open Forest - Flooded Gum
Moist Open Forest - White Mahogany - Grey Gum
Open Forest - Blackbutt
Hardwood Plantation - mostly cleared
Regrowth Swamp Oak

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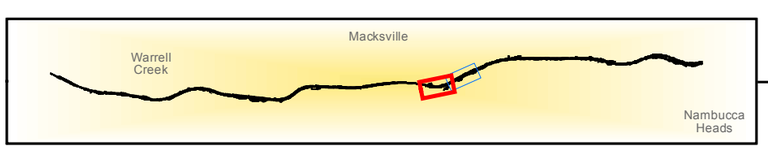

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Biodiversity (Map 1 of 2)

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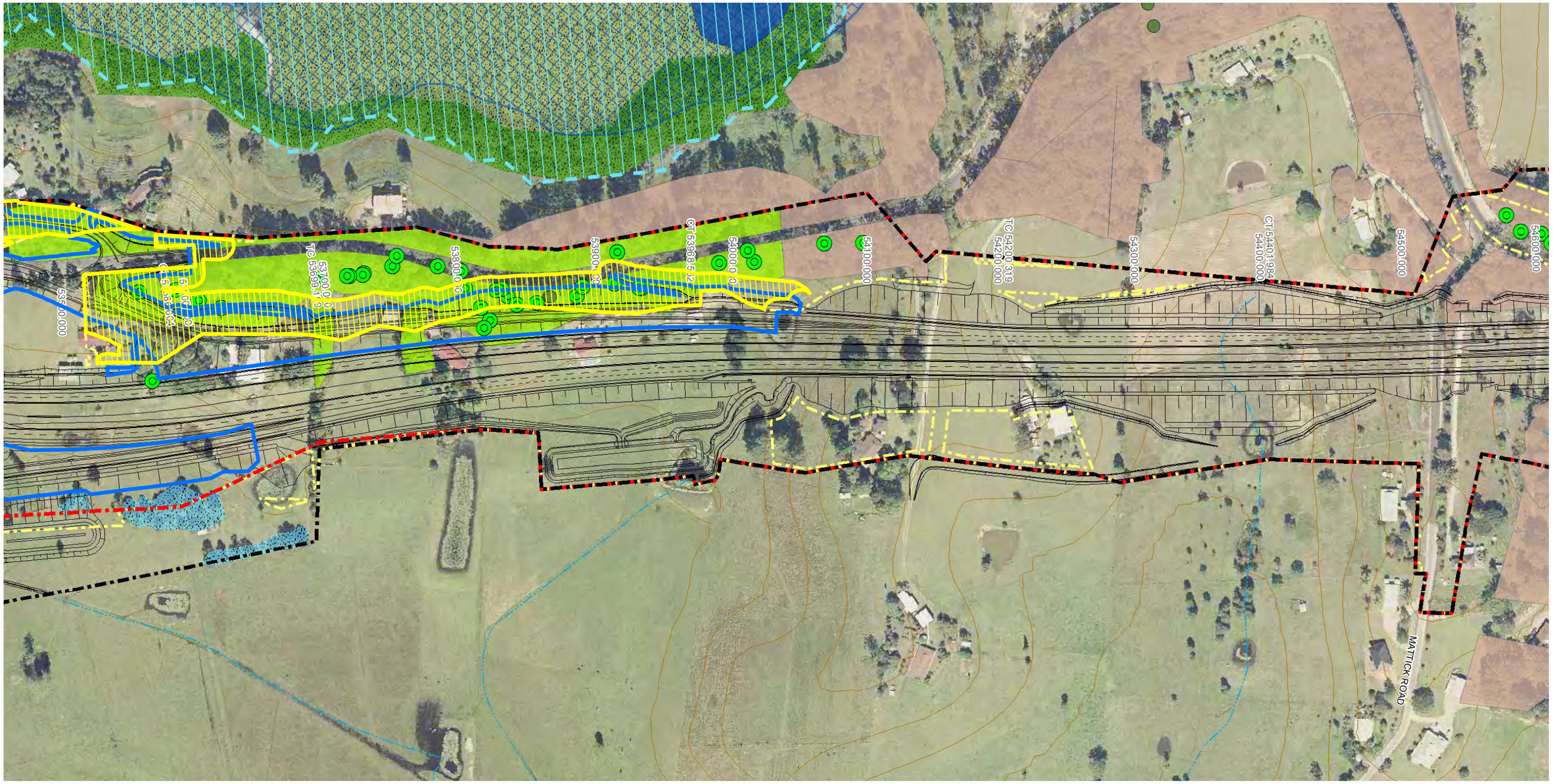

Additional clearing required under Modification for North Facing Ramps
Area of design subject to modification
Approved clearing limit (including design refinements, MaCR, MiCR) inside proposed boundary only
North Facing Ramps proposed project boundary (03/09/2015 including Design refinements)
Approved project boundary (including design refinements)
5m contours
20yr ARI flood
Natural drainage
SEPP14 wetland

Contamination
Potential contaminated site

Biodiversity - Flora
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Vegetation Community (EEC)
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Saltmarsh EEC

Vegetation Community
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Open Forest - Blackbutt
Hardwood Plantation - mostly cleared
Regrowth Swamp Oak

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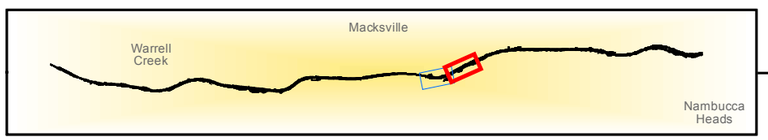

PACIFIC HIGHWAY UPGRADE **WC2NH**

North Facing Ramps at North Macksville – Modification environmental assessment

Projection: GDA 1994 MGA Zone 56
Source: RMS, AADJV, Geolink, Benwell

FIGURE: Biodiversity (Map 2 of 2)

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6.6.3.6 Noxious Weeds

Noxious weeds listed under the Noxious Weeds Act 1993 (NW Act) present within the study area include:

- Fireweed
- Lantana
- Blackberry (mostly under control).

Additionally, environmental weeds including Whiskey Grass, Camphor Laurel and Coolatai Grass were detected over large parts of the study area. Measures to manage these weed species are outlined in the Weed and Pathogen Management Plan (WPMP) for the Approved Project.

6.6.3.7 Threatened Flora Species

One threatened flora species was detected within the study area, namely Slender Marsdenia (*Marsdenia longiloba*) which is listed as endangered under the TSC Act and vulnerable under the EPBC Act.

A number of Slender Marsdenia plants occur immediately adjacent to Old Coast Road (recorded previously as part of earlier studies on the Approved Project) associated with areas of Moist Open Forest as seen in **Figure 6-3**.

These plants are included as part of the WC2NH Threatened Flora Management Plan as threatened plants which are to be retained and monitored in situ. It is envisaged that should impacts to Slender Marsdenia be unavoidable, translocation of impacted plants should be undertaken in accordance with the requirements of the Approved Project Threatened Flora Management Plan.

Milky Silkpod (Parsonsia dorrigoensis) has been recorded at the southern extent of the Approved Project associated with areas of Moist Open Forest. This species has some potential to occur within areas associated with the study area, based on appropriate habitat type being present. However it is considered to have a very low potential to occur based on the extensive surveys undertaken associated with the study area which have not detected this species to date.

6.6.3.8 Endangered Ecological Communities

The following TSC Act listed EECs occur within the broader area surrounding the subject sites (including a 50 metre buffer zone):

- Swamp Sclerophyll Forest EEC
- Swamp Forest – Swamp Mahogany/ Paperbark EEC
- Freshwater Wetland EEC
- Swamp Oak Forest EEC.

The proposed modification would clear an additional 0.077 hectares of Swamp Forest – Swamp Mahogany/ Paperbark EEC (**Figure 6-3**). The EEC is moderately to highly disturbed (following historic clearing, livestock grazing, drainage modification and dam construction, and edge effects). This vegetation comprises relatively small and fragmented patches of regrowth vegetation. Similar areas of EEC occur adjacent to the study area and within the broader locality, where equivalent and better quality examples occur on the Nambucca River and Warrell Creek floodplains.

6.6.3.9 Fauna Habitat Assessment

Fauna Habitat Types

The proposed modification includes the following general fauna habitat types as described in the Project EA:

- Aquatic/ riparian habitats: occurrences on site are of low to moderate habitat value
- Modified habitats: dominant habitat type across the site and of low habitat value
- Dry open forests: small areas of this habitat type (e.g. Blackbutt forest) associated with the site
- Moist open forest: small areas of this habitat type associated with sites of moderate habitat value
- Swamp forest: small occurrences on site are of low to moderate habitat value.

Descriptions of the values of these habitats are provided in the Project EA. The key habitat features within the study area include:

- Aquatic/ riparian habitats: occur within parts of the proposed modification consisting of disturbed swamp forest wetlands, farm dams and modified drainage lines providing potential habitat for common frogs (low likelihood of supporting threatened frog species) and birds, including the TSC Act listed species Black-necked Stork and Brolga
- Hollow-bearing trees: a number of hollow-bearing trees are associated with mature trees occurring on the sites. It is envisaged that a number of mature trees containing hollows will be impacted by the proposal
- Nest Box Replacement Zone: a total of 49 Nest boxes have been prescribed for installation within Nest Box Replacement Zone S with 25 already installed at this location. It is envisaged that a number of trees supporting nest boxes will be impacted by the proposal
- Koala food trees: low densities of primary Koala food trees Tallowwood (*Eucalyptus microcorys*) and Swamp Mahogany are associated with areas of moist open forest and to a lesser extent swamp forest. However, scat and scratch searches below trees failed to record any evidence of Koala activity. Based on Koala Population Monitoring undertaken, it is currently considered that study areas associated with the proposed modification experience low level usage by Koalas and is not considered Koala habitat (critical to the survival).

In general, although the study area was found to contain a variety of fauna habitat resources, relative to the extent of habitat within the Approved Project footprint and retained habitats within the broader locality the proposed modification affects a minor portion of the habitat available locally.

Threatened Fauna

No threatened fauna species were detected during the field surveys. The study area provides moderate to high value habitat locally throughout moist open forest due to the density of hollow bearing trees which is expected to be partially impacted by the proposal. A potential occurrence assessment of threatened fauna species and full list of threatened fauna species which were considered with known/ potential occurrences in areas is provided in the biodiversity report in **Appendix C**.

For all known/ potential species, the habitat within the study area forms a minor portion of the habitat available to populations of these species in the locality. Key habitat features (eg significant foraging habitat, potential breeding habitat, etc.) for most of these species either do

not occur within the study area or are minor occurrences within the study area relative to their local occurrence.

6.6.3.10 EPBC Act Listed Migratory Species

The values of the study area for EPBC Act listed migratory species is generally as described in the Project EA. Results of the field survey and the nature of the proposed modification (small vegetation impacts) concur with the Project EA statement that: '*There is no evidence to suggest that an area of important habitat exists or that the study area is occupied by an ecologically significant proportion of a population of a migratory species.*' Consequently, it is unlikely that any EPBC Act listed migratory species would be significantly affected by the proposed modification, triggering the need for referral to the Australian Government Department of Environment (DoE).

6.6.4 Impact assessment

6.6.4.1 EP&A Act Approval (NSW)

Section 10.4.2.1 of the Project EA (Table 10-10), identifies the area of impacts on native vegetation for the Warrell Creek to Urunga Pacific Highway upgrade. The total vegetation clearance for the project is 258.45 hectares (based on a 10 metre buffer from the concept design) (see **Table 6-8**).

The Nambucca Heads to Urunga stage of Warrell Creek to Urunga upgrade is currently under construction and the majority of the clearing required for that stage is complete. It is anticipated that the Nambucca Heads to Urunga (NH2U) project would result in the clearance of 171.33 hectares of native vegetation. As such, native vegetation clearing available for the Warrell Creek to Nambucca Heads (WC2NH) project is 87.09 hectares in accordance with the Project EA.

Since the Project EA was prepared, vegetation communities within the project boundary have been ground truthed by the Pacifico project ecologist, GeoLINK. This has resulted in:

- Identification of some areas that contained no native vegetation as EEC
- Reclassification of some areas of EEC to other native vegetation (non-EEC)
- Reclassification of some areas of EEC and other native vegetation (non-EEC) to non-native vegetation.

Table 6-8 Approved clearing areas

Vegetation type	Total for Warrell Creek to Urunga project (ha) (from EA)	NH2U clearing undertaken/ proposed (ha)	Residual for WC2NH Project (ha)
Endangered ecological communities (EEC)			
Freshwater Wetlands	4.842	1.44	3.40
Lowland Rainforest	0.58	0.23	0.35
Mixed Floodplain Forest	12.49	10.64	1.85
Swamp Forest - Swamp Mahogany / Paperbark	12.47	8.68	3.79
Swamp Forest - Swamp Oak	33.07	11.36	21.71
Subtotal	*63.45*	*32.35*	*31.10*
Other native vegetation (non EEC)			
Moist Open Forest – Flooded Gum	21.91	11.88	10.03
Moist Open Forest - White Mahogany / Grey Gum / Ironbark	28.76	28.89	-0.13
Open Forest – Blackbutt	144.11	98.18	46.93
Open Forest – Scribbly Gum	0	0.03	-0.03
Mangroves	0.19	0.00	0.19
Subtotal	*194.97*	*138.98*	*55.99*
TOTAL	**258.42**	**171.33**	**87.09**

Since the Project EA was approved a number of design refinements have been made and these have been approved through Consistency Assessment reports. Additional vegetation clearance has been included in some of these assessments. Therefore the amount of vegetation clearance currently approved for the WC2NH project (based on the 100% detailed design and some smaller sections of concept design) is 89.36 hectares, including 10.47 hectares of EEC and 78.88 hectares of other native vegetation (non-EEC).

Proposed clearing areas to vegetation communities from the proposed modification is summarised in **Table 6-9**. Clearing areas are shown including a 10 metre buffer from the concept design for the EP&A Act approvals.

[2] *The total amount of freshwater Wetlands clearing incorporates the increase as a result of the EPBC Act modification.*

Table 6-9 Additional clearing areas under EP&A Act

Vegetation communities	Additional clearing areas (ha) (10m buffer)	Approved Project clearing areas (ha)	Approved areas cleared to date for Approved Project (ha)
Moist Open Forest – White Mahogany, Grey Gum	1.324	-0.13	5.50
Swamp Mahogany/ Paperbark (Swamp Sclerophyll Forest EEC)	0.077	3.79	4.238
Total Area	***1.401***		

The proposed design refinements have resulted in a minor increase of 1.401 hectares of additional vegetation clearing. This includes 0.077 hectares of EEC and 1.324 hectares of non-EEC vegetation. The additional clearing would exceed the Approved Project clearing areas for each vegetation type. Additional impacts to the EEC and other native vegetation would be relatively minor however cumulative in relation to impacts associated with the broader Approved Project. These additional impacts would not alter the conclusions of the Project EA in relation to the EEC.

Although the overall total clearing of 90.76 hectares for the project would exceed the 89.36 hectares approved under the Project EA (including subsequent approved Consistency Assessments) by 1.401 hectares, the project has significantly reduced the impact on total EEC vegetation by 20.55 hectares compared to the Approved Project. This is considered a positive outcome for the overall project.

6.6.4.2 EPBC Act approval (Commonwealth)

The Conditions of Approval under the EPBC Act provide limits of clearing areas for particular EPBC Act listed species habitat that can be cleared as part of the project.

The clearing calculations and areas of habit affected for the Approved Project were calculated for the referral using a more conservative method. Instead of calculating areas by using the concept design with a 10 metre buffer the referral buffer area were calculated based on the following:

- Concept design with 15 metre buffer
- Operational water quality basins with 10 metre buffer
- Adjustments to access roads within Nambucca State Forest with 10 metre buffer
- Utility adjustments with clearing requirements of utility authorities
- Three metre clearing width for boundary fencing - excluding within Nambucca State Forest and swamp forest where a flying fox camp is located
- A 10 per cent contingency which includes provision for clearing for construction phase water quality basins, accesses to ancillary facilities, stockpile sites and design refinements.

To ensure consistency with the Approved Project and the referral the clearing areas for the EPBC Act assessment have been calculated in **Table 6-10** using the same buffer area assumptions as the referral.

Table 6-10 Additional clearing areas under EPBC Act

Threatened Fauna Potential Habitat	Additional clearing areas (ha) EPBC Act buffer	Approved referral clearing area (ha) EPBC Act buffer	Approved areas cleared to date for Approved Project (ha)
Vegetation Communities			
Open Forest - Blackbutt	0.001	77.00	54.55
Moist Open Forest – White Mahogany, Grey Gum	1.525	5.50	5.50
Swamp Mahogany/ Paperbark (Swamp Sclerophyll Forest EEC)	0.084	5.30	4.18
Total Area	***1.610***		
Threatened Fauna Potential Habitat			
Koala Habitat	1.610	106.60	82.90
Grey-headed Flying-fox habitat (foraging habitat)	1.610	106.60	82.90
Spotted-tailed Quoll habitat	1.610	114.10	89.42
Regent Honeyeater and Swift Parrot (wintering habitat)	0.084	5.30	4.32
Threatened Flora Habitat			
Slender Marsdenia/clear Milkvine and Wooll's Tylophora/Cryptic Forest Twiner Habitat	1.525[3]	17.80	16.12
Parsonsia dorrigoensis (Milky Silkpod) habitat	1.525	24.30	22.22

As seen in **Table 6-10** an additional clearing of 0.001 hectares of Open Forest – Blackbutt, 1.525 hectares of Moist Open Forest – White Mahogany, Grey Gum and 0.837 hectares of Swamp Forest – Swamp Mahogany / Paperbark EEC, would be required for the proposed modification. These vegetation types are listed as potential habitat under the EPBC Act for Koala, Grey-headed Flying Fox, Spotted Quoll, Regent Honeyeater, Swift Parrots and Milky Silkpod.

Clearing of 1.525 hectares of Moist Open Forest – White Mahogany, Grey Gum would exceed the 5.5 hectares of clearing that was approved in the referral for the Approved Project. A modification to the referral would need to be submitted and approved prior to clearing of this vegetation community.

A number of Slender Marsdenia plants occur immediately adjacent to Old Coast Road (recorded previously as part of earlier studies on the Approved Project) associated with the 1.525 hectares of Moist Open Forest – White Mahogany, Grey Gum that would be cleared. Clearing this area does not exceed the clearing areas approved in the referral (EPBC CoA 1a) and Project EA, however these plants are included as part of the WC2NH Threatened Flora Management Plan as threatened plants which are to be retained and monitored in situ. It is envisaged that should

[3] *As the area of Slender Marsdenia was not survey the area of Moist Open Forest – White Mahogany, Grey Gum was utilised.*

impacts to Slender Marsdenia be unavoidable, translocation of impacted plants should be undertaken in accordance with the requirements of the Approved Project Threatened Flora Management Plan.

6.6.4.3 Additional impacts

Previous assessments of significance for threatened species, migratory species and EECs impacted by the broader WC2NH project have been prepared for the Project EA. These assessments have been reviewed and updated in relation to additional impacts to threatened species, migratory species and EECs from the potential clearing of the Project footprint. Whilst these works would contribute to additional incremental impacts to threatened species and EECs as part of the broader WC2NH project, the Proposal would not increase the risk of 'significant impacts' to threatened species and EECs.

In addition the proposed modification would have the following impacts on biodiversity:

- Potential clearing impacts to a number of Slender Marsdenia adjacent to Old Coast Road. Impacts to this species are to be avoided if possible
- Habitat removal for potentially occurring EPBC, TSC Act and ROTAP listed flora species
- Likely loss of hollow-bearing trees but as mentioned it is envisaged that clearing of mature vegetation would be minimised where possible
- Likely loss of trees currently supporting nest boxes installed for hollow bearing tree loss, however these boxes can relocated. Partial loss of Nest Box Replacement Zone S
- Likely habitat removal for locally occurring fauna species although habitats present are generally of low quality with the exception of native vegetation represented by the moist open forest stand which would be partially impacted
- The Proposal may contribute to habitat fragmentation although this would be minor given that clearing of native vegetation would be avoided
- Construction of the proposed modification would have the potential to contribute to the risk of introducing/ and or spreading weeds and pathogens to/ from the site
- The proposed modification would incrementally contribute to the overall risk associated the wildlife injury and mortality associated with the Approved Project during vegetation/ habitat removal/ modification, though only to a relatively minor extent.

6.6.5 Mitigation/ management measures

In order to minimise impacts to biodiversity it is recommended that the detailed design process would aim to position the proposed modification to:

- Avoid direct impacts (clearing) to areas of EEC and provide a 10 metre buffer to these areas where possible
- Avoid impacts to the identified locations of Slender Marsdenia with the final design of the proposed modification
- Avoid clearing of native vegetation where possible
- Avoid clearing of hollow bearing trees where possible.

Additionally the following measures should be undertaken in order to ameliorate impacts to biodiversity.

- An additional Nest Box Replacement Zone of similar quality habitat should be selected for relocation of nest boxes

- Should impacts to Slender Marsdenia be unavoidable, translocation of the affected individuals must be undertaken in accordance with the WC2NH Threatened Flora Management Plan. In this instance, consideration of additional biodiversity offsetting requirements should be undertaken by Roads and Maritime
- All environmental biodiversity management plans should be updated to include the additional areas of the proposal.

6.7 Hydrology, water quality and soil management

6.7.1 Introduction

This section addresses the hydrological, water quality and soil impacts of the proposed modification. These impacts for the Approved Project were addressed in the Project EA in Chapter 16 (water quality and hydrology) and Working Paper 5 – Water (flooding and water quality). This section evaluates the impacts and mitigation required for hydrology, water quality and erosion and sediment control.

6.7.2 Existing environment

The key water quality consideration in this location is a SEPP 14 Wetland located around 100 metres to the west of the upgraded highway. While Approved Project requirements do not specifically require water quality control measures for local roads, including on and off ramps, due to the proximity of the wetland, it is proposed that all pavement runoff from the upgraded highway or local roads be treated before discharging into this SEPP 14 Wetland.

The drainage design of the upgraded highway includes a permanent water quality basin, named B52.93, located on the western side of the upgraded highway at chainage 53,000 to treat, and provide spill containment, before road water runoff is released into the SEPP 14 Wetland. The Approved Project also includes a clean water detention basin next to B52.93 which is required to maintain the flood immunity of the property access track downstream and manage flows to the downstream wetland. In developing the options, consideration was given to their impact on the permanent and the temporary basins, as well as on the clean water detention basin.

A permanent water quality basin is also proposed on the eastern side of the southbound off ramp at chainage 53450 to treat, and provide spill containment, before road water runoff is released downstream to the east of the main alignment.

Temporary erosion and sediment control for this proposed modification has been developed based on the Landcom publication Managing Urban Stormwater – Soils and Construction Volume 1 – 4th Edition (2004), commonly known as the Blue Book. Temporary basins have been specified for areas where average annual soil loss is greater than 150m^3/year. A set of progressive erosion and sediment control plans will be prepared on site to ensure that sediment runoff is managed to suit construction activity.

6.7.3 Impact assessment

The proposed modification would have construction and operational impacts on groundwater and surface water, sediment and acid sulphate soil impacts similar to that detailed in the Project EA for this section of the highway.

The proposed modification would not impact the permanent basin B52.93 or the adjacent clean water detention basin. Therefore the permanent water quality design measures of the upgraded highway would not need to be altered. Access to the basin would need to be provided in coordination with a new property access for an affected landholder.

Some backwater effects from the Nambucca River cause water to pond to the west of the upgraded highway during major regional events. Two key flooding and hydrology considerations are:

- The flood immunity available for access to the ramps and to Old Coast Road central
- Potential discharge to the SEPP 14 Wetland downstream of culvert C53.02 which could be sensitive to changes in flow rates. This culvert is linked to the permanent basin B52.93 and the associated clean water detention basin that is part of the Approved Project without the ramps.

In terms of flood immunity, for access to the ramps and Old Coast Road, and the proposed modification would allow access in a 20 year flood event and still be accessible in a 50 year event. A small section of the existing Old Coast Road just north of the intersection with the existing highway would start to go under water in a 100 year flood event and would start to restrict access to the ramps, Letitia Close and Old Coast Road central in anything above a 100 year flood event.

In terms of the second consideration of discharge to the SEPP 14 Wetland, the following **Table 6-11** summarises the flow rates and velocities discharging to the SEPP 14 Wetland, for the existing situation, the Approved Project and proposed modification.

Table 6-11 Discharge into SEPP 14 Wetland at culvert C53.02 and permanent basin B 52.93

Case	5 year event		100 year event	
	Velocity (m/s)	Flow rate (m^3/s)	Velocity (m/s)	Flow (m^3/s)
Existing	2.03	0.092	2.31	0.154 (pipe) 0.201 (over road)
Approved Project and proposed modification	1.49	0.142	2.05	0.227*

* *This flow would occur both over the access road and through the pipe. The exact split would be likely to be similar to the split in the existing situation*

For the Approved Project, the permanent basin B52.93 is supplemented by a clean water detention basin which reduces peak flows into the wetland and allows the existing flood immunity of the access track between the basin and the SEPP 14 Wetland to be maintained. With these measures in place, **Table 6-11** shows that the Approved Project would generally have lower discharge velocities and lower peak discharges than the existing situation.

The proposed modification would not affect the upgraded highway and location of culvert C53.02, or the permanent basin B52.93 and clean water retention basin. Therefore the proposed modification would also have generally lower discharge velocities and lower peak discharges to the SEPP 14 Wetland than the existing situation.

The proposed modification would require a new culvert to drain the trapped area between the southbound off ramp and the upgraded highway at chainage 53,450 and replacement and widening of a culvert on Old Coast Road, 40 metres from the intersection with the existing highway, with a new pipe. In addition, it would require minor adjustments to a number of other culverts and outlets associated with the Approved Project.

Earthworks quantities have been estimated for the ramps, local roads and upgrade to the intersection of Old Coast Road and the Existing Pacific Highway. The proposed modification would require borrowing about 16,000 cubic metres.

6.7.4 Mitigation/ management measures

Detailed construction and operational phase environmental safeguards are described in the Project EA and Working Paper, and detailed in the soil and water management plan and acid sulphate management plan amongst others. These will be relevant to this proposed modification and no additional management or mitigation measures are required.

6.8 Planning and land use

6.8.1 Introduction

This section considers potential land use and property impacts that may result from the proposed modification. These issues were addressed in chapter 11 (Social and economic) of the Project EA. Additional impacts on land which has already been acquired by Roads and Maritime are not considered in this assessment.

6.8.2 Impact assessment

As the proposed modification is mostly situated within the existing Approved Project boundary, there would be limited property impacts. There would only be minor impacts to adjoining land uses.

The proposed modification would be mostly within the Approved Project boundary as identified in the Project EA. However, on the eastern side of the highway, additional land take is required to ensure that the roundabout, the off ramp and Letitia Close have appropriate sight lines for safe traffic movement. This has resulted in the acquisition of one additional property on Letitia Close. Due to this, access to an adjoining property without street access, would be moved away from the highway corridor and be placed in a safer location. The impacts of this access have been considered in the Major Consistency Assessment for the proposed design refinements to Old Coast Road (RMS, 2015).

There is a permanent water quality basin proposed to the east of the southbound off ramp. This basin is to be located outside the existing Project Boundary and within the adjacent property, which is owned by Roads and Maritime.

6.8.3 Mitigation/ management measures

Mitigation/management measures for the Approved Project are relevant to the proposed modification. No additional mitigation measures are required.

6.9 Socio-economic analysis

6.9.1 Introduction

This section considers potential socio-economic impacts that may result from the proposed modification. These issues were addressed in chapter 12 (Social and economic) of the Project EA. This assessment addresses the same items that were addressed in the environmental assessment.

6.9.2 Impact assessment

Regional agricultural and forestry impacts and local community socio-economic

The proposed modification would not result in any additional impacts from that already assessed by the Project EA.

Access

During construction, there may be additional construction traffic and activities being undertaken in the area, due to the increase in infrastructure required at this location. However, it is not expected to materially affect local access arrangements beyond that identified in the Project EA. As per the Project EA, local access would be managed during construction.

During operation, the addition of the ramps would not result in any changes to community and property access. Property accesses would be maintained as identified in the Project EA. Local access would also be maintained, with Letitia Close still crossing the highway via a bridge to maintain east west access.

Under the Approved Project, southbound highway vehicles would have had to exit the highway at Bald Hill Interchange or the Nambucca Heads Interchange to access Macksville. The introduction of the proposed modification would reduce travel time for highway vehicles heading south to Macksville. Further details on the traffic impacts are addressed in **Section 6.2** of this report.

Following discussions with the local bus service providers, it has been agreed that the existing bus access arrangements are to be retained for Letitia Close. Given the very low traffic volumes, no formalised bus bay is required.

Business exposure

The reduction of time to access Macksville would improve the attractiveness of the town as a 'rest stop' for highway traffic. This could result in additional traffic electing to use Macksville as a rest stop and to obtain fuel and food.

The improved connectivity to Macksville resulting from the addition of the proposed modification, in conjunction with the Bald Hill Road interchange to the south, would allow both northbound and southbound vehicles using the upgraded highway to stop at Macksville more easily which could have benefits for local businesses.

Community cohesion

During construction of the proposed modification, it is not expected that there would be any additional community cohesion issues than those identified in the Project EA.

During operation, there may be a perceived additional loss of cohesiveness in the Letitia Close/ Old Coast Road area due to highway/ through traffic mixing with local traffic on Old Coast Road. However, the proposed modification would not result in a reduced level of local access. All traffic movements on the local road network have been retained, the only change being the introduction of highway bound traffic along a short stretch of the local road.

Amenity effects

Due to the introduction of the ramps, there would be additional construction activity in the Approved Project area. The potential amenity effects during construction including noise and visual impacts would be consistent with what was identified in the Project EA. The same measures identified in the EA would be used to mitigate and manage these impacts.

During operation, there would be a change in amenity impacts as identified in the Project EA. As discussed in **Section 6.3**, there would be little change in the expected noise levels as a result of the introduction of the proposed modification.

There would be a change in visual impacts, with an increased project footprint at this location. However, this would be confined to the immediate properties adjacent to the Approved Project and Letitia Close and Old Coast Road. Visual impacts are discussed in **Section 6.5**.

The northbound off ramp connects to a roundabout with Letitia Close/Old Coast Road. This traffic movement would result in potential head light glare to one property as vehicles travel up

the ramp. Modelling of the potential visual light intrusion has identified that this could impact one of the properties located on the hill to the south of the roundabout. Potential alternatives to manage this intrusion are being considered, including visual mounds adjacent the road or on-property treatments.

Tourism impacts

The proposed modification would not directly impact on any tourism activities and destinations.

However, the ramps would improve travel times and access to Macksville and nearby areas, making the region more readily accessible, when compared to the Approved Project. Car transport is important for tourists visiting the area and the improvement in travel time would enhance the attractiveness of Macksville and nearby areas and local tourism locations (eg the Nambucca River Tourist Park) as a destination.

As per the Project EA, signage would be used at the off ramp location to identify Macksville as a place for supplies, fuel, accommodation, tourist locations, facilities and other services.

6.9.3 Mitigation/ management measures

Mitigation/management measures for the Approved Project are relevant to the proposed modification. There are additional management measures in relation to light intrusion of the proposed modification:

- An additional section of visual screening along the southbound off-ramp to reduce the impacts of headlight intrusion
- Addition of a vegetated visual mound on Letitia Close near the south east corner of the roundabout to reduce the impacts of headlight intrusion
- The two properties where headlight glare may intrude into residences, Roads and Maritime will consult with the property owners to determine the best visual barrier (block out blinds, vegetation screen) to install to minimise head light intrusion.

6.10 Other environmental issues

6.10.1 Air quality

Considering that air quality impacts of the Approved Project were assessed in the Project EA as minor or negligible, the ramps with their relatively low traffic flows would have negligible impact on air quality and there would be no significant differences between options.

6.10.2 Hazard and risk

There would be no additional hazards and risks from the Project EA as a result of the proposed modification. There would only be a small portion of heavy vehicles with a hazardous load which would use the proposed modification.

6.10.3 Waste management

There would be no additional waste management impacts from the Project EA as a result of the proposed modification.

6.10.4 Energy

There would be no additional impacts on energy from the Project EA as a result of the proposed modification.

6.10.5 Greenhouse gas

There would be small additional impacts from greenhouse gases during the construction of the proposed modification.

During operation, the main sources of greenhouse gases would be from electricity in road lighting and vehicle emissions. Due to the improved highway access to Macksville from the north, there may be a small reduction in emissions as vehicles drive on a better pavement and grade, and have a shorter distance to access Macksville.

7. Conclusion and additional management measures

7.1 Conclusion

In response to representations from Nambucca Shire Council and the Macksville Chamber of Commerce to the Approved Project, Roads and Maritime are proposing to include north facing ramps at North Macksville (proposed modification).

The proposed modification would include a northbound on ramp onto the upgraded highway, a southbound off ramp from the upgraded highway, tie-ins of the ramps to local roads, an upgraded intersection at Old Coast Road and the existing Pacific Highway (existing highway) and a median cross-over facility to enable emergency vehicles (including ambulances stationed at North Macksville) to travel both north and south on the upgraded highway.

This modification environmental assessment has been prepared in order to seek planning approval for the proposed modification. The report addresses the key issues identified in the Director General's requirements for the Warrell Creek to Urunga Pacific Highway upgrade as well as issues raised in the Preferred Options report (refer to **Appendix A**).

The proposed modification has been designed to be mostly within the Approved Project boundary. Only small impacts in addition to these associated with the Approved Project are anticipated and include:

- Potential light intrusion to one residence in Letitia Close due to vehicle head lights on the off ramp and roundabout
- Additional construction traffic in the proposed modification area and possibly an increased duration of construction activities
- Slight increase in noise levels experienced by receivers (no more than 1 dB(A) for any receiver)
- Additional vegetation clearing including state and federally listed species.

7.2 Additional mitigation and management measures

Mitigation and management measures identified in the Project EA, are sufficient to address the majority of additional impacts. However, additional mitigation measures have been developed to address headlight intrusion of the proposed modification. These measures are:

- An additional section of visual screening along the southbound off-ramp to reduce the impacts of headlight intrusion
- Addition of a vegetated visual mound on Letitia Close near the south east corner of the roundabout to reduce the impacts of headlight intrusion
- The property where headlight glare may intrude into the residence - Roads and Maritime will consult with the property owner in connection with visual screening adjacent the road or on-property treatments
- An additional Nest Box Replacement Zone of similar quality habitat should be selected for relocation of nest boxes

- Should impacts to Slender Marsdenia be unavoidable, translocation of the affected individuals must be undertaken in accordance with the WC2NH Threatened Flora Management Plan. In this instance, consideration of additional biodiversity offsetting requirements should be undertaken by Roads and Maritime
- All environmental biodiversity management plans should be updated to include the additional areas of the proposal.

8. References

Austroads *Guide to Traffic Management Part 3: Traffic Studies and Analysis*

GeoLink 2016, *Biodiversity Assessment, North Facing Ramps – Warrell Creek to Nambucca Heads Pacific Highway Upgrade,* March, Sydney.

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