



Transport  
Roads & Maritime  
Services

---

# **REALIGNMENT OF THE NEWELL HIGHWAY AT GRONG GRONG**

## REVIEW OF ENVIRONMENTAL FACTORS

APRIL 2015

(blank page)

# Roads and Maritime Services

---

## Realignment of the Newell Highway at Grong Grong

Review of environmental factors  
April 2015

Prepared by NGH Environmental Pty Ltd

NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622) and NGH Environmental (Heritage) Pty Ltd (ACN: 603 938 549. ABN: 62 603 938 549) are part of the NGH Environmental Group of Companies.

RMS 15.120  
ISBN: 978-1-925217-33-9

# Executive summary

---

## The proposal

Roads and Maritime Services proposes to realign (build) a section of the Newell Highway to the west of Grong Grong (the proposal) about 22 kilometres east of Narrandera.

Key features of the proposal would include:

- Bypassing Grong Grong to the west of the town.
- Building about 2.4 kilometres of new two lane carriageway (one lane in each direction).
- Building a cutting around 940 metres long and up to 4.5 metres deep.
- Building a north and west access between the highway and Grong Grong. The accesses would include intersections with unrestricted turning movements in all directions, protected right turn lanes and deceleration lanes at the highway exit and entry points.
- Removing around 175 metres of existing road and then replanting between the north access and the new section of highway.
- Removing about 640 metres of existing road and then replanting between the west access and the new section of highway.
- Building a 1 metre wide painted centre median.
- Changing Angle Road and its connection with the existing highway.
- Adjusting public utilities, including relocating the Nextgen optic fibre cable.
- Building temporary ancillary facilities, including a work site compound, stockpile sites, construction water quality basins and haulage roads.

## Need for the proposal

The Newell Highway forms part of the National Land Transport Network (NLTN) and the Melbourne-Brisbane corridor. It is a crucial road link for freight, passenger and tourist traffic between Queensland, NSW and Victoria as well as within the Murrumbidgee region.

There is an existing low speed 90 degree bend on the Newell Highway within the town of Grong Grong that is a constraint to the efficient and safe operation of this increasingly important interstate and regional transport corridor.

Several trucks have rolled over at the bend. The layout of the existing highway and the crash history limit traffic efficiency, particularly for heavy vehicles, and prevents the operation of high productivity vehicles (longer heavy vehicles carrying heavier loads) along this section of the Newell Highway. Reference to 'longer heavy vehicles' means higher productivity vehicles (HPVs), which is the term used throughout this REF.

The proposal is needed to improve freight efficiency, provide HPV access and improve road safety.

## Proposal objectives

The objectives of the proposal include:

- Providing consistent travel speeds and times for Newell Highway traffic.
- Improving road safety and reducing the risk of incidents between local and through traffic and between vehicles, pedestrians and cyclists.

- Enabling access for HPVs, such as road trains on the Newell Highway.
- Maintaining suitable access to Grong Grong to support social and economic activity in the town.

## Options considered

Four route options were considered during the options selection process, including:

- Option 1: Do nothing.
- Option 2: Do minimum – safety improvements and widening.
- Option 3: Realignment of the Newell Highway – Outer Option.
- Option 4: Realignment of the Newell Highway – Inner Option.

The options were evaluated against the proposal objectives taking into account transport needs, social and environmental impacts and engineering and cost constraints.

Option 3 was selected as the preferred option as it would best meet the proposal objectives. While option 3 was the most expensive of the options it would best address the freight efficiency and access needs of the highway, allow for expected growth in freight traffic and provide the greatest assurance of road safety. It would also improve the amenity (improving the general feel of the town, making it more pleasant and attractive) of Grong Grong by reducing traffic conflicts and noise within the town and by improving safety for pedestrians and cyclists.

Two options were considered to provide access between the new road and the town of Grong Grong. The options included:

- Town access option A - dual access (north and west).
- Town access option B - single access (central).

The town access options were identified and evaluated in close consultation with the Grong Grong community.

Town access option A was identified as the preferred town access option. The selection of this option was based on a clear community preference for dual access in the north and west. Town access option A best meets the proposal objectives and allows vehicles to easily call through Grong Grong without having to backtrack. Town access option A would make stopping in Grong Grong more appealing for motorists than town access option B.

## Statutory and planning framework

Clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for the realignment of the Newell Highway to the west of Grong Grong and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from council is not required.

This review of environmental factors fulfils the requirements of Section 111 of the EP&A Act and has been prepared in accordance with clause 228 of the Environmental Planning and Assessment Regulation 2000. It has also considered the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the *Australian Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

## Community and stakeholder consultation

Consultation was undertaken in 2011 but the proposal was put on hold due to community concern and to reconsider the objectives of and need for the proposal.

Consultation on the current proposal started in September 2014. Feedback from the consultation helped inform the access option chosen and the concept design.

Roads and Maritime has consulted with the local community and stakeholders including the Grong Grong Progress Association, Earth Park Coordinator, local farmers, local clubs, local businesses, Narrandera Shire Council and government agencies. Community and stakeholder consultation has continued throughout the environmental assessment and will be ongoing during the detailed design and construction phases of the proposal.

## Environmental impacts

Beneficial outcomes from the proposal would include:

- Improved freight productivity by providing a more efficient route and enabling access for HPVs at Grong Grong. The proposal would reduce the highway travel distance by 810 metres and travel time by more than 1¼ minutes.
- Improved cost efficiency for the transport industry by extending HPV access on the Newell Highway. The equivalent of 160 vehicles could be taken off the road, improving cost efficiency by 22 per cent (Infrastructure NSW, 2014).
- Improved road safety by reducing the risk of incidents between local and highway traffic.
- Reduced traffic volumes travelling through Grong Grong, which would reduce traffic noise and air pollution and improve general amenity (improving the general feel of the town, making it more pleasant and attractive).
- More efficient travel times and consistent highway travel speed with additional benefits of reduced fuel consumption and carbon emissions.

Adverse impacts from the proposal would include:

- Permanent acquisition of between 15.7 hectares and 32.7 hectares of land (mostly agricultural land) resulting in the loss of land available for agricultural use.
- Clearing of 4.3 hectares of Inland Grey Box Woodland, which is listed as an endangered ecological community (EEC) under the TSC Act. Around 3.2 hectares of this area also meets the definition of the EEC listed under the EPBC Act.
- Removal of up to eight hollow bearing trees, which support nesting and roosting habitat for a variety of fauna.
- Loss of some passing trade for three local businesses including the motel, general store and hotel due to the highway bypassing Grong Grong.
- Potential for impacts on the town's identity, unique character and sense of place.
- Changes to access between the Newell Highway and the town, requiring additional movements for highway traffic to access Grong Grong.
- Alteration to property access for acquired properties including changes to farming practices such as sheep movements across the highway.
- Generation of dust and increased traffic during construction.
- Construction noise levels exceeding the NSW *Interim Construction Noise Guideline* (DECC, 2009) noise management levels at the majority of assessed residential sensitive receivers (some homes and the motel). The construction noise would be below the *highly noise-affected level* and would vary as work is carried out at different locations.

- Impacts on the landscape character and visual amenity (the look and feel) of the area as a result of clearing of woodland vegetation and because the new section of highway would be visible from some residences. The outlook would change from a mainly rural/agricultural area to a rural highway.

Impacts have been avoided or managed to an extent through selection of the preferred option and development of the concept design. For example, access between the highway and Grong Grong would be provided in the north and in the west. This dual access arrangement would provide through access to enable motorists to easily call into Grong Grong and return to the highway without the need to back track.

Safeguards and management measures have been identified to address, manage and minimise potential adverse environmental impacts from the proposal.

Key measures include:

- Installation of signage on the highway to encourage highway motorists to visit Grong Grong and to provide information about the businesses.
- Further consultation with local businesses, farmers, the local community and Narrandera Shire Council during detailed design, construction and operation of the proposal to carry out measures that minimise business and community impacts and to evaluate the effectiveness of those measures.
- Further consultation with affected landowners and residents where property acquisition or property access changes would be required.
- Vegetation pre-clearing and clearing activities will be carried out in accordance with the Roads and Maritime *Biodiversity Guidelines* (RTA, 2011).
- Implementing the urban design plan, including appropriate signage at the access points and avenue planting of local species along the north and west access roads to help define the town entrances.
- Residents and businesses identified as noise sensitive receivers for the proposal will be informed in advance of the extent and timing of potentially noisy construction activities.

Biodiversity offsets for cleared Inland Grey Box Woodland EEC will be required for the proposal. Roads and Maritime will prepare a biodiversity offset strategy for the proposal.

## Justification and conclusion

The preferred option best meets the proposal objectives and would satisfy key government strategies and plans.

A number of potential environmental impacts from the proposal have been avoided or reduced during options assessment and development of the concept design. Safeguards and management measures detailed in this REF would further minimise and manage expected impacts.

The proposal would deliver improved road safety, consistent travel speeds and reduced travel times, improved freight efficiency and improved traffic noise and pollution within Grong Grong. The long term benefits of the proposal are considered to outweigh the likely environmental impacts. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning. The proposal is unlikely to significantly affect threatened species, populations or ecological communities or their habitats and therefore a species impact statement is not required. The proposal is also unlikely to significantly affect Commonwealth land or have a significant impact on any matters of national environmental

significance and therefore a referral to the Federal Minister for the Environment is not considered necessary.

## Display of the review of environmental factors

This review of environmental factors is on display for comment between Monday 27 April and Friday 15 May. You can access the documents in the following ways:

### Internet

The documents will be available as pdf files on the Roads and Maritime website at <http://www.rms.nsw.gov.au/projects/south-western/grong-grong/index.html>.

### Display

The review documents can be viewed at the following locations:

- **Grong Grong General Store**, 34 Junee Street, Grong Grong, Monday to Friday 6.30am to 6pm, Saturdays 8am to 6pm, Sundays 8am to 2pm.
- **Narrandera Shire Council**, 141 East Street, Narrandera, Monday to Friday 8.15am to 4.30pm.

### Community information session

To find out more visit the community information session at the Grong Grong Hall on Wednesday 6 May 2015 anytime between 10am and 6pm.

### Purchase

The review documents are available for purchase in hard copy (\$25.00) or CD/USB (\$10.00) by contacting Project Development Officer, Dean Howard, on (02) 6938 1121.

## How can I make a submission?

To make a submission on the proposal, please send your written comments to:

Roads and Maritime Project Development Officer:  
Dean Howard  
Roads and Maritime Services  
PO Box 484, Wagga Wagga NSW 2650  
T 6938 1121  
E [Wagga.Regional.Office@rms.nsw.gov.au](mailto:Wagga.Regional.Office@rms.nsw.gov.au)

Submissions must be received by 5pm Friday 15 May 2015.

## Privacy information

All information included in submissions is collected for the sole purpose of assisting in the assessment of this proposal. The information may be used during the environmental impact assessment process by relevant Roads and Maritime staff and its contractors.

Where the respondent indicates at the time of supply of information that their submission should be kept confidential, Roads and Maritime will attempt to keep it confidential. However there may be legislative or legal justification for the release of the information, for example under the *Government Information (Public Access) Act 2009* or under subpoena or statutory instrument.

The supply of this information is voluntary. Each respondent has free access at all times to



the information provided by that respondent but not to any identifying information provided by other respondents if a respondent has indicated that the representation should be kept confidential.

Any respondent may make a correction to the information that they have provided by writing to the same address the submission was sent.

The information will be held by Roads and Maritime, 1 Simmons Street, Wagga Wagga NSW 2650.

## What happens next?

Following the submissions period, Roads and Maritime will collate submissions. Acknowledgement letters will be sent to each respondent. The details of submission authors will be retained and authors will be subsequently advised when project information is released.

After consideration of community comments Roads and Maritime will determine whether the proposal should proceed as proposed, or whether any alterations to the proposal are necessary. The community will be kept informed regarding this Roads and Maritime determination.

If the proposal goes ahead, Roads and Maritime proceeds with final design and tenders are called for construction of the project.

If you have any queries, please contact the Roads and Maritime project manager on (02) 6938 1121.

# Contents

---

1	Introduction .....	1
1.1	Proposal identification .....	1
1.2	Purpose of the report.....	2
2	Need and options considered .....	6
2.1	Strategic need for the proposal .....	6
2.2	Existing road and infrastructure.....	10
2.3	Proposal objectives .....	11
2.4	Alternatives and options considered .....	11
2.5	Preferred option.....	25
3	Description of the proposal .....	27
3.1	The proposal .....	27
3.2	Design .....	31
3.3	Major design features.....	32
3.4	Construction activities .....	36
3.5	Ancillary facilities .....	41
3.6	Public utility adjustment.....	42
3.7	Property acquisition.....	45
4	Statutory and planning framework .....	48
4.1	State Environmental Planning Policies.....	48
4.2	Local Environmental Plans.....	50
4.3	Other relevant legislation.....	53
4.4	Commonwealth legislation .....	55
4.5	Confirmation of statutory position.....	55
5	Stakeholder and community consultation .....	56
5.1	Consultation strategy.....	56
5.2	Community involvement.....	56
5.3	Aboriginal community involvement.....	60
5.4	State Environmental Planning Policy (Infrastructure) consultation.....	60
5.5	Government agency and stakeholder involvement .....	60
5.6	Ongoing or future consultation .....	61
6	Environmental assessment .....	62
6.1	Biodiversity .....	62
6.2	Property and land use .....	85
6.3	Traffic and transport .....	92
6.4	Socio Economic.....	96
6.5	Landscape character and visual amenity .....	105
6.6	Noise and Vibration.....	112
6.7	Soils and water.....	132
6.8	Aboriginal Heritage.....	136
6.9	Non-Aboriginal Heritage .....	138
6.10	Air Quality.....	139

6.11	Waste Minimisation and Management .....	141
6.12	Cumulative Impacts.....	145
6.13	Summary of beneficial effects .....	145
6.14	Summary of adverse effects.....	145
7	Environmental management .....	147
7.1	Environmental management plans (or system).....	147
7.2	Summary of safeguards and management measures .....	147
7.3	Licensing and approvals.....	157
8	Conclusion .....	158
8.1	Justification.....	158
8.2	Objects of the EP&A Act .....	159
8.3	Conclusion.....	164
9	Certification .....	165
10	References.....	166

## Figures

Figure 1-1:	The proposal.....	4
Figure 1-2:	Regional context of the proposal .....	5
Figure 2-1:	Preliminary route options, 2011 .....	12
Figure 2-2:	Preliminary access route option 1 (for option C), 2011.....	13
Figure 2-3:	Preliminary access route option 2 (for option C), 2011.....	13
Figure 2-4:	Preliminary access route option 3 (for option C), 2011.....	14
Figure 2-5:	Preliminary access route option 4 (for option C), 2011.....	14
Figure 2-6:	Proposed route options (Source: Roads and Maritime, 2014).....	17
Figure 2-7:	Town access option A – Dual Access.....	22
Figure 2-8:	Town access option B – Single Access (Central) .....	23
Figure 3-1:	Key features of the proposal – Western end (refer Figure 3-5 for intersection arrangement) .....	28
Figure 3-2:	Key features of the proposal - Centre.....	29
Figure 3-3:	Key features of the proposal – Northern end (refer Figure 3-6 for intersection arrangement) .....	30
Figure 3-4:	Typical cut and fill cross sections for the proposal. ....	33
Figure 3-5:	Close up of Dual Access – West (Source: Roads and Maritime, 2015) .	34
Figure 3-6:	Close up of Dual Access – North (Source: Roads and Maritime, 2015) .	35
Figure 3-7:	Location of potential water extraction point .....	40
Figure 3-8:	Photos of ancillary facility locations .....	41
Figure 3-9:	Map of utilities in the area.....	43
Figure 3-10:	Nextgen fibre optic cable relocation.....	44
Figure 3-11:	Proposed property acquisition options (Source: Roads and Maritime, 2014).....	47
Figure 4-1:	Land Use Zones (Source: Narrandera LEP 2013).....	51
Figure 4-2:	Map of Land classed as Terrestrial Biodiversity (Source: Narrandera LEP 2013).....	53
Figure 6-1:	Survey areas for threatened orchids.....	64
Figure 6-2:	Vegetation communities identified though NSW VIS (OEH, 2014).....	66
Figure 6-3:	Vegetation types within the construction footprint. ....	69
Figure 6-4:	Distribution of the Inland Grey Box Woodland EEC within the construction footprint .....	71
Figure 6-5:	Location of habitat features within the study area .....	75

Figure 6-6: Location of businesses and other facilities in Grong Grong <i>Source: PAA Design November 2014, p. 8</i> .....	87
Figure 6-7: Landscape character zones (Source: Peter Andrews and Associates, 2014).....	107
Figure 6-8: Selected viewpoints for the proposal.....	108
Figure 6-9: Noise monitoring locations.....	113
Figure 6-10: Existing Newell Highway $L_{eq,15hr}$ daytime traffic noise levels, dB(A) ....	117
Figure 6-11: Existing Newell Highway $L_{eq,9hr}$ night-time traffic noise levels, dB(A) .....	118
Figure 6-12: Proposed 2016 Newell Highway $L_{eq,15hr}$ daytime traffic noise levels, dB(A).....	126
Figure 6-13: Proposed 2016 Newell Highway $L_{eq,9hr}$ night-time traffic noise levels, dB(A).....	127
Figure 6-14: Proposed 2026 Newell Highway $L_{eq,15hr}$ daytime traffic noise levels, dB(A).....	128
Figure 6-15: Proposed 2026 Newell Highway $L_{eq,9hr}$ night-time traffic noise levels, dB(A).....	129

## Tables

Table 2-1: Performance of the route options against the proposal objectives .....	18
Table 3-1: Proposal Design Criteria and Requirements.....	31
Table 3-2: Estimated materials and quantities .....	38
Table 3-3: Breakdown of vehicle usage on site .....	39
Table 3-4: Proposed property acquisition details .....	46
Table 4-1: SEPP (Rural Lands) response to the Clause 7 planning principles.....	48
Table 4-2: Land use zoning and permissibility under Narrandera LEP .....	52
Table 5-1: Overview of community consultation and activities to date.....	57
Table 5-2: Summary of issues raised by the community .....	58
Table 6-1: Vegetation types within the study area. ....	68
Table 6-2: Approximate area of each vegetation type and EEC within the construction footprint.....	76
Table 6-3: Assessments of significance undertaken for flora species .....	78
Table 6-4: Assessments of significance undertaken for fauna species .....	79
Table 6-5: Key threatening process relevant to the proposal.....	81
Table 6-6: Traffic volumes – Grong Grong, 2011 counts.....	93
Table 6-7: Traffic volumes – Grong Grong, 2031 counts.....	94
Table 6-8: Sensitivity and magnitude rankings .....	105
Table 6-9: Landscape character impact matrix.....	106
Table 6-10: Magnitude and sensitivity of visibility .....	106
Table 6-11: Summary of visual impacts (Peter Andrews and Associates, 2014)....	109
Table 6-12: Summary of impacts at each LCZ.....	110
Table 6-13: Attended 15-minute noise measurement summary (19 May 2009) ....	116
Table 6-14: Modelled traffic volumes .....	116
Table 6-15: Noise management levels at Residential receivers .....	119
Table 6-16: Construction noise management levels (NMLs) – standard hours .....	120
Table 6-17: Road traffic noise assessment criteria for residential land uses .....	120
Table 6-18: Relative increase criteria for residential land uses.....	121
Table 6-19: Construction noise predictions, standard construction hours .....	122
Table 6-20: Operational noise predictions, dB(A) .....	125
Table 6-21: Potential type and sources of waste generated during construction of the proposal .....	143
Table 7-1: Summary of site specific environmental safeguards.....	148
Table 8-1: Objects of the EP&A Act and relevance to the proposal.....	160

## **Appendices**

- Appendix A Site Photos
- Appendix B Current design layout
- Appendix C Consideration of clause 228(2) factors and matters of national environmental significance
- Appendix D Socio Economic Assessment (Elton Consulting Group Pty Ltd)
- Appendix E Stage 1 and Stage 2 PACHCI letters
- Appendix F Biodiversity Assessment (NGH Environmental Pty Ltd)
- Appendix G Background Searches
- Appendix H Newell Highway realignment at Grong Grong - Urban Design Strategy (Peter Andrews + Associates Pty Ltd)
- Appendix I Noise Assessment Report (EMGA Mitchell McLennan Pty Ltd)

# 1 Introduction

---

## 1.1 Proposal identification

Roads and Maritime Services proposes to realign a section of the Newell Highway to the west of Grong Grong (the proposal). The proposal is located within the Narrandera local government area (LGA), and is within the Roads and Maritime South West Region.

The proposal is required to reduce travel times on the highway, improve freight efficiency and increase safety for road users and pedestrians. It would remove a sharp, low speed 90 degree turn from the Newell Highway located within town and replace it with a 110 km/h highway bypassing Grong Grong to the west. The proposal is shown in Figure 1-1.

A detailed description of the proposal is in Chapter 3.

Key features of the proposal would include:

- Realigning a section of the Newell Highway from about 20.4 kilometres to about 23.2 kilometres east of Narrandera. The realignment would bypass Grong Grong to the west of the town.
- Constructing about 2.4 kilometres of new two lane carriageway (one lane in each direction).
- Constructing two accesses between the highway and Grong Grong; one about 1.4 kilometres to the north and another around 1.3 kilometres to the west of Grong Grong. The accesses would include intersections with unrestricted turning movements in all directions, protected right turn lanes and deceleration lanes at the highway exit and entry points.
- Constructing a large cutting at about 22 kilometres east of Narrandera around 940 metres long and up to 4.5 metres deep.
- Removing around 175 metres of existing road and then replanting between the north access and the new highway alignment.
- Removing around 640 metres of existing road and then replanting between the west access and the new highway alignment.
- Constructing a 1 metre wide painted centre median.
- Changing Angle Road and its connection with the existing highway.
- Adjusting public utilities, including relocating the Nextgen optic fibre cable.
- Constructing temporary ancillary facilities, including a work site compound, stockpile sites, construction water quality basins and haulage roads.

The existing highway through Grong Grong would be transferred to Narrandera Shire Council to operate as a regional and local road once the new alignment is operational. Part of this section of road would become Berrembed Street and another part would become Canola Way. Redundant sections of road would be removed and these areas would be revegetated. The exact configuration would be negotiated with council. Any works required to meet council standards for local roads would be carried out before hand over. The works may include heavy patching, line marking and resealing and would be confirmed by a joint Roads and Maritime and Narrandera Shire Council condition assessment.

The new highway alignment would be signposted for 110 km/h. The proposal would also include suitable signposting to encourage motorists to stop and rest in town.

The regional context of the proposal is shown in Figure 1-2.

The Newell Highway passes through the town of Grong Grong, which is one of the four main settlements within the Narrandera Shire. The population of Grong Grong in 2011 was 391 people within a 1.1km<sup>2</sup> area (Australian Bureau of Statistics, 2011).

Grong Grong consists of a number of residential properties and is surrounded by rural areas that are mainly used for agricultural activities such as cropping and grazing. Vegetation within the region is fragmented and isolated in the landscape. The main areas of remnant vegetation include scattered areas located on the eastern side of the Newell Highway just north of the town, along Narran Street and within the road reserve of the Newell Highway. The street network of Grong Grong is generally based on a grid pattern and includes a number of formed and unformed roads.

The Junee Hay Railway line extends through Grong Grong and is used for various freight services, however, the weekly passenger train service between Sydney, Narrandera and Griffith no longer stops in Grong Grong. Narrandera is the closest operating passenger station. There are a number of small businesses that operate in Grong Grong including a motel, mechanic and agricultural supply / stock and station agent, all located on the existing Newell Highway. Other local businesses include a general store (which incorporates a newsagent, licensed post office and accredited visitor information centre) along Junee Street, a hotel on the Ganmain Road, as well as active grain silos and a piggery just outside the town. Grong Grong Park, on the corner of Balaro and Junee streets, adjacent to the general store, is used as a rest area by passing motorists.

The topography of Grong Grong is relatively flat, rising gently in the north (towards Ardlethan). There are no waterways located near the proposal. The nearest waterway is Cowabbie Creek, about 1.5 kilometres east of the proposal. This creek flows into Bundidgerry Creek which flows in a westerly direction about five kilometres south of the proposal.

Ardlethan is located about 47 kilometres to the north of Grong Grong along the Newell Highway. Matong and Ganmain are located to the east of Grong Grong along Ganmain Road. Narrandera is located about 22 kilometres west of Grong Grong along the Newell Highway.

## 1.2 Purpose of the report

This Review of Environmental Factors (REF) has been prepared by NGH Environmental on behalf of Roads and Maritime South West Region. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impact of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposal and associated environmental impacts has been undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act.
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in Section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.



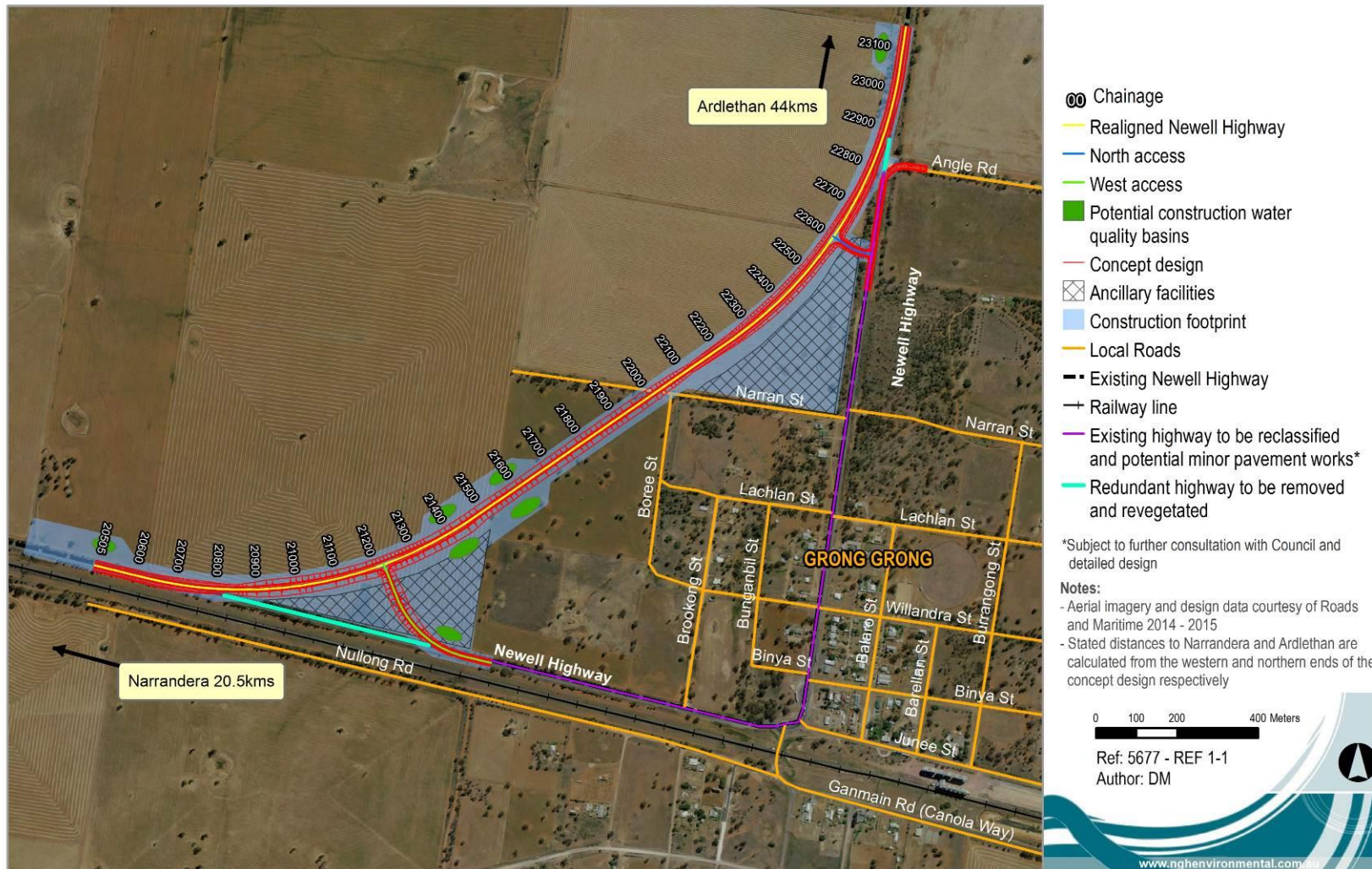
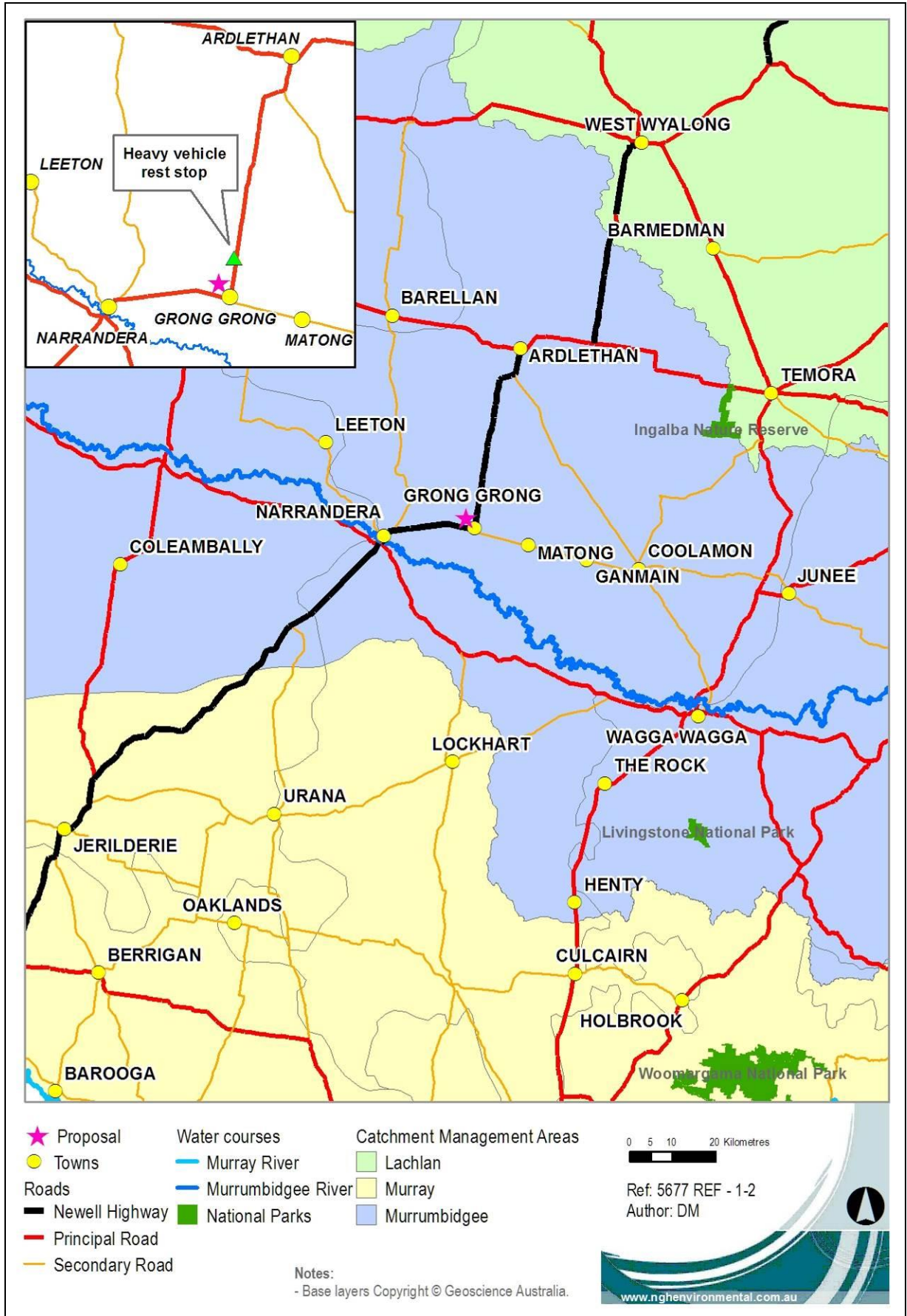


Figure 1-1: The proposal



**Figure 1-2: Regional context of the proposal**

## 2 Need and options considered

---

### 2.1 Strategic need for the proposal

The Newell Highway is part of the National Land Transport Network (NLTN) and the Melbourne-Brisbane corridor. It is a crucial road link for freight, passenger and tourist traffic between Queensland, NSW and Victoria. The Newell Highway provides a key economic link to domestic and export markets for agricultural products from across western NSW (Infrastructure NSW, 2014). It is also an important regional traffic route by linking towns and major centres in the region.

The amount of freight to be moved along the Newell Highway (the freight task) is substantial. In 2007, the Newell Highway between Narrandera and Moree (encompassing Grong Grong) experienced 1.2 million tonnes of regional freight movement. About 600 (650 towards Narrandera and 534 towards Ardlethan) heavy vehicles travel the Newell Highway through Grong Grong on average each day, which is around 32 per cent of all traffic. As there is no direct rail link between Melbourne and Brisbane, the amount of road freight along the Newell Highway will continue to remain high. It is estimated that heavy vehicle traffic at Grong Grong will increase to 1060 heavy vehicles per day by 2031, which is an increase of 77 per cent (based on 2011 heavy vehicle numbers).

The majority of the Newell Highway has a posted speed limit of 110 km/h. The current alignment of the Newell Highway through Grong Grong has a posted speed limit of 60 km/h. The low speed 90 degree bend at an intersection within town is posted with 35 km/h curve advisory signage. The low speed 90 degree bend in the Newell Highway at Grong Grong restricts traffic efficiency and constrains travel times for all vehicles, in particular freight vehicles.

The low speed 90 degree bend in the highway also prevents the operation of High Productivity Vehicles (HPV) such as B-triples and A-Doubles through Grong Grong. The intersection is one of three remaining constraints to the operation of HPVs on the highway between West Wyalong and Tocumwal. Extending HPV access on the Newell Highway would mean that the equivalent of 160 vehicles could be taken off the road, improving cost efficiency by 22 per cent (Infrastructure NSW, 2014).

There have been several truck rollovers and light vehicle incidents at the current low speed 90 degree bend. Safety works were completed at this area in 2012 which included improved signage and line marking. However, the presence of the low speed 90 degree bend in the highway alignment continues to present a safety risk and there have been two crashes at this location since the safety works were completed.

The current alignment of the Newell Highway at Grong Grong and crash history mean that operation of HPVs through Grong Grong cannot be allowed. Currently, the largest approved vehicles along this section of the highway are Higher Mass Limit (HML) B-Doubles. If left untreated, this location would prevent improved efficiency of long-haul movement once adjacent sections are approved for HPV operation.

If the proposal does not proceed, the vision and planned outcomes for the Newell Highway stated in the Long Term Transport Master Plan, the Freight and Ports Strategy and the draft Newell Highway Corridor Strategy at Grong Grong, would not be achieved (refer to section 2.1.1). The planned gains in freight productivity and the operation of HPVs over the full length of the Newell Highway would not be delivered.

The proposal is required to:

- Improve road safety and reduce conflicts between local and through traffic and between vehicles and vulnerable road users. With the potential increase in heavy vehicle traffic by 77 per cent to 1060 trucks per day by 2031, road safety issues and conflicts between local and through traffic would intensify.
- Enable access for HPVs along this section of the Newell Highway, which would improve freight efficiency.
- Improve consistent travel speeds for Newell Highway traffic, reduce travel time and fuel consumption and reduce costs to road users.

### 2.1.1 Relevant plans and strategies

#### **NSW 2021: A Plan to Make NSW Number One**

*NSW 2021: A Plan to Make NSW Number One* (Department of Premier and Cabinet, 2011) is a 10 year plan that provides goals and targets to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen the local environment and communities. It is the NSW Government's strategic plan, setting priorities for action and guiding resource allocation.

The Plan lists a number of goals relevant to the proposal, including:

- Reduce travel time.
- Improve road safety.
- Invest in critical infrastructure.

The proposal is considered to be consistent with *NSW 2021: A Plan to Make NSW Number One* as it would improve road safety and reduce travel times by bypassing the town of Grong Grong and the current low speed 90 degree bend. The proposal would be an investment in critical infrastructure as it would improve a section of the National Land Transport Network and the Melbourne-Brisbane corridor. In particular the proposal would remove one of the last three remaining constraints to the operation of HPVs on the Newell Highway between West Wyalong and Tocumwal.

#### **NSW State Infrastructure Strategy**

The NSW Government's *State Infrastructure Strategy* (Department of Premier and Cabinet, December 2012) responds to the recommendations in the *Infrastructure NSW 20 year State Infrastructure Strategy: First things first* (Infrastructure NSW, 2012). The *State Infrastructure Strategy Update 2014* (Infrastructure NSW, 2014) recommends to the NSW Government the next critical infrastructure priorities for NSW consistent with the *State Infrastructure Strategy*.

*State Infrastructure Strategy: First things first* (Infrastructure NSW, October 2012) identifies two objectives for Regional NSW that the proposal would contribute towards achieving, including:

- Improve local transport networks.
- Efficient access to markets, particularly mining and agricultural products to domestic and international markets.

The proposal would improve Grong Grong's local transport network by removing highway traffic from town and by improving road safety.

The proposal would improve the efficiency of transporting agricultural products to market by reducing travels times and removing one of the three remaining constraints to HPVs on the Newell Highway between West Wyalong and Tocumwal.

*State Infrastructure Strategy update 2014* (Infrastructure NSW, November 2014) identifies that various intersection upgrades will be essential in “unlocking the productive potential of the Newell”. The 2014 update states that “there are a number of intersections where turning is required to stay on the highway, with seven intersections preventing HPV access altogether”. The 2014 update specifically identifies addressing the intersection at Grong Grong as a priority investment.

### **NSW Long Term Master Plan 2012**

The *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) sets the framework for the NSW Government to deliver an integrated, modern transport system that puts the customer first. The NSW Long Term Transport Master Plan will guide the NSW Government’s transport funding priorities during the next 20 years.

The Newell Highway is mentioned a number of times throughout the master plan. Upgrades along the Newell Highway will deliver improved safety and travel times for all road users and better efficiency and increased amenity for local communities. All of which are consistent with the objectives of the proposal.

The master plan outlines a section regarding strategic regional corridors. A number of road corridors have strategic value in supporting economic development, population and employment growth. The Newell Highway is considered to be a strategic regional corridor. Keeping the Newell Highway corridor open and performing well in moving both people and freight will positively impact on the broader regional and NSW economies. Avoiding the low speed 90 degree bend and upgrading this section of the Newell Highway to accommodate HPVs would support this.

The proposal is specially mentioned in this master plan, which states “We will realign the Newell Highway (A39) at Grong Grong” (p 257).

A specific action that comes from the master plan is the development of a Newell Highway (A39) corridor strategy to support greater use of HPVs. The *Draft Newell Highway Corridor Strategy* (Transport for NSW, 2014) aims to provide access for HPVs along the entire length of the Newell Highway in the short to medium term, which in turn would address road safety, transport efficiency and asset performance issues. The proposal would remove one of the three remaining constraints to HPVs on the Newell Highway between West Wyalong and Tocumwal.

### **NSW Freight and Ports Strategy**

The *NSW Freight and Ports Strategy* provides a framework for industry, all levels of government and stakeholders to guide investment and other decisions to enhance freight logistics in NSW (Transport for NSW, 2013).

The proposal is specifically mentioned in this strategy as a funded project, which states “The Newell Highway forms part of the NLTN Melbourne-Brisbane Corridor and is a crucial road link for freight traffic between Queensland and Victoria. This project will construct a bypass for the Newell Highway at Grong Grong, to include a link road with the village. The realignment will remove poor horizontal alignment and permit the Newell Highway to accommodate a posted speed limit of 100km/h”.

The proposal supports a number of actions from the strategy including:

- *Improving access for HPVs on State and Local roads.* The proposal would create a new alignment that would bypass the town of Grong Grong. This would remove the 90 degree bend from the highway alignment, which would enable access for the operation of HPVs along this section of highway.
- *Developing and maintaining capacity for freight on the road network.* The proposal would improve travel times, road efficiency and freight capacity.

- *Develop and maintain projects to support network capacity.* The proposal would enable HPV operations along this section of the highway.
- *Mitigate noise and emissions from freight operations.* The proposal would reduce noise and other emissions within the town as the highway would bypass Grong Grong. The new highway alignment would also reduce fuel consumption and emissions from heavy vehicles as they would no longer have to decelerate to negotiate the turn or reduce their speed through town when travelling on the highway.
- *Improve heavy vehicle safety.* The proposal would create a highway bypass of the town, avoiding the low speed 90 degree bend at Grong Grong. This would substantially decrease the risk of heavy vehicle crashes on the highway and at this bend.

### **Murray-Murrumbidgee Regional Transport Plan**

The *Regional Transport Plan for Murray-Murrumbidgee* (Transport for NSW, 2013) outlines specific actions to address the specific challenges of the area. The plan looks at the changing demographics in the Murray-Murrumbidgee region, taking into account not only a growing, but an ageing population and the increasing need for better links between towns within the region.

The plan identifies specific actions for the Murray-Murrumbidgee region including investing in the road network by improving safety, increasing accessibility and enhancing freight efficiency. Reference is made to the NSW Long Term Transport Master Plan, regarding the proposal by stating “We will realign the Newell Highway (A39) at Grong Grong”. The regional plan would target the opportunity to invest in the road network by realigning this section of the Newell Highway at Grong Grong as it would align with a number of the stated actions.

### **Draft Newell Highway Corridor Strategy**

The *Draft Newell Highway Corridor Strategy* (Transport for NSW, 2014) sets out how the NSW Government will manage road transport along the Newell Highway in the long-term. From road safety and transport efficiency to asset maintenance issues, this strategy sets the direction for managing the Newell Highway into the future.

Realignment of the Newell Highway at Grong Grong is specifically mentioned as a short term action within the corridor strategy (Transport for NSW, 2014, page 31).

The proposal is also discussed within the strategy in relation to potential intersection improvements required for adequate HPV access. The strategy states that an upgrade of the intersection is required to remove the 90 degree bend from the Newell Highway, to improve the alignment of the highway and allow heavy vehicles to travel more smoothly and safely.

One of the key challenges stated in the corridor strategy is economic growth/productivity relating to HPV access to some sections of the Newell Highway. This relates to current intersection configurations such as the low speed 90 degree bend at Grong Grong. To address this challenge the strategy states “There are intersections that need to be improved to facilitate HPV access including Grong Grong, West Wyalong heavy vehicle bypass, Parkes intersections and Narrandera intersections.”

Short-term investments are identified in the strategy relating to the improvement of intersections along the route so HPVs can travel the full length of the highway, in particular at West Wyalong (vehicle bypass) and Grong Grong.

## Riverina Regional Plan 2013 - 2016

The focus of the *Riverina Regional Plan* (Regional Development Australia – Riverina, 2013) is on projects with regional significance. Its five key goals are:

- Encourage greater economic diversity and industry innovation.
- Nurture the development of a sustainable environment for future generations and develop an innovative response to the water challenge.
- Support education and skill development initiatives to develop the capacity and confidence to contribute to regional growth.
- Facilitate a collaborative approach between all tiers of government, business and community to solving the challenges of the region.
- Encourage a positive approach to health and living.

The proposal would support the Riverina Regional Plan through encouraging greater economic diversity and industry innovation by providing improved road and freight efficiency at Grong Grong and also providing HPV capacity.

## 2.2 Existing road and infrastructure

The Newell Highway serves the Central West of NSW. It is a vital part of the Melbourne-Brisbane transport corridor, providing a major interstate route for freight and people such as tourists and long-distance coach passengers.

The Newell Highway is designated National Route A39 and is the longest highway in NSW being about 1058 kilometres long. From north to south the Newell Highway begins at the Queensland border near Goondiwindi and runs south through the main towns of Moree, Narrabri, Dubbo, Parkes, West Wyalong, Narrandera, Jerilderie and Finley. It ends at Tocumwal where the highway crosses the New South Wales/Victoria border at the Murray River and continues south through Victoria as the Goulburn Valley Highway.

Through Grong Grong, the Newell Highway is a single undivided carriageway with one lane in each direction. The speed limit is 110km/h, reducing to 60km/h through Grong Grong. The existing low speed 90 degree bend in the highway at Grong Grong has curve advisory signage of 35km/h. Travelling south into Grong Grong the highway descends a gentle slope just at the northern limit of the town. Ganmain Road (MR243) intersects with the Newell Highway immediately west of the bend, crosses the railway line and extends to the east towards Junee and Gundagai.

The existing road surface through town is generally in good condition, although contains some minor pot holes and surface failures. The low speed 90 degree bend was resurfaced in 2012 with asphalt.

A heavy vehicle rest area, "Firetail Rest Area", is located about five kilometres to the north of Grong Grong. It accommodates up to 21 heavy vehicles and 10 light vehicles. Facilities at this rest area include four picnic table shelters and a toilet block, all constructed in 2012. A designated fruit disposal zone is located about 7.5 kilometres west of Grong Grong, towards Narrandera. The only facilities available at this disposal point are three disposal bins. There is a local park in the town of Grong Grong on the corner of Balara and Junee streets, known as Grong Grong Park. Facilities include covered picnic tables, barbeques, toilets, drinking water, public phone and rubbish bins. Although the park is not an official rest area or campground, it is regularly used by travellers for up to 24 hours, particularly caravans.

Existing lighting through the town of Grong Grong consists of single street lights at Willandra, Binya, Junee and Berrembed streets, intersecting with the existing Newell

Highway.

Safety works were completed in 2012 along the existing Newell Highway at Grong Grong. These included correction to the slope of the road surface, renewed line marking and signposting and installation of raised pavement markers and additional guide posts.

## 2.3 Proposal objectives

The objectives of the proposal include:

- Providing consistent travel speeds and times for Newell Highway traffic.
- Improving road safety and reducing the risk of incidents between local and through traffic and between vehicles, pedestrians and cyclists.
- Enabling access for longer heavy vehicles, such as road trains on the Newell Highway.
- Maintaining suitable access to Grong Grong to support social and economic activity in the town.

Reference to 'longer heavy vehicles' means higher productivity vehicles (HPVs), which is the term mainly used throughout this REF.

Urban design objectives for the proposal include:

- Ensure connectivity is maintained and improved to and from the village and the new highway.
- Respect the value of Grong Grong as a place of interest.
- Ensure the highway and access roads are a sensitive fit within Grong Grong and its landscape setting.
- Design for low maintenance.

## 2.4 Alternatives and options considered

### 2.4.1 Options development and selection process

The options assessment started in 2008. Initially the primary driver for the project was the need to address ongoing road safety issues caused by the low speed 90 degree bend on the highway alignment at Grong Grong. The (then) Roads and Traffic Authority (RTA) investigated and developed preliminary realignment options ranging from realignment of the highway within the town to an external realignment that would bypass the town, as shown in Figure 2-1.

From these preliminary realignment options the (then) RTA selected a preferred preliminary realignment option, Option C. This option was chosen as it addressed road safety issues and avoided direct impacts to existing houses while still being close to town. The preferred preliminary realignment option was further developed to include access locations to enter and exit the town of Grong Grong. The four initial access options were:

- Initial town access option 1: Access located 400 metres west of the town of Grong Grong (shown in Figure 2-2).
- Initial town access option 2: Access connected in with Wallandra Street (shown in Figure 2-3).
- Initial town access option 3: Access connected in with Narran Street (shown in



Figure 2-4.

- Initial town access option 4: Access located 100 metres north of Narran Street (shown in Figure 2-5).

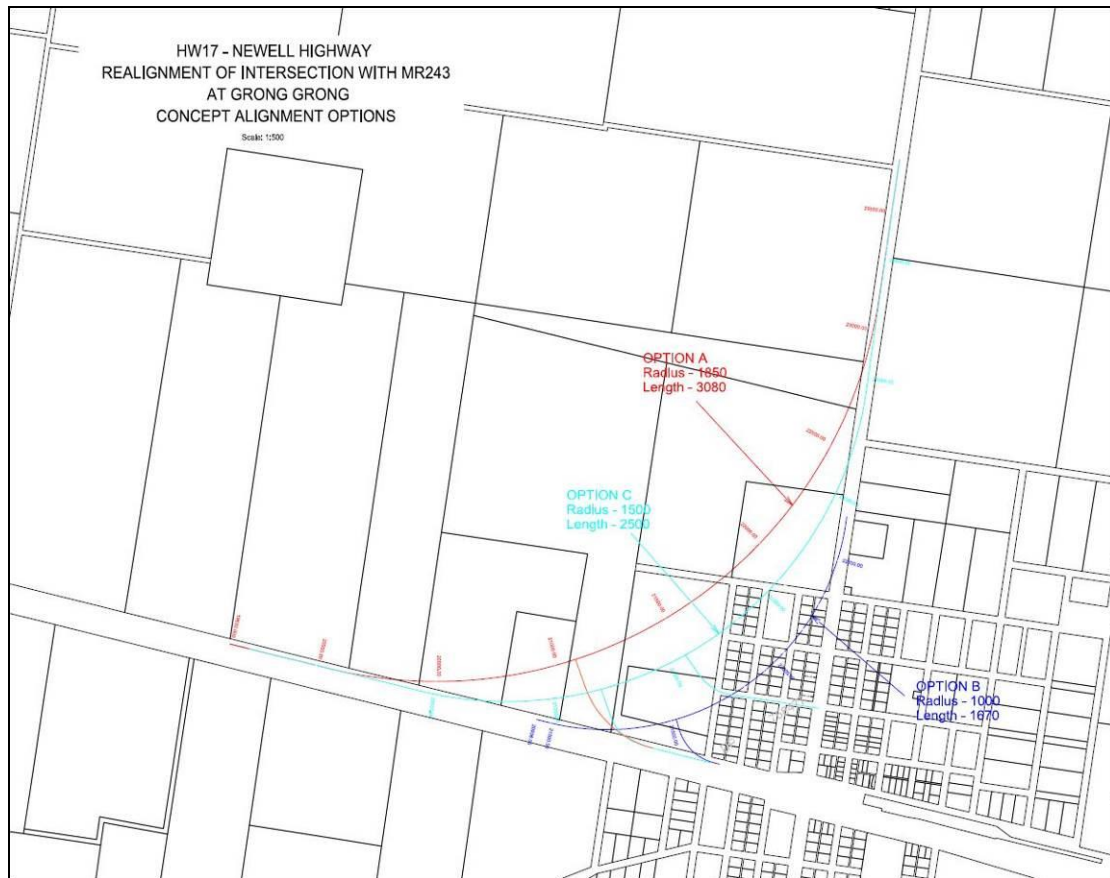


Figure 2-1: Preliminary route options, 2011

NEWELL HIGHWAY INTERSECTION REALIGNMENT, GRONG GRONG

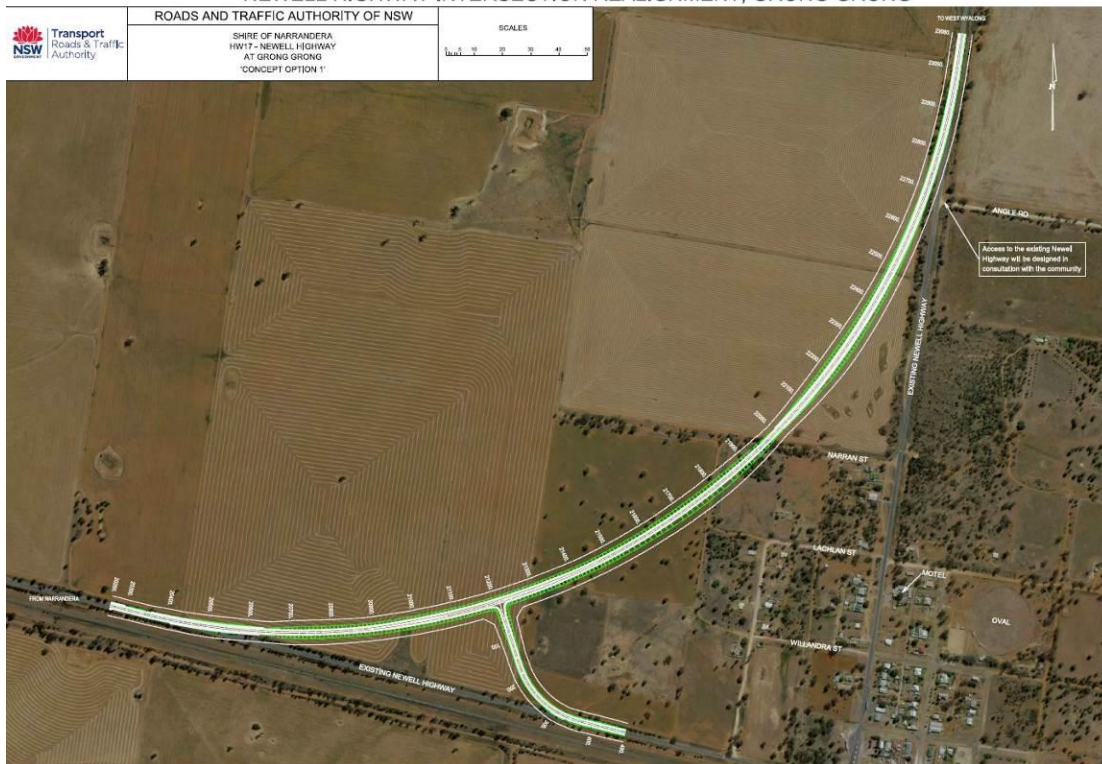


Figure 2-2: Preliminary access route option 1 (for option C), 2011

NEWELL HIGHWAY INTERSECTION REALIGNMENT, GRONG GRONG

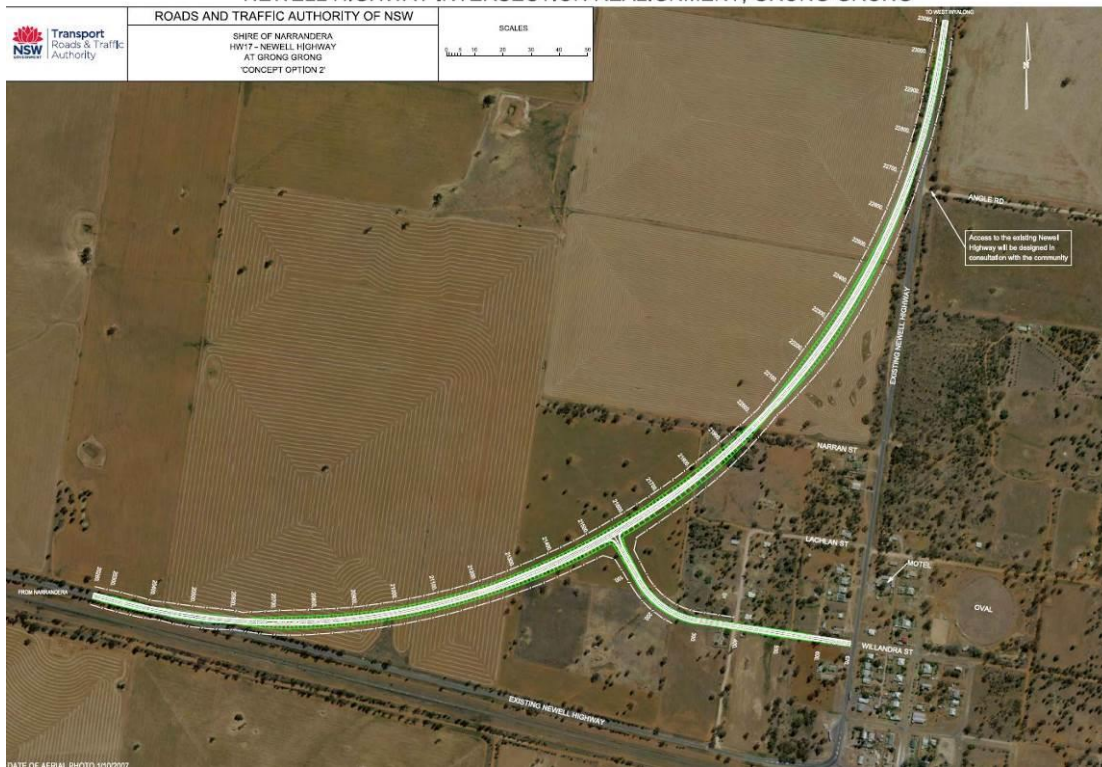


Figure 2-3: Preliminary access route option 2 (for option C), 2011

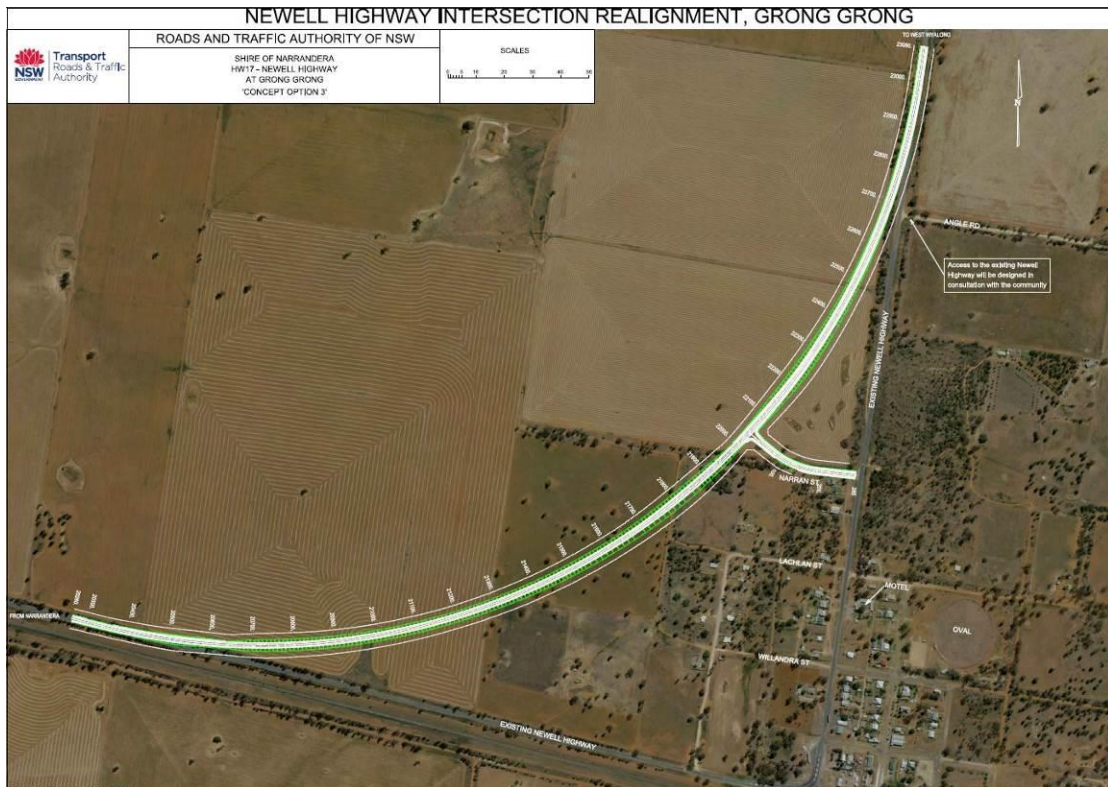


Figure 2-4: Preliminary access route option 3 (for option C), 2011

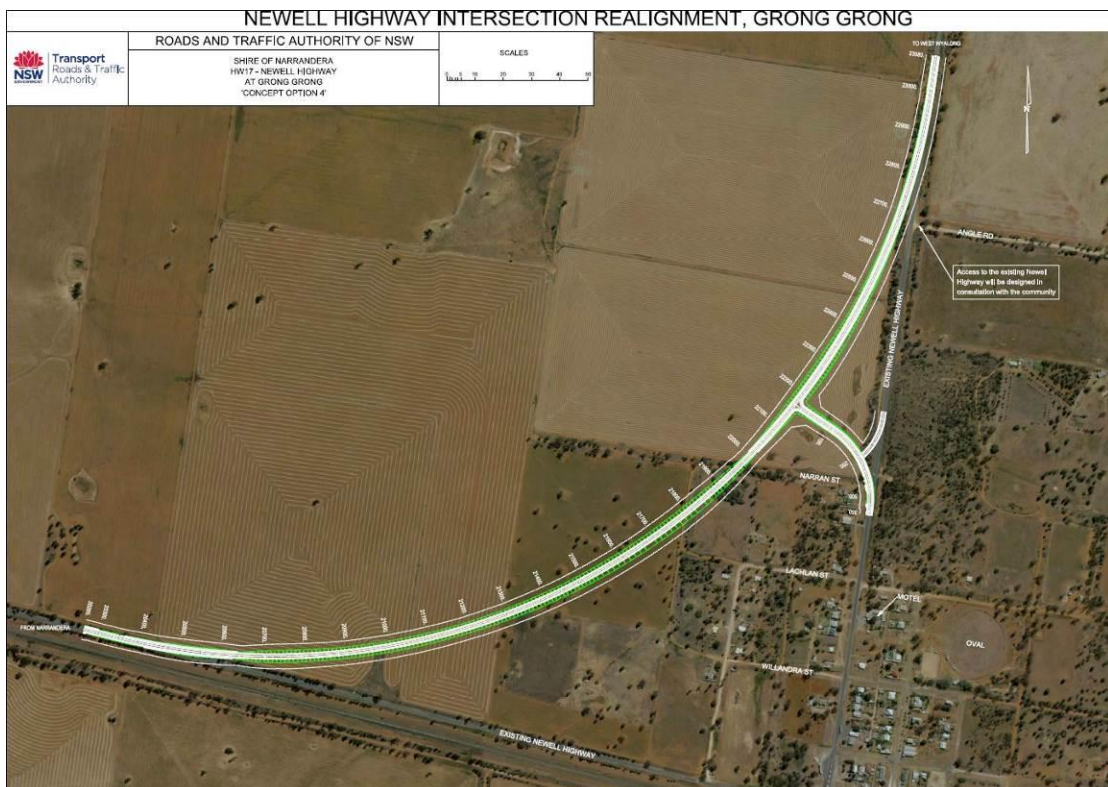


Figure 2-5: Preliminary access route option 4 (for option C), 2011

The environmental assessment process started in 2009 and the initial community consultation started in 2011. Community consultation was undertaken while the project was still in early development and was run in conjunction with Narrandera

Shire Council's community meeting for their Village Strategy, which included discussion on an updated Local Environmental Plan (LEP) for the area. At the meeting the (then) RTA presented the preferred preliminary realignment option and the four initial town access options to the community and sought their feedback on the options.

At this point the Grong Grong community indicated a strong preference that the highway alignment should remain through town so that passing trade would continue to use Grong Grong businesses. The local community presented a petition to Roads and Maritime with 170 signatures stating "We:- The residents of Grong Grong object strongly against the proposed Newell Highway Bypass at Grong Grong because we believe it will kill our small caring community due to loss of passing trade" and "We as travellers who travel through Grong Grong object strongly against the proposed Newell Highway bypass as we believe it will destroy this little town".

Around this time the need for freight efficiency, HPV access and improved travel times on the Newell Highway also became drivers for change on this section of the highway. This was reflected in a range of new strategic plans and strategies for the region and State, for example, the *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) and the *Murray-Murrumbidgee Regional Transport Plan* (Transport for NSW, 2013). Relevant strategies and plans are discussed in further detail in section 2.1.1.

Based on feedback from the community and guidance from the new set of State and regional plans and strategies, the (then) RTA, and later Roads and Maritime, reconsidered the scope and objectives of the proposal. The proposal objectives were updated from a road safety focus to also include the need for freight efficiency, HPV access and improved travel times on this section of the Newell Highway.

A road safety audit was carried out in 2012 and raised the need for safety works to help minimise crashes at the 90 degree bend as an interim measure until a more strategic solution could be implemented. Roads and Maritime completed safety works in 2012 to address key findings of the road safety audit.

By September 2014 Roads and Maritime had identified four route options (these are described in section 2.4.2). These route options were assessed against the proposal objectives, with consideration to the initial community feedback and the advantages and disadvantages of each option. Analysis of the route options is documented in section 2.4.3.

Once the preferred route option had been selected, two town access options were identified (these are described in section 2.4.5). Roads and Maritime sought community feedback on these town access options in October 2014 through two drop-in sessions, a community information evening and a survey. The Grong Grong community communicated a strong preference for dual access into and out of the town and raised the need for good signposting to attract motorists into town. Community feedback was the primary tool used for selection of the preferred town access option. Consideration was also given to the proposal objectives and the advantages and disadvantages of each town access option.

## 2.4.2 Identified route options

Four route options were identified for the Newell Highway at Grong Grong, including:

- Option 1: Do nothing.
- Option 2: Do minimum – safety improvements and widening.
- Option 3: Realignment of the Newell Highway - outer option.

- Option 4: Realignment of the Newell Highway - inner option.

These options are shown in Figure 2-6 and are described below.

### **Option 1: Do Nothing**

Option 1 would involve doing nothing other than continuing the ongoing maintenance of the existing Newell Highway through Grong Grong. This option would involve keeping the existing low speed 90 degree bend at Grong Grong as part of the Newell Highway alignment and maintaining the existing safety improvements completed in 2012. Option 1 would not include any work to enable access for longer heavy vehicles such as HPVs.

### **Option 2: Do Minimum – safety improvements and widening**

Option 2 would involve keeping the existing low speed 90 degree bend at Grong Grong as part of the Newell Highway alignment and completing sufficient widening to enable HPV operation. It would also include any further safety works, additional to those completed in 2012, that may reduce the likelihood of further crashes at the 90 degree bend. An example would be fitting the intersection with vehicle activated speed warning signs to help notify drivers of the sharp turn ahead.

### **Option 3: Realignment of the Newell Highway – outer option**

Option 3 would involve realigning the Newell Highway to be located outside of town. This option would effectively bypass Grong Grong with a new alignment about 2.4 kilometres long located on the western outskirts of the town. Access arrangements into and from Grong Grong would be included. This option would be located mostly through agricultural land.

### **Option 4: Realignment of the Newell Highway – inner option**

Option 4 would include construction of a new highway alignment still within the built up area of Grong Grong. The alignment would be close to the existing 90 degree bend, would include a 60km/h design speed and would be about 850 metres long. Access arrangements to town would be included.

## 2.4.3 Analysis of route options

Table 2-1 provides a summary of the options analysis undertaken against the proposal objectives. More detailed analysis of the options is provided after Table 2-1.

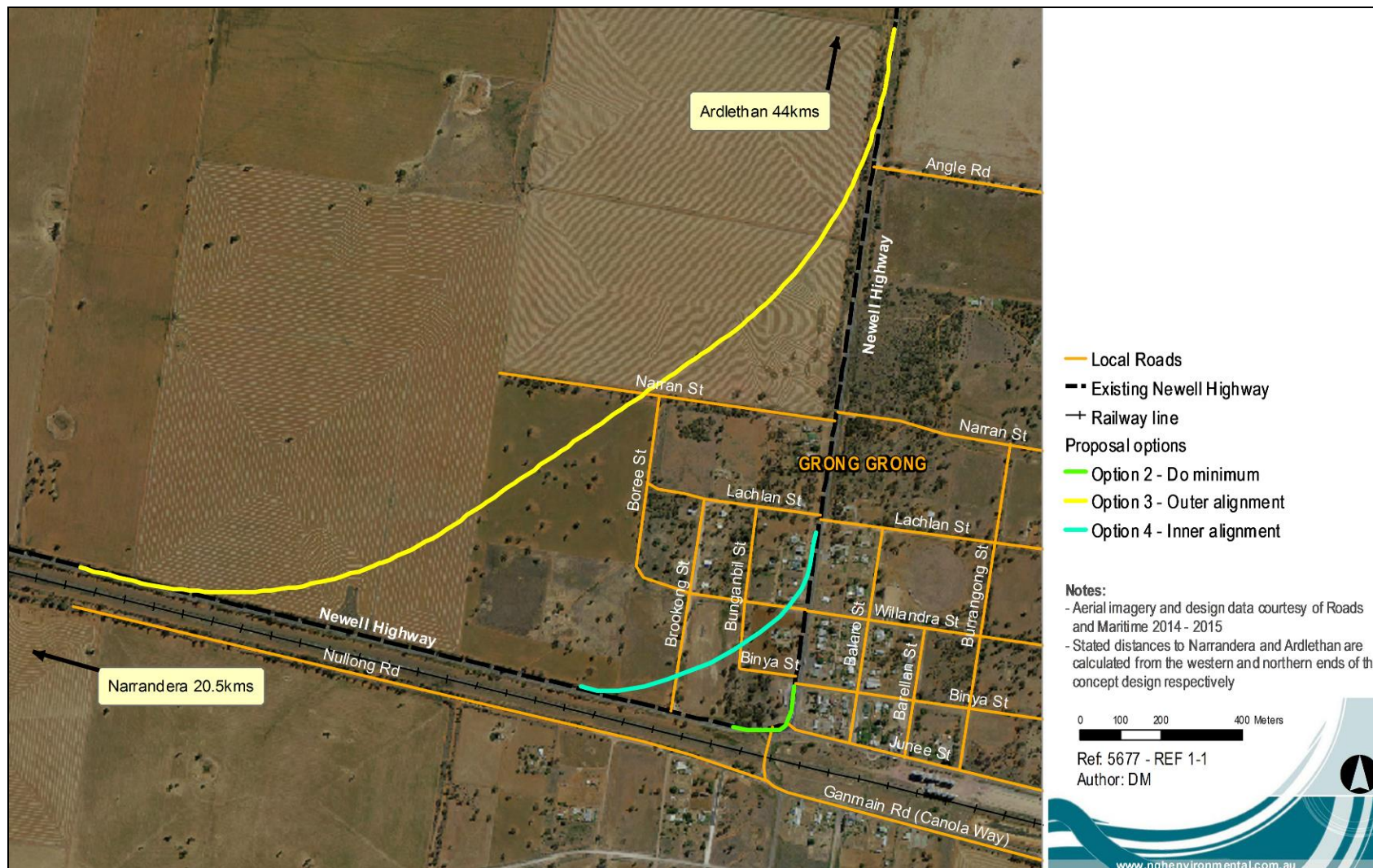





Figure 2-6: Proposed route options (Source: Roads and Maritime, 2014)

Table 2-1: Performance of the route options against the proposal objectives

Objective	Option 1	Option 2	Option 3	Option 4
Providing consistent travel speeds and times for Newell Highway traffic.	Does not meet proposal objective	Does not meet proposal objective	Meets proposal objective	Does not meet proposal objective
Improving road safety and reducing the risk of incidents between local and through traffic and between vehicles, pedestrians and cyclists.	Does not meet proposal objective	Does not meet proposal objective	Meets proposal objective	Partly meets proposal objective
Enabling access for longer heavy vehicles, such as road trains on the Newell Highway.	Does not meet proposal objective	Partly meets proposal objective	Meets proposal objective	Partly meets proposal objective
Maintaining suitable access to Grong Grong to support social and economic activity in the town.	Meets proposal objective	Meets proposal objective	Partly meets proposal objective	Meets proposal objective

### Legend

Colour	Rating	Meaning
Red		Does not meet proposal objective
Yellow		Partly meets proposal objective
Green		Meets proposal objective

### Option 1: Do Nothing

Option 1 would satisfy one of the proposal objectives by maintaining the existing access to Grong Grong. However, the access would continue to present safety issues at the low speed 90 degree bend in town and longer heavy vehicles access (eg for HPVs) on this part of the highway would not be possible.

Initial feedback from the community included preference for an in-town option. The Grong Grong community raised the need to keep highway traffic coming through town to maintain passing trade for local businesses. The 'Do nothing' option would be one option that would satisfy this community preference.

Another advantage of the 'Do nothing' option would be minimal disturbance to the town and the environment. For example there would be no impacts on flora and fauna and no need for land acquisition.

Option 1 would involve the lowest capital cost compared to the other options.

However, the 'Do nothing' option would not satisfy most of the proposal objectives. Travel speeds would remain as they are, requiring highway traffic to slow from 110km/h to 60km/h through town and then to around 35km/h to turn at the low speed 90 degree bend. As a result travel times would not improve along this section of the Newell Highway.

Road safety would not be improved as the low speed 90 degree bend would remain as part of the Newell Highway alignment. This option would most likely result in further crashes occurring at the low speed 90 degree bend.

Road user conflicts would not be resolved as highway traffic, including heavy vehicles, would continue to travel through town.

The 'Do nothing' option would not enable the operation of longer heavy vehicles (eg HPVs) on this section of the highway. This restriction would continue to limit freight

efficiency and productivity in the area and ultimately across the region.

The 'Do nothing' option would not meet road user safety standards.

Another disadvantage is that option 1 would not improve amenity or reduce traffic noise within the town of Grong Grong. Highway traffic, including heavy vehicles, would continue to travel through Grong Grong. Given traffic volumes are projected to increase to 2031, amenity within the town would be expected to decline into the future.

Option 1 performed poorly against the proposal objectives, especially when compared to the other options. This is clearly evident in Table 2-1.

### **Option 2: Do Minimum – safety improvements and widening**

Option 2 would satisfy one of the proposal objectives by maintaining access to Grong Grong. The Grong Grong community raised the need to keep highway traffic coming through town to maintain passing trade for local businesses. This could be achieved through option 2.

Another advantage is that option 2 would involve relatively low capital cost compared to options 3 and 4.

Option 2 would provide access for longer heavy vehicles (eg HPVs) on this section of the highway. However, freight efficiency improvements would be limited compared to options 3 and 4 given the highway alignment would remain through town via the 90 degree bend.

Option 2 would not satisfy the proposal objective relating to road safety and road user conflict. While there would be marginal improvements to safety, option 2 would not address the root cause of safety concerns or road user conflicts given the 90 degree bend within town would remain on the highway alignment. This option performed poorly on road safety compared to options 3 and 4.

Option 2 would not satisfy the proposal objective relating to consistent travel speeds and times. Speed limits would remain as they are currently, with a low speed environment through town. There would be no travel time reduction.

Another disadvantage is that option 2 would not improve amenity within town.

Against the proposal objectives option 2 performed better than option 1 but this option did not perform as well as options 3 or 4. This is clearly shown in Table 2-1.

### **Option 3: Realignment of the Newell Highway – outer option**

This option meets three of the four proposal objectives and partially satisfies the fourth objective. Option 3 performs best against the project objectives overall compared with the other options. This is clearly shown in Table 2-1.

Option 3 would be the only option that would support a consistent 110km/h travel speed for this section of the highway. It would also support consistent travel times, which would be reduced by about 75 seconds for light vehicles and 90 seconds for heavy vehicles.

This option would improve road safety and is the only option that would reduce conflicts between through and local traffic. These outcomes would be achieved by realigning the highway outside of town.

Option 3 would also enable access for longer heavy vehicles (such as HPVs) on this section of the highway and would result in the best solution to improve freight efficiency compared to the other options.



Further benefits of option 3 would include:

- Improvements to the amenity in town through reduced noise impacts and lower traffic volumes.
- Reduced travel distance along the Newell Highway (reduced by about 810 metres) with the added benefit of reduced fuel usage.
- Caters for predicted growth in freight and other traffic over the next 20 years.
- Bypassing the rise at the northern end of town.

While option 3 best met the proposal objectives out of all the options, there were some disadvantages to this option. Option 3 would provide access between the highway and Grong Grong, however, it performed the lowest out of all the options against the objective to maintain suitable access to Grong Grong to support social and economic activity in town. This is because to access the town motorists would be required to turn off the highway rather than pass directly through it, which may discourage some motorists from stopping at Grong Grong.

This was also the least preferred option of the Grong Grong community whose preference was for an in-town highway alignment. Option 3 would decrease some passing trade for Grong Grong businesses. When considering option 3 the community raised the need for dual access between the highway and the town and clear signposting to enable vehicles to easily call through town and stop at the local businesses.

Option 3 would have the highest capital cost out of all the options and while this would be a disadvantage of this option, it was considered that option 3 still represented value for money given its advantages.

Other disadvantages of option 3, include:

- Would require property acquisition, mainly on agricultural land and Crown land.
- Would require clearing of native vegetation, including some areas comprising endangered ecological community (EEC).

#### **Option 4: Realignment of the Newell Highway – inner option**

Option 4 would meet one of the proposal objectives by maintaining suitable access to Grong Grong. Compared to option 3 it would retain more passing trade for Grong Grong businesses. This option would achieve the Grong Grong community's request to for an in-town option.

This option would partially satisfy the proposal objective relating to improved road safety and reduced road user conflicts. It would improve safety by avoiding the low speed 90 degree bend in the existing highway alignment. However, it would not reduce conflicts between highway through traffic and local traffic or between vehicles and vulnerable road users.

Option 4 would partially satisfy the proposal objective to enable longer heavy vehicle access (eg HPVs) and improve freight efficiency. It would enable access for HPVs along this section of the Newell Highway, resulting in some freight efficiency gains. However, the speed limit through town would remain at 60 km/h, which would not achieve maximum freight efficiency gains, especially compared to option 3.

The capital cost of option 4 would be less than option 3 but more than options 1 and 2.

Option 4 would involve a 60km/h speed zone through town so would not meet the proposal objective to provide consistent travel speed and times. Also improvement to the alignment may lead to increased vehicle speeds approaching town, despite the

60km/h speed limit.

Other disadvantages of option 4 were identified as:

- Demolition of at least three residences and further impacts on four other residential properties.
- More properties would need to be acquired than the other options.
- The future predicted increase in traffic volumes would continue to adversely impact on the safety of residents in town.
- The rise at the northern end would remain as part of the highway alignment.
- Clearing of native vegetation, including endangered ecological community.
- Would have direct impacts on land owned by the Local Aboriginal Land Council (LALC) and Crown land. This would complicate acquisition required for the proposal and may present a risk to the proposal proceeding.

#### 2.4.4 Preferred route option

Option 3 is the preferred route option as it would best meet the proposal objectives. In particular it would provide a consistent travel speed for highway traffic, improve road safety and efficiency and enable access for HPVs along this section of the highway. This option would reduce conflicts between local and through highway traffic and between vehicles and vulnerable road users such as cyclists and pedestrians. This option would also improve the amenity of Grong Grong by reducing traffic volumes and noise within town.

While option 3 had the highest capital cost of the options, the options analysis found the option would be value for money. The main adverse impacts of option 3 would include impacts to businesses that rely on passing trade and removal of some Inland Grey Box Woodland EEC. The provision of easy access into town and use of effective signposting would reduce the impact of the realignment on businesses in town.

While option 3 would result in some negative socio-economic and environmental impacts, the benefits of the option are considered to outweigh these impacts, especially in comparison to the other options. Option 3 would provide the best results for improving freight efficiency by maintaining the 110km/h speed limit, reducing traffic noise and emissions within Grong Grong and enabling access for HPVs and thereby improving road freight efficiency. Bypassing the town would also improve road safety and safety for pedestrians and cyclists within Grong Grong. This option is also the best option to cater for the predicted growth in freight and other traffic to occur over the next 20 years.

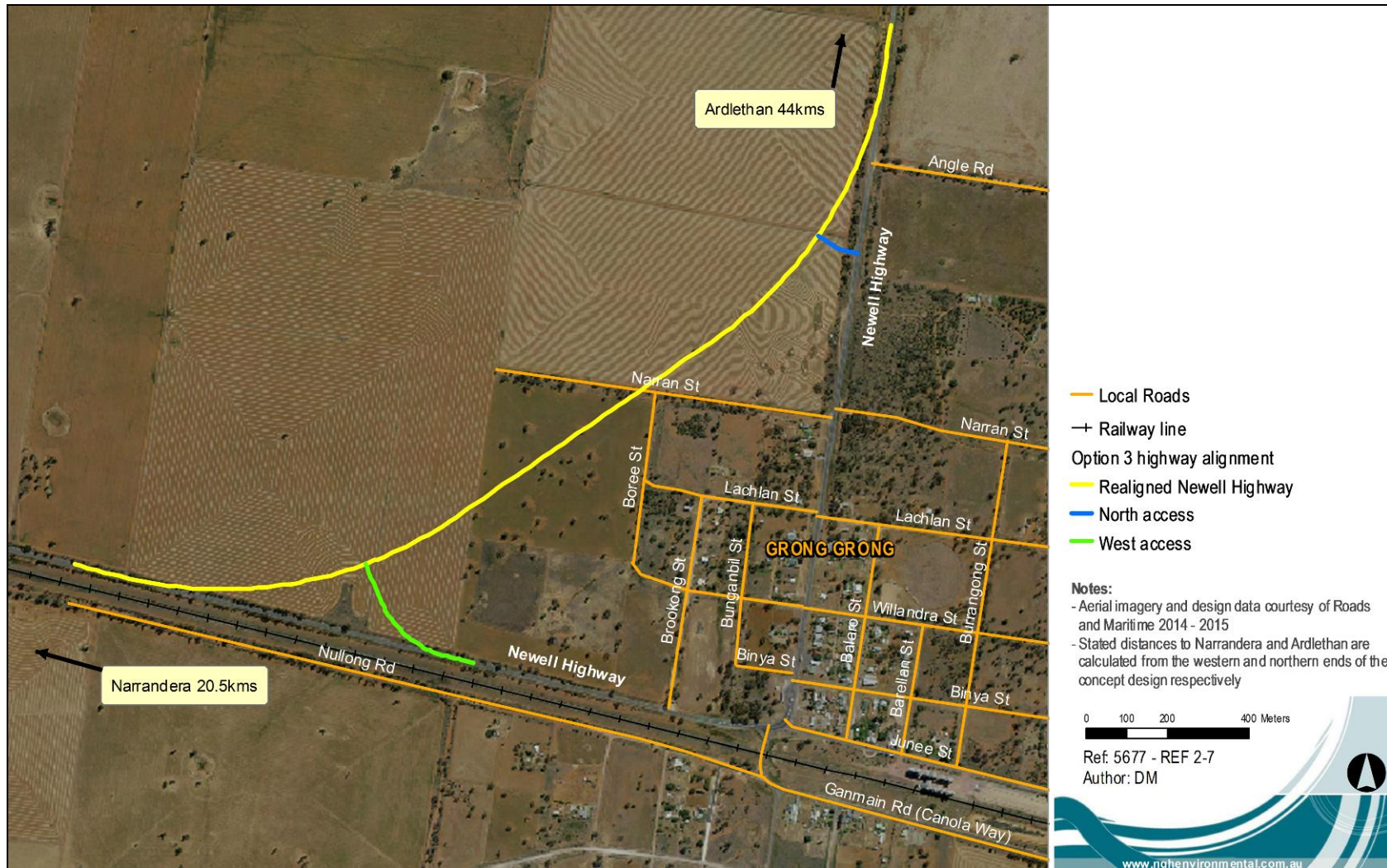
Option 3 would enable suitable access to Grong Grong to support social and economic activity in the town. Town access options are discussed in sections 2.4.5, 2.4.6 and 2.4.7.

#### 2.4.5 Identified town access options

Town access options were identified based on the preferred route option being option 3. The two town access options considered were:

- Town access option A - dual access (north and west).
- Town access option B - single access (central).

The town access options are shown in Figure 2-7 (option A), and Figure 2-8 (option B) and are described below.



**Figure 2-7: Town access option A – Dual Access**

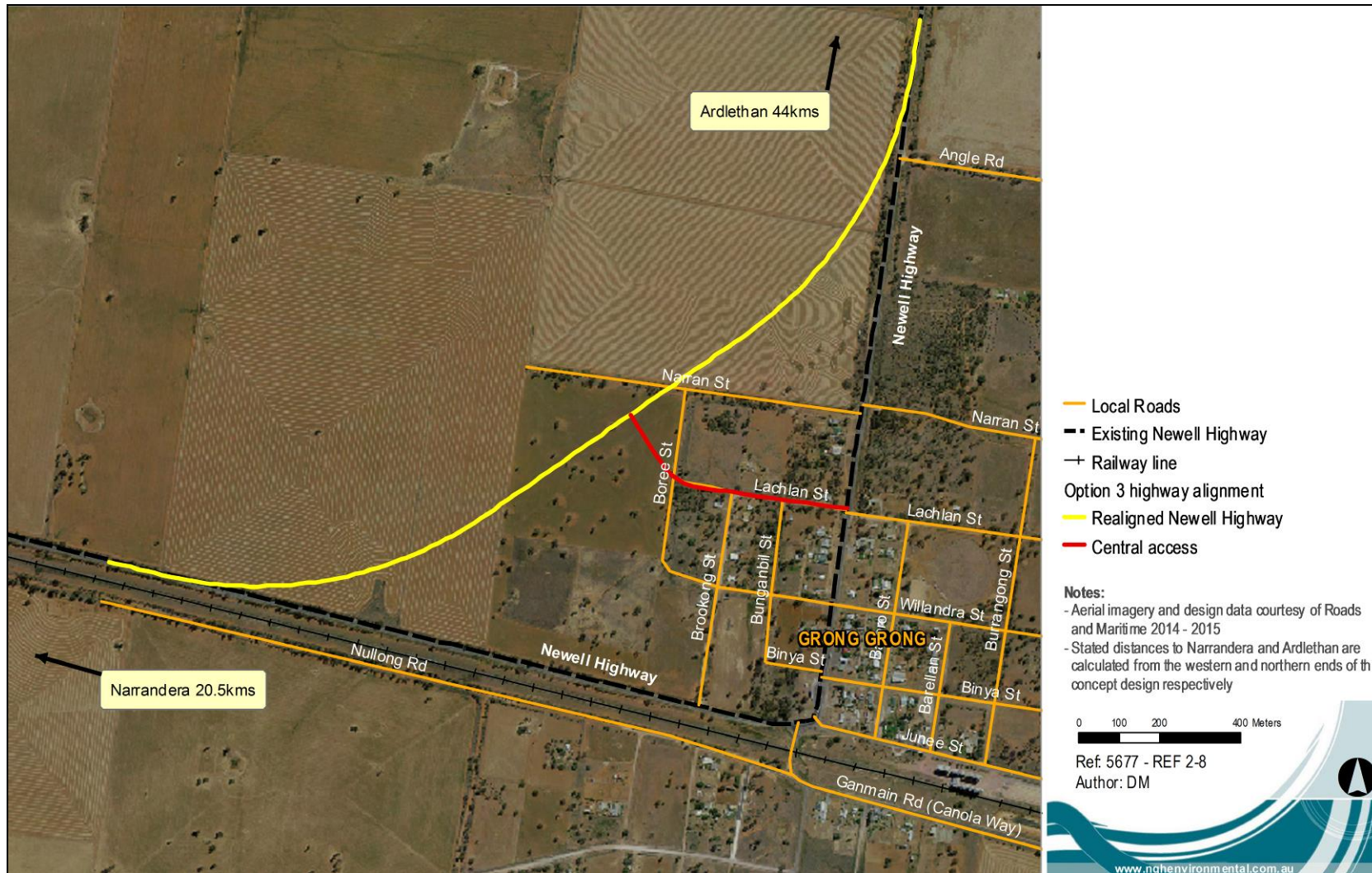


Figure 2-8: Town access option B – Single Access (Central)

### **Town access option A – dual access (north and west)**

Option A would involve constructing north and west accesses into and out of the town of Grong Grong using the existing Newell Highway alignment. The north access would be about 200 metres south of Angle Road. The west access would be near the current “Ausguang Pty Ltd” sign.

Both accesses would consist of a minimum treatment of channelised right turns with deceleration lanes. This arrangement would enable unrestricted turning movements (including both left and right turns) into and out of town at both the north and west access areas.

### **Town access option B – single access (central)**

Option B would involve a single access from the centre of the route option 3 highway alignment. This access would cross a cleared paddock where it would connect up with Lachlan Street, then it would intersect with the existing Newell Highway alignment in town.

The design of this access would consist of minimum treatment channelised right turn with deceleration lanes along both the northbound and southbound lanes. The access would cater for unrestricted turning movements into and out of town.

## 2.4.6 Analysis of town access options

### **Town access option A – dual access (north and west)**

Out of the two town access options, the Grong Grong community communicated a strong preference for town access option A. This option would allow road users travelling in both directions to access Grong Grong from either end of the alignment by providing two access points off the Newell Highway into the town of Grong Grong. This option would provide easy access through Grong Grong, enabling motorists to call into Grong Grong and then re-join the highway without the need to back track. As a result, out of the two town access options, this option would best meet the proposal objective to maintain suitable access to Grong Grong to support social and economic activity in the town. There would also be fewer impacts on local roads compared to town access option B as access would be via the existing highway alignment.

Once provision for turning movements and the length of access road is taken into account the costs of town access options A and B would be similar.

### **Town access option B – single access (central)**

The Grong Grong community communicated a strong preference against this town access option. Out of the two town access options, this option performed lowest against the proposal objective to maintain suitable access to Grong Grong to support social and economic activity in the town. It would allow for one access point between the Newell Highway and the town of Grong Grong which would minimise the number of conflict points with the Newell Highway. A number of residents along Lachlan Street may be impacted upon by this central access option.

Further disadvantages of this option would include:

- Higher impact on local roads and the community as access would come off Lachlan Street, increasing vehicle usage along this street.
- Road users travelling along this section of the highway would need to back track to re-enter the Newell Highway, which may make it less appealing for drivers to turn off into Grong Grong.

## 2.4.7 Preferred town access option

Town access option A was selected as the preferred town access option. The selection of this option was based on a clear community preference for dual access in the north and west providing access through the town.

Town access option A best meets the proposal objectives and allows vehicles to easily call through Grong Grong without having to backtrack. Town access option A would be the most appealing option for motorists, providing the best incentive to stop in Grong Grong compared to the single access option.

Some of the local economic activity in Grong Grong comes from road users travelling along the Newell Highway. A number of these travellers use the general store, hotel, motel, toilets and Grong Grong Park facilities. The Grong Grong community would like to encourage road users to still use these facilities once the Newell Highway is realigned. Town access option A makes this movement more efficient and enticing as travellers can come in one end and out the other without having to backtrack.

## 2.5 Preferred option

The preferred option comprises 'Route option 3 – realignment of the Newell Highway – outer option' and 'Town access option A – dual access (north and west)'. The preferred option would include:

- Realigning the Newell Highway outside of town, bypassing Grong Grong with a new alignment about 2.4 kilometres long located on the north-western outskirts of the town.
- Dual access between the Newell Highway and Grong Grong. Access would be in the north and west into and out of the town along the existing Newell Highway alignment.

The preferred option was selected as it performed best overall against the proposal objectives, as follows:

<b>1. Provides consistent travel speed and times for Newell Highway traffic at Grong Grong.</b>
<ul style="list-style-type: none"><li>➤ The reduction in Newell Highway travel distance would be about 810 metres.</li><li>➤ Reduction in travel time of 75 seconds for light vehicles and 90 seconds for heavy vehicles.</li><li>➤ Speed limit is set at 110km/h after opening to traffic, consistent with the majority of the Newell Highway.</li><li>➤ Is consistent with <i>NSW 2021: A Plan to Make NSW Number One</i> as it would reduce travel times, by providing a constant speed limit.</li><li>➤ The cutting would flatten a section of the highway at the northern end of town, levelling out the vertical alignment.</li><li>➤ Vehicles travelling on the highway would no longer need to reduce speed, decelerate and accelerate to negotiate the low speed 90 degree bend or reduce speed going through town.</li></ul>

<p><b>2. Improves road safety and reduces conflicts between local and through traffic and between vehicles and vulnerable road users such as pedestrians and cyclists.</b></p>
<ul style="list-style-type: none"> <li>➤ Bypassing the low speed 90 degree bend would reduce risk of vehicles crashes, particularly for heavy vehicles.</li> <li>➤ Would improve the current vertical and horizontal alignments and sight distances of the highway at this location.</li> <li>➤ Would be designed in accordance with <i>Austroads Design Guides</i> and <i>Road Design Supplements to Austroads Guides</i> to ensure current safety standards are met.</li> <li>➤ Is consistent with <i>NSW 2021: A Plan to Make NSW Number One</i> as it would improve road safety by bypassing the low speed 90 degree bend to allow safe operation of heavy vehicles.</li> <li>➤ Reduced traffic volumes through town would increase safety for pedestrians and cyclists within Grong Grong town.</li> </ul>
<p><b>3. Enables access for HPVs through Grong Grong to improve freight efficiency on the Newell Highway.</b></p>
<ul style="list-style-type: none"> <li>➤ The design would meet the requirements of HPV operation.</li> <li>➤ Would reduce operational costs for freight and other vehicles by enabling HPV operations along this section of the highway.</li> <li>➤ Avoiding the low speed 90 degree bend would also reduce fuel consumption and emissions from heavy vehicles as they would no longer have to decelerate to negotiate the turn or reduce their speed through town.</li> </ul>
<p><b>4. Maintains suitable access to Grong Grong to support social and economic activity in the town.</b></p>
<ul style="list-style-type: none"> <li>➤ Dual access to the north and west allow for vehicles to easily call through Grong Grong without having to backtrack.</li> <li>➤ The new alignment would remain two lane, two way with appropriate deceleration lanes at the intersections providing access to Grong Grong.</li> <li>➤ Amenity of the town would be improved with reductions in traffic noise and emissions.</li> <li>➤ Advanced signposting and landscaping at access areas to encourage visitors to come to Grong Grong would be designed and implemented in consultation with the community.</li> </ul>

## 3 Description of the proposal

---

### 3.1 The proposal

Roads and Maritime Services proposes to move the Newell Highway to the west of Grong Grong. The proposal is shown in Figure 1-1 and Figure 3-1 to Figure 3-3. A typical cross section is shown in Figure 3-4. Details on the intersection arrangements are provided in Figure 3-5 and Figure 3-6.

Key features of the proposal would include:

- Realigning a section of the Newell Highway from about 20.4 kilometres to about 23.2 kilometres east of Narrandera. The realignment would bypass Grong Grong to the west of the town.
- Constructing about 2.4 kilometres of new two lane carriageway (one lane in each direction).
- Constructing two accesses between the highway and Grong Grong; one about 1.4 kilometres to the north and another around 1.3 kilometres to the west of Grong Grong. The accesses would include intersections with unrestricted turning movements in all directions, protected right turn lanes and deceleration lanes at the highway exit and entry points.
- Constructing a large cutting at about 22 kilometres east of Narrandera around 940 metres long and up to 4.5 metres deep.
- Removing around 175 metres of existing road and then replanting between the north access and the new highway alignment.
- Removing around 640 metres of existing road and then replanting between the west access and the new highway alignment.
- Constructing a 1 metre wide painted centre median.
- Changing Angle Road and its connection with the existing highway.
- Adjusting public utilities, including relocating the Nextgen optic fibre cable.
- Constructing temporary ancillary facilities, including a work site compound, stockpile sites, construction water quality basins and haulage roads.

The existing highway through Grong Grong would be transferred to Narrandera Shire Council to operate as a regional and local road once the new alignment is operational. Part of this section of road would become Berrembed Street and another part would become Canola Way. Redundant sections of road would be removed and these areas would be revegetated. The exact configuration would be negotiated with council. Any works required to meet council standards for local roads would be carried out before hand over. The works may include heavy patching, linemarking and resealing and would be confirmed by a joint Roads and Maritime and Narrandera Shire Council condition assessment.

The new highway alignment would be signposted for 110 km/h. The proposal would also include suitable signposting to encourage motorists to stop and rest in town.



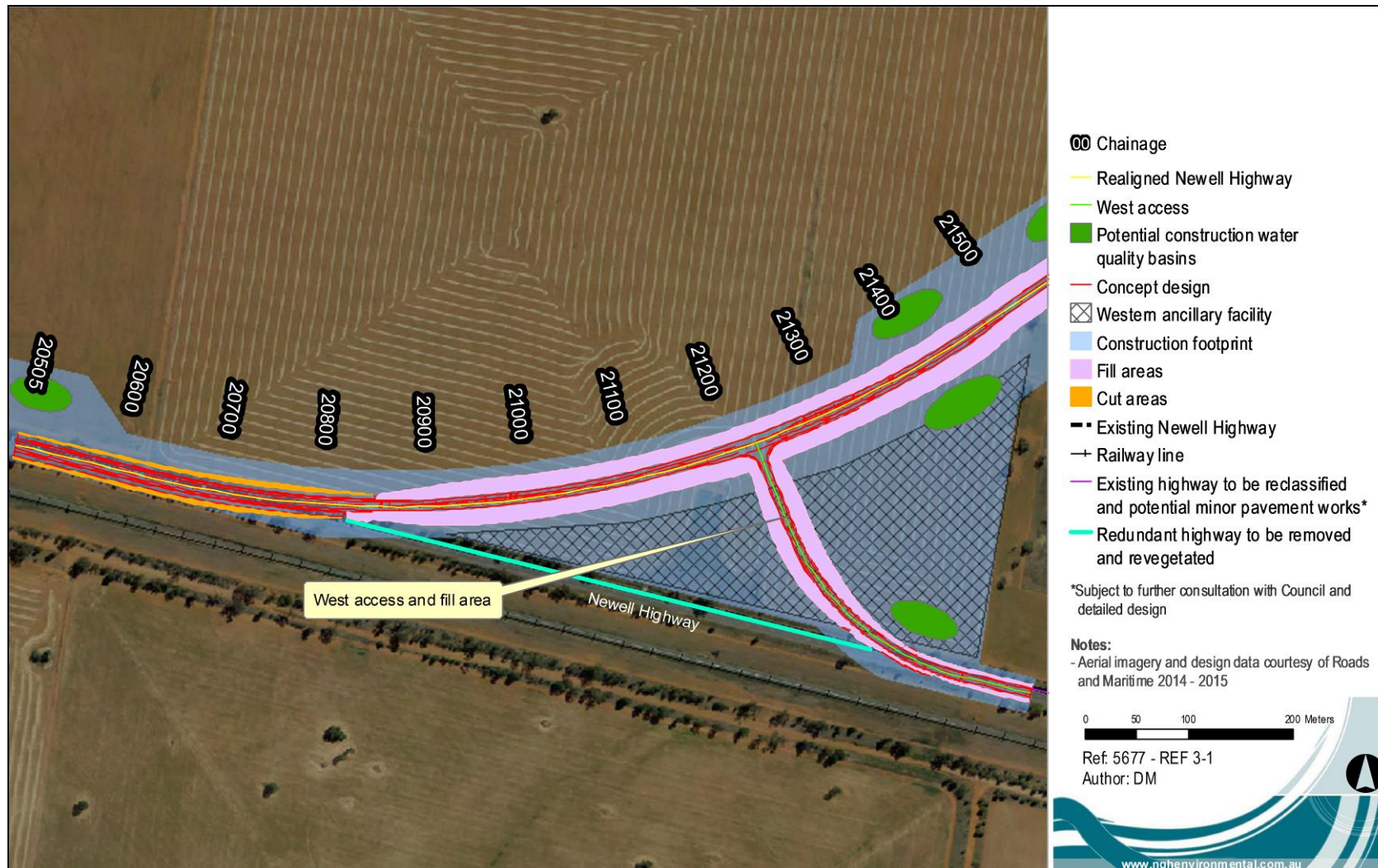


Figure 3-1: Key features of the proposal – Western end (refer Figure 3-5 for intersection arrangement)

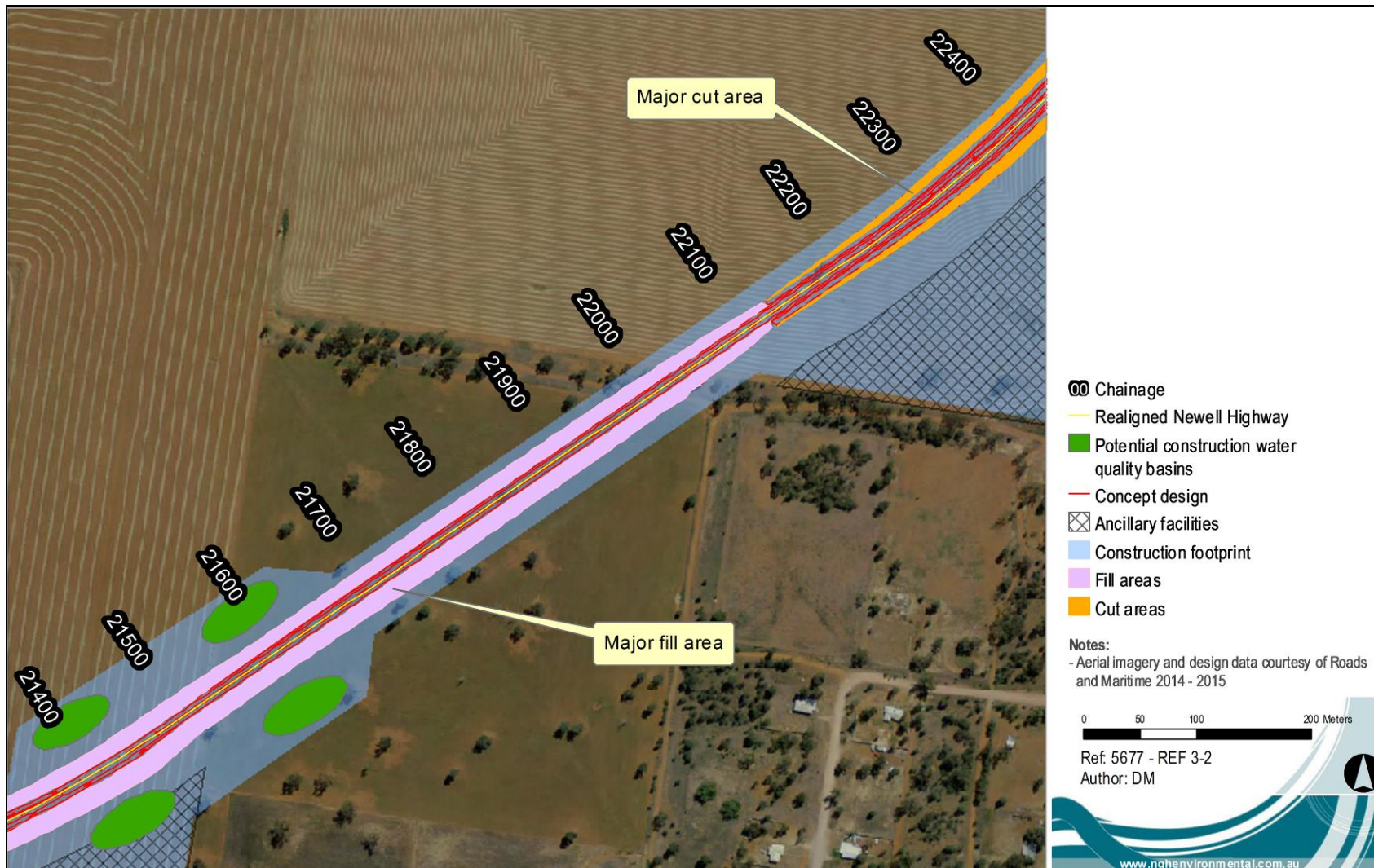


Figure 3-2: Key features of the proposal - Centre

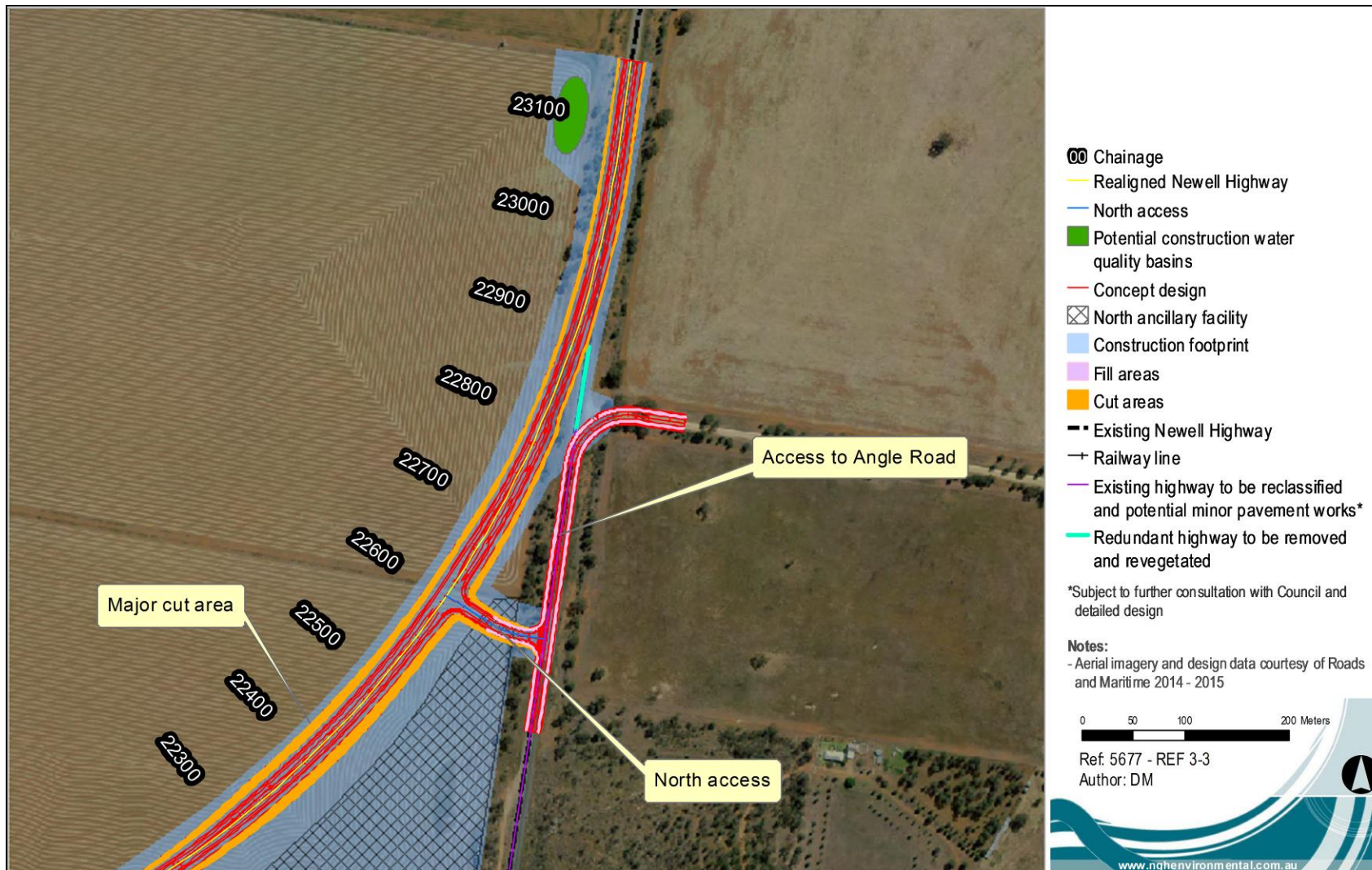


Figure 3-3: Key features of the proposal – Northern end (refer Figure 3-6 for intersection arrangement)

## 3.2 Design

### 3.2.1 Design criteria

The description of the proposal presented in this REF represents the proposal concept design. The concept design is provided in Appendix B and a typical cross section is provided in Figure 3-4. The concept design would be further refined during the detailed design phase of the proposal. Table 3-1 shows the criteria and requirements for the proposal.

**Table 3-1: Proposal Design Criteria and Requirements**

Criteria	Requirement
Design and posted speed	<ul style="list-style-type: none"> <li>• Design speed: 120 km/h</li> <li>• Sign posted speed: 110 km/h</li> </ul>
Lane width	<ul style="list-style-type: none"> <li>• 3.5m</li> </ul>
Carriageway	<ul style="list-style-type: none"> <li>• 1 undivided carriageway containing 2 lanes (one in each direction)</li> </ul>
Shoulders	<ul style="list-style-type: none"> <li>• 2.0m wide, sealed</li> </ul>
Verge	<ul style="list-style-type: none"> <li>• 1.0m verge adjacent to each lane</li> </ul>
Median	<ul style="list-style-type: none"> <li>• 1.0m centreline separation</li> </ul>
Intersection treatment	<ul style="list-style-type: none"> <li>• Minimum channelised intersection (CHR) treatment with left turn deceleration lanes</li> </ul>
Pedestrian or cycling	<ul style="list-style-type: none"> <li>• 2.0m sealed shoulder</li> </ul>
Batters	<ul style="list-style-type: none"> <li>• Fill batters: slopes of 4:1 – 6:1</li> <li>• Cut batters: slopes of 2:1</li> </ul>
Pavement type	<ul style="list-style-type: none"> <li>• Granular heavy duty pavement with bitumen sealed surface</li> </ul>
Drainage	<ul style="list-style-type: none"> <li>• 1.0m wide table drain along cut sections</li> </ul>
Design vehicle highway	<ul style="list-style-type: none"> <li>• B-triple</li> </ul>
Design vehicle through town (including access points)	<ul style="list-style-type: none"> <li>• B-triple</li> </ul>

### 3.2.2 Engineering constraints

Engineering constraints that have been identified for the proposal include:

- Minimising traffic disruption with appropriate timing for any staging works and lane closures. Most of the alignment can be constructed off line to the existing Newell Highway with the only disruptions when the tie-ins are constructed and the north and west connections are taking place. This work would be staged appropriately with standard traffic control measures.
- The northern cut area is reported to have ground water present beneath the surface. This needs to be investigated through detailed geotechnical investigations. If water is present, the cutting may require rock blanketing and deeper drainage to avoid long term maintenance concerns.
- There are several large granite rocks located within the area identified as the

north ancillary facility. The ancillary facility would be arranged around these rocks due to their size and nature.

- Any relocation of major public utilities would be undertaken in conjunction with the affected service provider. Currently the Nextgen optic fibre cable is the only service which has been identified as being affected. This work would be undertaken by Nextgen to install a new joint in the line and relocate the cable to the side of the proposed cutting to avoid any conflicts between construction vehicles and the cable (Figure 3-10).

### 3.3 Major design features

#### 3.3.1 Route alignment from north to south

Figure 1-1 provides an overview of the proposal.

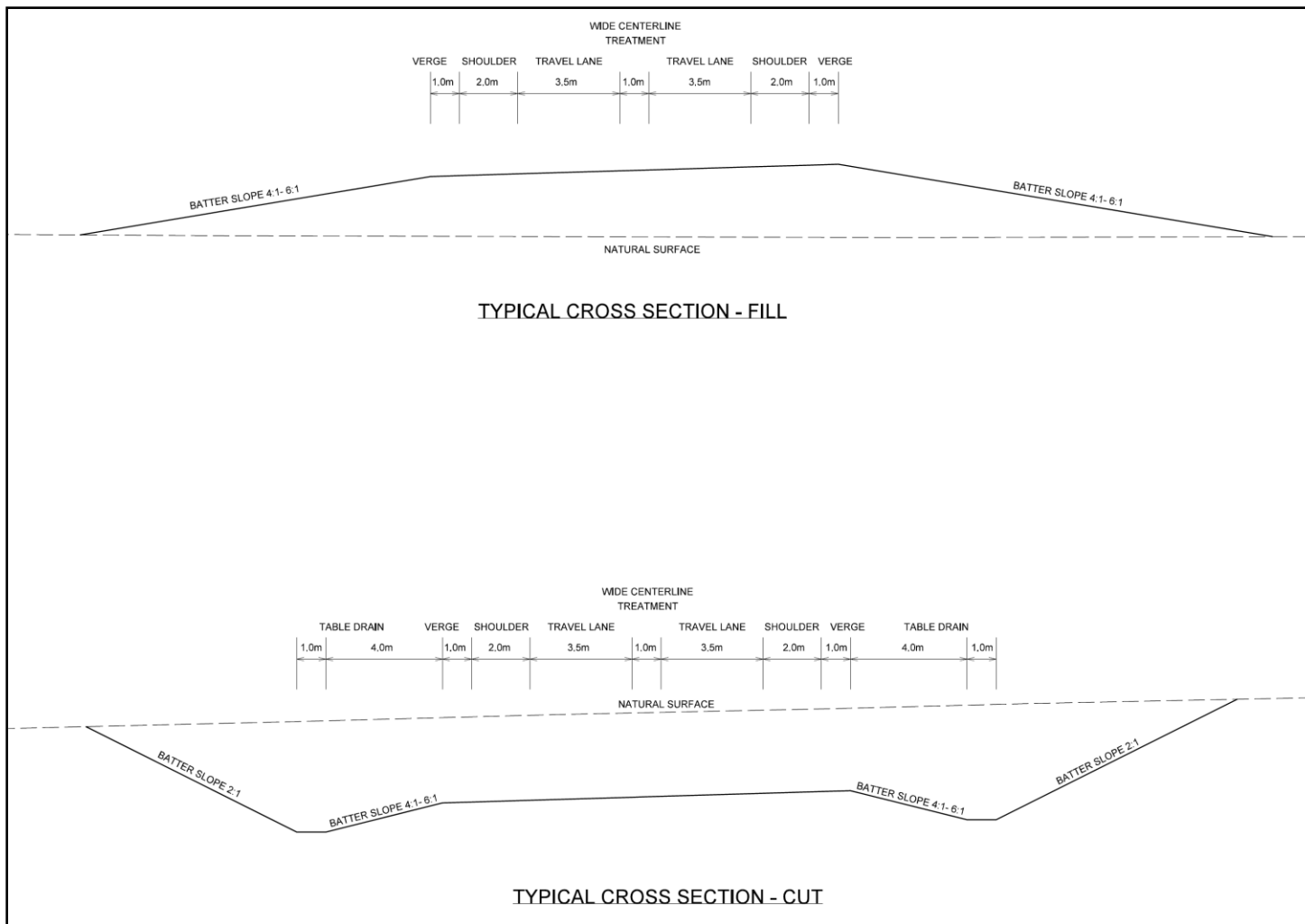
At the northern end, the proposal would exit the existing Newell Highway about 1.7 kilometres north of the low speed 90 degree bend in Grong Grong. The road between this point and Angle Road along the redundant portion of the Newell Highway would be removed. The proposal starts to realign to the west near Angle Road where it traverses through a rocky outcrop area that is used for agricultural activities. The north access intersects the proposal at around 1.4 kilometres north of Grong Grong, providing access to and from Grong Grong. The proposal then passes through a large cutting about 940 metres long, 40 metres wide and 4.5 metres deep between chainages 22140-23080.

The realignment then travels south-west, passing to the west of the intersection of Narran and Boree streets. Here the realignment traverses through Crown Land that contains a number of scattered paddock trees. The realignment then traverses through agricultural land; this area would be on fill. The western access intersects the proposal at around 1.3 kilometres from Grong Grong, providing access to and from Grong Grong. The realignment then re-joins the existing Newell Highway about 1.9 kilometres west of the low speed 90 degree bend in Grong Grong. A redundant section of road along the west section of the highway would be removed between the Newell Highway and the west access.

#### 3.3.2 Town access and intersections

Both the north and west accesses would consist of minimum treatment channelised right turns with deceleration lanes along both the northbound and southbound lanes, as shown in Figure 3-5 and Figure 3-6. These treatments would enable unrestricted turning movements at both access areas. This arrangement would enable motorists to turn both left or right when entering or leaving the town.

These accesses would provide road users with two opportunities to visit Grong Grong. It is proposed to undertake landscape treatments at both the north and west access points on the new road to identify access into Grong Grong. These plantings would consist of local endemic species such as Inland Grey Box woodland (*Eucalyptus microcarpa*). Avenue plantings along the access roads at tie-in points with the existing Newell Highway would be undertaken to direct traffic to the centre of town. These plantings would likely consist of White Ironbark (*Eucalyptus leucoxylon*).



**Figure 3-4: Typical cut and fill cross sections for the proposal.**

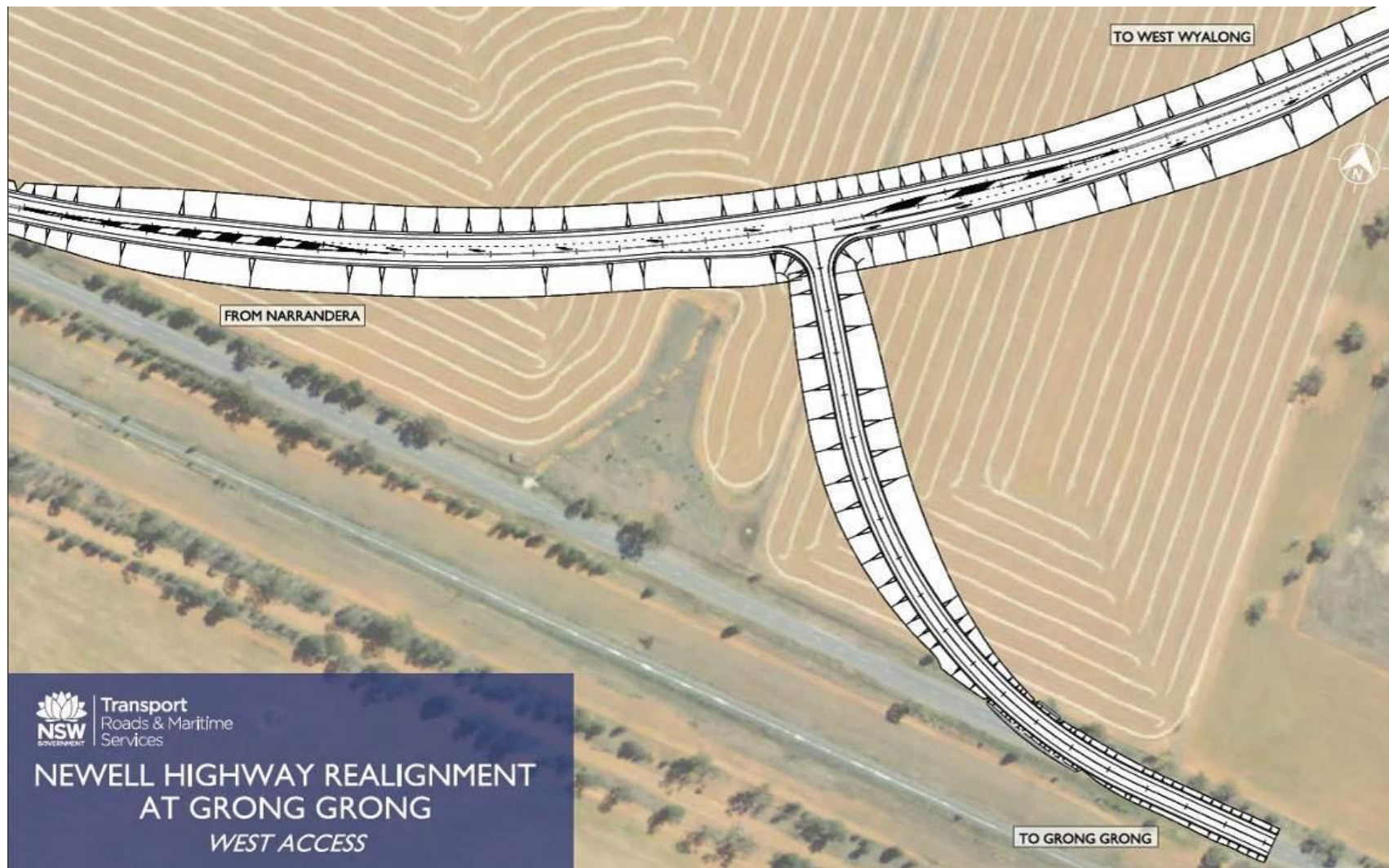


Figure 3-5: Close up of Dual Access – West (Source: Roads and Maritime, 2015)



Figure 3-6: Close up of Dual Access – North (Source: Roads and Maritime, 2015)



### 3.3.3 Major cut

To construct the new highway alignment, the proposal would involve a major cut. The cut would be about 940 metres long and up to 4.5 metres deep from around chainage 22140 to chainage 23080. The maximum width of the cut would be about 40 metres at around chainage 22415. This cut area would include a batter slope of 2:1 on the backside of the table drains, and a batter slope of between 4:1 and 6:1 down to the base of the table drain area. This may be further amended during the detailed design phase to balance earthworks. Refer to Figure 3-1 for the location of the major cut area.

## 3.4 Construction activities

The construction footprint for the proposal is shown in Figure 1-1.

### 3.4.1 Work methodology

The methods that would be used for the construction of the proposal would be conventional techniques generally utilised on major road projects. The proposal is expected to involve the following general work methodology:

- Site establishment.
  - Pre-construction identification and marking of sensitive areas as identified in this REF, the Construction Environmental Management Plan (CEMP) and relevant sub-plans.
  - Installation of environmental controls.
  - Installation of erosion and sedimentation controls.
  - Relocation of utilities such as Nextgen cables.
  - Establishment of site boundaries (eg fencing).
  - Construction of temporary access tracks / haulage roads within the construction footprint.
  - Installation of traffic controls.
- Clearing and grubbing of vegetation.
- Stripping, stockpiling and management of topsoil.
- Drainage works (longitudinal and transverse).
- Bulk earthworks (cut / fill including blasting and/or hammering of hard rock).
- Temporary stockpiling.
- Laying of pavement materials.
- Laying of subsoil drains.
- Sealing of pavement.
- Construction of verges.
- Finalisation of batters.
- Removal of existing road.
- Landscaping and tree planting.
- Line marking and installation of road furniture.
- Removal of site environmental controls and site dis-establishment.
- Removal of stockpile sites, erosion and sedimentation controls and traffic control.

The work methodology for the proposal would be refined during the detailed design phase.

### 3.4.2 Construction hours and duration

The proposal is expected to start construction in September 2015 and finish by June 2016, when the new road would open to traffic. No full road closures are anticipated for the proposal.

The proposal would be undertaken during standard working hours. Standard working hours include:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sunday and Public Holidays: No work

### 3.4.3 Plant and equipment

Plant and equipment needed for the proposal would be determined during the construction planning phase. Indicative plant and equipment that may be used in the construction of the proposal, include:

- Excavators
- Dump trucks
- Bulldozers
- Scrapers
- Rollers
- Bitumen trucks
- Hand tools
- Chainsaws
- Backhoe
- Compressor
- Cranes
- Delivery trucks
- Graders
- Light vehicles
- Water carts
- Concrete delivery truck
- Generators
- Power tools
- Rock drill

### 3.4.4 Earthworks

It is estimated the proposed cut and fill earthworks would balance out, assuming the material coming out of cut areas is of a reasonable quality. If the project does require sourcing fill, it is likely to be sourced from a local quarry in the region. Fill would not be taken from vegetated areas at the edge of the footprint or along the existing road reserve. If the proposal is likely to generate spoil material, it is estimated these quantities would be low.

The current estimated volume of cut is 46,000m<sup>3</sup> (92,000 tonnes), while the estimated fill volume is 48,000m<sup>3</sup> (96,000 tonnes). This would result in about 2,000m<sup>3</sup> (4,000 tonnes) of surplus material. These volumes do not consider topsoil stripping or pavement material. They are the difference between the existing ground surface and proposed design surface.

Where possible, surplus material would be re-used on site to flatten batter areas between 6:1 to 10:1 in accordance with the Austroads guidelines to increase the recoverable area for heavy vehicles and for cars. Using the surplus material on site would reduce the need to find off site re-use or disposal locations, thus reducing fuel use during construction and the need to transport waste to other areas.

Surplus material that cannot be beneficially re-used on-site would be reused or disposed of in the following order of priority:

- Transferred to nearby Roads and Maritime projects approved for immediate use.
- Transferred to a Roads and Maritime approved site for reuse on concurrent private/local government project.
- Disposal at an approved materials recycling or waste disposal facility.
- As otherwise provided for by the relevant waste legislation.

Precise fill and cut volumes and ratios would be determined during the detailed design phase.

### 3.4.5 Source and quantity of materials

Table 3-2 shows the estimated materials and quantities for the construction of the proposal.

**Table 3-2: Estimated materials and quantities**

Materials	Quantities	
	Cubic Metres	Tonnes
General cut volumes	46,600	92,000
General fill volumes	48,000	96,000
Road base	7990	16,800
Road sub-base	6000	12,600
Select fill volumes	19,990	40,800
Sand (bedding material)	120	240

Fill would be sourced from cut material and/or borrow pits. Local quarries would be used for construction materials. Bitumen supplies for surfacing would come from Melbourne, Sydney or Brisbane depending on the classification and supply availability.

Pavement materials would be sourced from a quarry that produces material of adequate quality to meet Roads and Maritime specifications.

### Water use

The required quantities of water are not yet known, however, water would be used for the following:

- Dust suppression.
- Addition of moisture to earthworks and pavement materials to optimise compaction.
- Miscellaneous concrete works.
- Machinery wash-down.

Water for construction would be sourced firstly from water quality basins and then from Bundidgerry Creek, located about five kilometres south of the proposal along Grong Grong River Road, off Old Narrandera Road (refer to Figure 3-6). The land is Crown Land (TSR54731), which is under control of Local Land services.

An access track already exists (as shown in Figure 3-7), which is currently used for water extraction by Roads and Maritime. To safely access the extraction point along Bundidgerry Creek, some vegetation removal would be required to upgrade the

existing access track. This would impact on less than 0.2 hectares of River Red Gum (*Eucalyptus camaldulensis*) vegetation. No trees would be removed. Refer to Photo 12 of Appendix A for a site photo of the proposed extraction point. Figure 3-7 shows a map of the water extraction point for the proposal.

### 3.4.6 Traffic management and access

Traffic would be maintained along the existing Newell Highway while the majority of the proposal is constructed. Some lane closures would be required during construction at the “tie-in” locations with the existing Newell Highway. During these times, local traffic delays would be kept to a minimum with one lane of traffic open under traffic control along the Newell Highway.

Construction traffic would generally use the Newell Highway to get to and from the proposal. Construction access locations are to be finalised in consultation with the construction contractor. Access would be provided in a suitable location to ensure safe entry and exit from the site including sufficient sight distance and signage, a low speed environment and minimising the impact on local traffic.

It is estimated that about 300 external vehicle movements per day would occur when construction commences. This is broken down in Table 3-3.

**Table 3-3: Breakdown of vehicle usage on site**

Equipment / Vehicle	Estimated movements per day
Trucks	200
Light vehicles	100

Haulage of materials on site would be undertaken within the construction footprint for the proposal where possible. Deliveries to site would use the existing Newell Highway. Where the highway cannot be used, internal haul routes would be established within the construction footprint once the alignment is cleared of vegetation. These haul routes would link excavation sites and temporary construction ancillary facility sites to the various work areas. Controlled construction traffic entry and exit points would be minimised. This may require the introduction of temporary traffic management measures.

Traffic management and access during construction would be managed in accordance with *Traffic Control at Work Sites Manual* (RTA, 2010a). A traffic management plan and traffic control plan would be developed before construction work commences.



**Figure 3-7: Location of potential water extraction point**

### 3.5 Ancillary facilities

Construction of the proposal would require the establishment and continued use of temporary construction ancillary facilities for the duration of the construction period.

Two ancillary facilities sites have been identified for the construction of the proposal, one at the northern end of the proposal and one at the western end. Refer to Figure 3-8 for photos and Figure 1-1 for a map of these ancillary locations.



North ancillary facility – Paddock area. Tree line is Narran Street.



West ancillary facility – existing gate access.

**Figure 3-8: Photos of ancillary facility locations**

The ancillary facilities would be used for a construction compound, support amenities and administration buildings, stockpiling of materials, servicing of equipment and parking of construction vehicles.

The area at the north ancillary facility would be about 6.3 hectares. There are some large granite rock outcrops at this location. These rocky outcrop areas may be removed to accommodate this ancillary facility, although most likely this would be avoided. Access to this ancillary facility would be via the construction footprint of the proposal or via Narran Street.

The area at the west ancillary facility would be about four hectares. This site would be the main access point for construction of the proposal. Access to this ancillary facility would be via the existing Newell Highway near the current “Ausguang Pty Ltd” signage.

The location and management of the stockpile and storage areas within these ancillary facilities would be in accordance with the *Stockpile Site Management Guideline* (RTA, 2011a).

The final location of the ancillary facilities would be decided during the detailed design phase. Once the contractor has a preferred location for the ancillary facilities,

consultation with Roads and Maritime's Environment Manager (South West) would be undertaken prior to any works in those locations to decide if any additional environmental assessment is required.

### 3.6 Public utility adjustment

Major public utilities located near the proposal, mainly within town, include:

- Minor electricity transmission line and power poles.
- Telephone line
- Water hydrants.

Figure 3-9 shows the location of these utilities.

The Nextgen fibre optic cable currently runs under the existing highway at Angle Road and continues west through the agricultural land to Gawnes Road.

The Nextgen fibre optic cable would require relocation due to road cutting required in this area. An additional joint would be added to the Nextgen fibre optic cable. The relocation would include boring under the proposal and installing a new pit on the west side of the new alignment, within the proposed road reserve boundary, about 200 metres south of Angle Road. Refer to Figure 3-10 for a map showing the Nextgen fibre optic cable relocation.

Roads and Maritime have undertaken consultation with Nextgen about the relocation of Nextgen fibre optic cables from the northern end of the proposal near Angle Road. The relocation of this utility would be undertaken at the start of construction.

No other underground utilities have been identified to date, however, any additional utilities that are located during the detailed design phase would be relocated following consultation with relevant utility operators.

Should it be determined that relocation of utilities would be outside of the area of the proposal (including the identified construction footprint), consultation with Roads and Maritime's Environment Manager (South West) would be undertaken to decide if any additional environmental impact assessment is required.

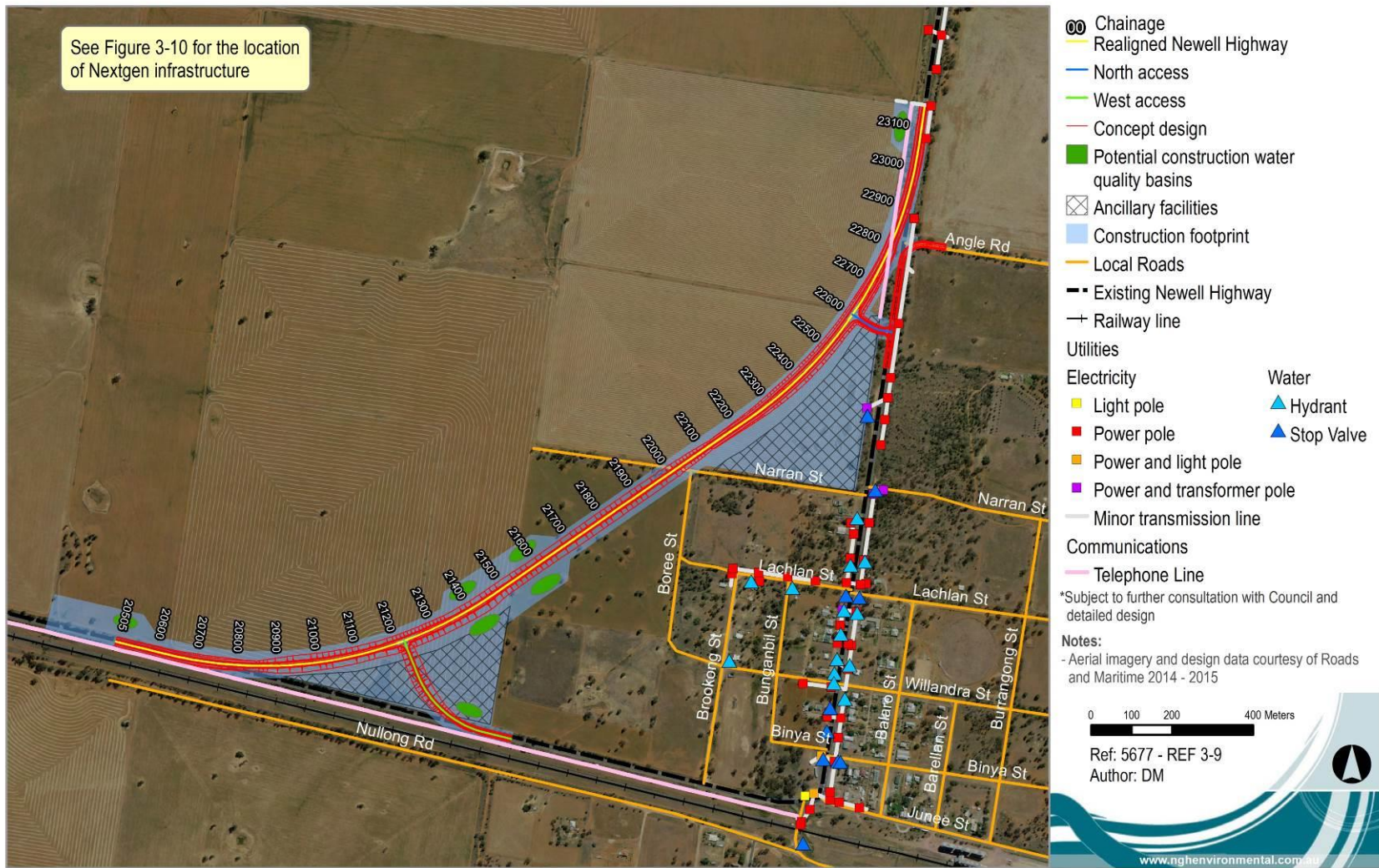


Figure 3-9: Map of utilities in the area



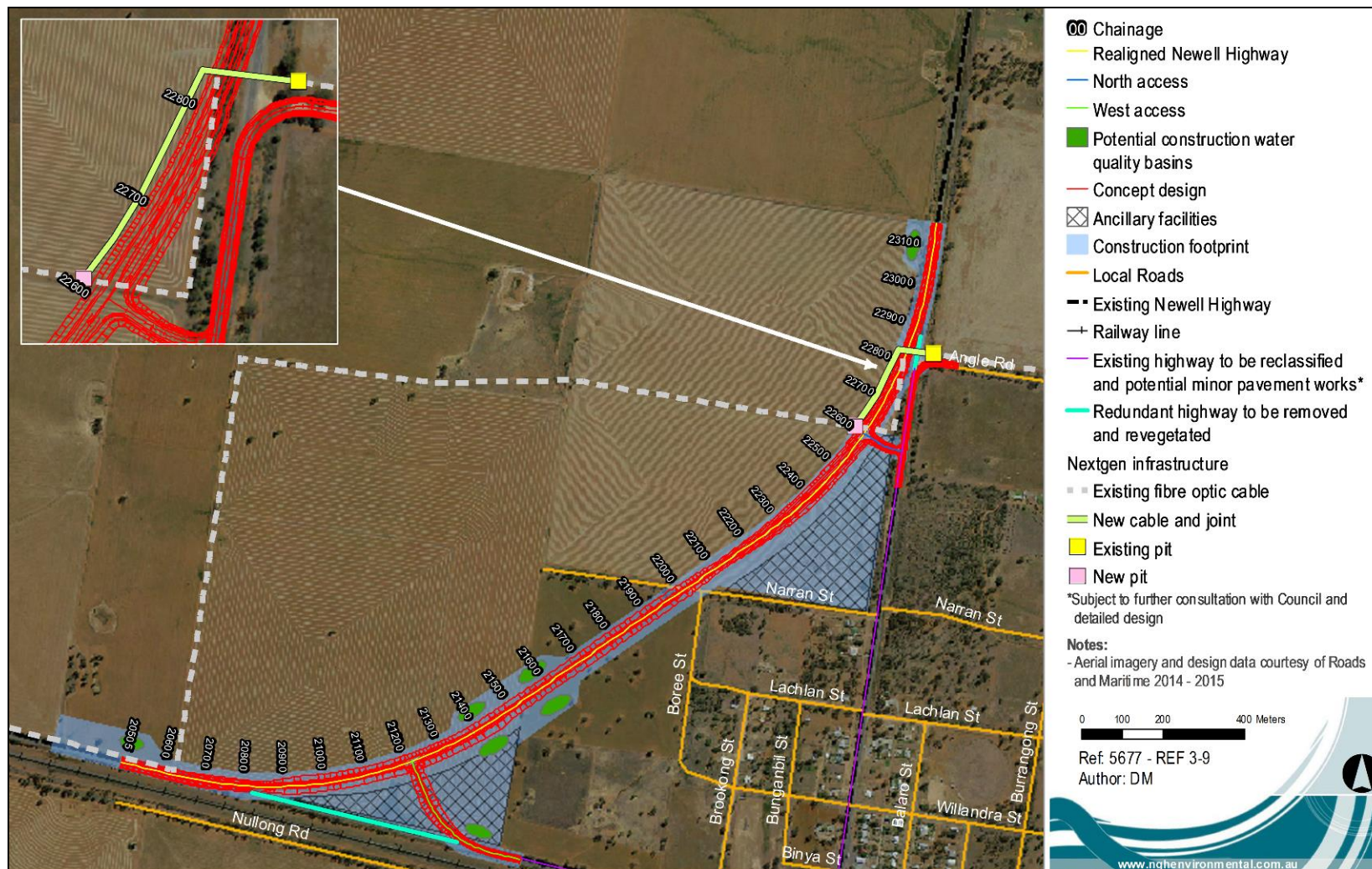


Figure 3-10: Nextgen fibre optic cable relocation

### 3.7 Property acquisition

The proposal would require acquisition of a minimum of 15.7 hectares and a maximum of 32.7 hectares of land depending on the outcome of ongoing negotiations between Roads and Maritime and landowners, and decisions about whether to lease or purchase land that will become surplus once construction is complete. Land to be acquired includes Crown, Council and private land. Refer to Figure 3-11 for a map of property acquisition areas.

The minimum and maximum property acquisition scenarios for the proposal are described below. There may be other property acquisition outcomes between these two limits, depending on further consultation with affected landowners.

The minimum acquisition scenario is to acquire a 50-60 metre corridor of land (about 15.7 ha) for the proposal footprint (required acquisition areas) and lease any additional areas (as shown on Figure 3-11) from the landowners. Once works are complete the leased areas would be rehabilitated and returned to the landowners.

The maximum acquisition scenario is to acquire the 50-60 metre corridor of land for the proposal footprint (required acquisition areas) and also the potential acquisition areas (as shown on Figure 3-11) (totalling 32.7 hectares). Once construction work is complete, the additional areas would be rehabilitated and appropriately revegetated and remain the property of Roads and Maritime permanently or sold.

Table 3-4 shows details of the coloured areas in Figure 3-11, including the current owner status of each section of land and potential minimum and maximum acquisitions required.

The future of the section of Narran Street west of Boree Street (1 hectare in addition to the areas in Table 3-4) will be an integral part of the property acquisition discussions with Narrandera Shire Council and with the owner of 'Woodlands' and will be decided during the detailed design phase for the project.

Consultation with affected property owners has occurred during all stages of the proposal and would continue during the detailed design stage.

Where partial acquisitions are required, Roads and Maritime would realign private property fencing as part of the preliminary construction work and as agreed with property owners.

All acquisitions would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the *Land Acquisition Information Guide* (Roads and Maritime, 2014).

**Table 3-4: Proposed property acquisition details**

Area ID	Description	Total area in Hectares (ha)	Acquisition Type	Current Owner Status	Lot and DP	Land use zone *(LEP)
1.0	Red Area (West)	6.3ha	Required acquisition	Private property	Lots 1, 2 and 3 DP 870432	RU1
1.1	Lime Green Area (West)	3.6ha	Potential acquisition	Private property	Lot 3 DP 870432	RU1
1.2	Light Blue Area (West)	1.8ha	Potential acquisition	Private property	Lot 2 DP 870432	RU1
	<b>Max. acquisition Area 1</b>	<b>11.7ha</b>				
2.0	Orange Area	4.0ha	Required acquisition	Crown Land	Lot 122 DP 750851	RU1 RU5
2.1	Grey/Blue Area (Middle)	3.7ha	Potential acquisition	Crown Land	Lot 122 DP 750851	RU1
	<b>Max. acquisition Area 2</b>	<b>7.7ha</b>				
3.0	Pink Area (Middle)*	0.3ha	Required acquisition	Council Land		RU1
	<b>Max. acquisition Area 3</b>	<b>0.3ha</b>				
4.0	Green Area (North)	5.1ha	Required acquisition	Private property	Lot 59 and 29 DP 750851	RU1
4.1	Yellow Area (North)	7.9ha	Potential acquisition	Private property	Lot 59 DP 750851	RU1
	<b>Max. acquisition Area 4</b>	<b>13.0ha</b>				
	<b>TOTAL maximum acquisition</b>	<b>32.7ha</b>				

\*Note: Table 3-4 does not include the area of Narran Street west of the realignment (1 hectare) as discussions about this section of road are preliminary.

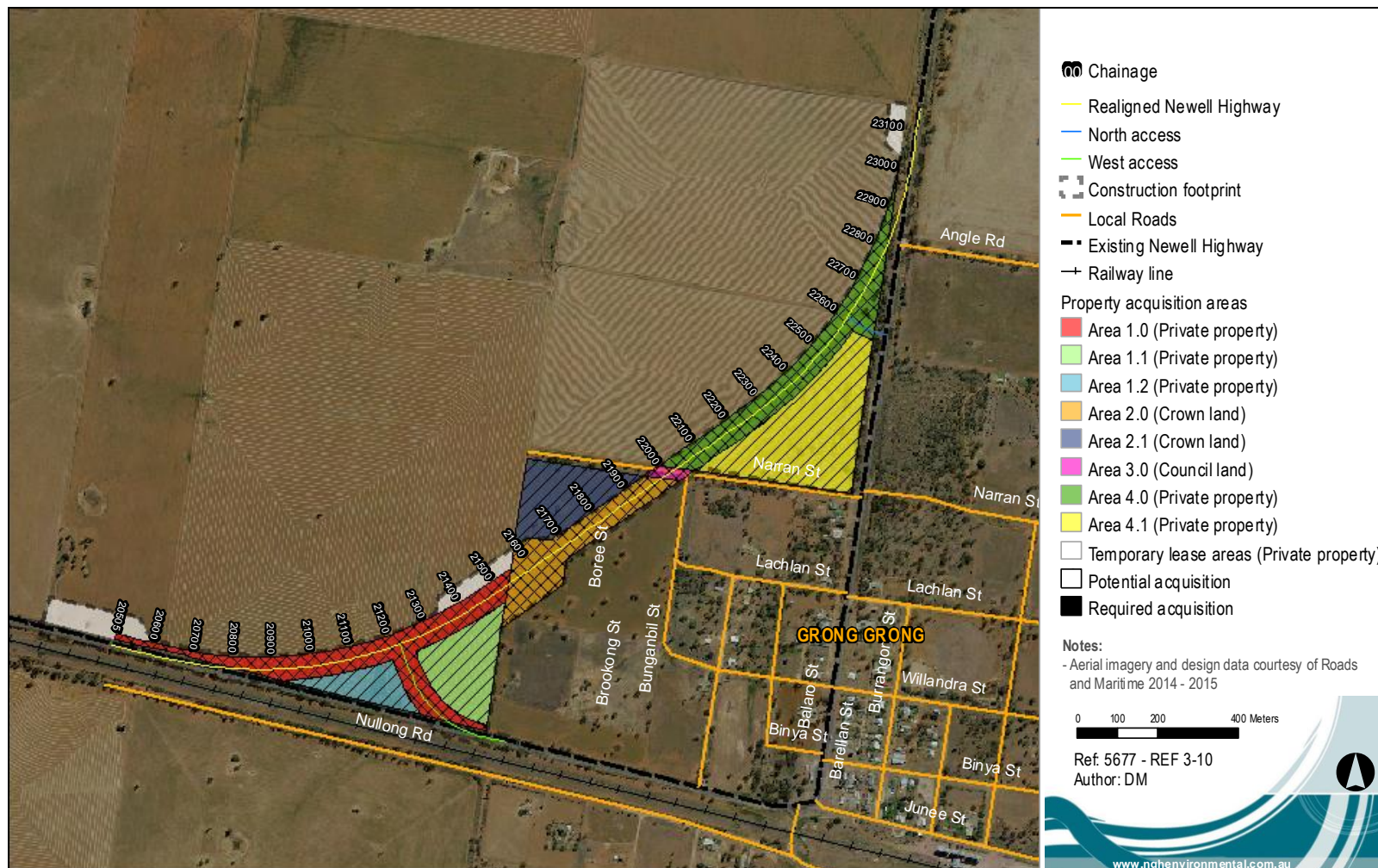


Figure 3-11: Proposed property acquisition options (Source: Roads and Maritime, 2014)

## 4 Statutory and planning framework

---

### 4.1 State Environmental Planning Policies

#### 4.1.1 State Environmental Planning Policy (Infrastructure) 2007

*State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for the realignment of the Newell Highway to the west of Grong Grong and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by *State Environmental Planning Policy No. 14 - Coastal Wetlands*, *State Environmental Planning Policy No. 26 - Littoral Rainforests*, *State Environmental Planning Policy (State and Regional Development) 2011* or *State Environmental Planning Policy (Major Development) 2005*.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities before the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in chapter 5 of this REF.

#### 4.1.2 State Environmental Planning Policy (Rural Lands) 2008

*State Environmental Planning Policy (Rural Lands) 2008* (SEPP (Rural Lands)) aims to facilitate the orderly and economic use of rural lands, including the subdivision, development and protection of rural lands. It applies to land within the Narrandera LGA.

Clause 7 of the SEPP (Rural Lands) identifies rural planning principles. Table 4-1 summarises how the proposal addresses or responds to each of these principles.

**Table 4-1: SEPP (Rural Lands) response to the Clause 7 planning principles**

Rural planning principle	Response
(a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,	The proposal would support and promote productive economic activities in the area by improving the highway network to enable safe and efficient journeys for a variety of users including freight, tourists and other road users.
(b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,	The proposal recognises and responds to the increasing freight demands of the area, region and State, some of which would include the transportation of agricultural produce.

<p>(c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,</p>	<p>The proposal would result in the acquisition of some rural land for road construction. However, overall the operation of the proposal would support the use of agricultural lands in the region by contributing to an improved highway network with better freight efficiency to service rural industries.</p>
<p>(d) in planning for rural lands, to balance the social, economic and environmental interests of the community,</p>	<p>The proposal would result in socio-economic and environmental impacts as described in chapter 6. The assessment concludes that on balance the social and economic benefits of the proposal would outweigh the adverse impacts, which would be minimised and managed appropriately.</p>
<p>(e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,</p>	<p>The proposal would have some impacts on natural resources including biodiversity, water and land resources. The impact assessment in chapter 6 describes these impacts in greater detail. On balance the assessment concludes that impacts are considered acceptable and have been either avoided or would be minimised and managed appropriately.</p>
<p>(f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,</p>	<p>The proposal would support opportunities for rural lifestyles and communities. There are socio-economic benefits and adverse impacts as a result of the proposal. These are described in section 6.4.</p>
<p>(g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,</p>	<p>Not applicable to this proposal.</p>
<p>(h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General</p>	<p>The proposal is consistent with State and local strategic plans as described in section 2.2.1.</p>

#### 4.1.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas, to ensure that permanent free-living populations are protected in their present range and to reverse the current trend of

population decline. The policy applies to the Narrandera LGA.

SEPP 44 does not apply to the proposal as the proposal does not require development consent. However the Biodiversity Assessment (Appendix F), carried out as part of this REF, considered SEPP 44, as detailed in section 6.2.

Potential koala habitat is considered to occur in areas of native vegetation where feed trees species (listed under Schedule 2 of SEPP 44) comprise at least 15 per cent of the total tree canopy. If land is potential Koala habitat then further investigations are required to determine if core Koala habitat is present.

The Koala has been recorded twice within a 10 kilometre radius of the proposal. The Narrandera Nature Reserve located along the Murrumbidgee River about 18 kilometres from the proposal is known to support a population of Koalas. One koala feed tree species, Bimble Box (*Eucalyptus populnea subsp bimbil*) was identified along Narran Street. This community was common throughout the road reserve area along Narran Street. The proposal traverses a small section of this habitat (less than 0.1 hectares).

Due to the small area of suitable feeding habitat, the lack of connectivity to areas of core habitat and the proximity to a busy road and urban area the area of the proposal is not considered to be potential or core Koala habitat.

## 4.2 Local Environmental Plans

### 4.2.1 Narrandera Local Environmental Plan 2013

The proposal is located within the Narrandera LGA. The Narrandera Local Environmental Plan 2013 (LEP) is the local planning instrument for the Narrandera LGA. The proposal would be located on land zoned by the LEP as:

- RU1 Primary Production Zone
- R5 Large Lot residential
- RU5 Village.

Refer to Table 4-2, which identifies the relevant work activity within each land use zone.

Other land use zones in the area but not traversed by the proposal include E2 – Environmental Conservation, E4 – Environmental Living and RU4 – Primary Production Small Lots.

Land use zones are shown in Figure 4-1.

Roads are permitted without consent within all of these zones. The proposal is also permissible without consent under clause 94 of the ISEPP, which is the governing instrument in this case (refer to section 4.1.1).

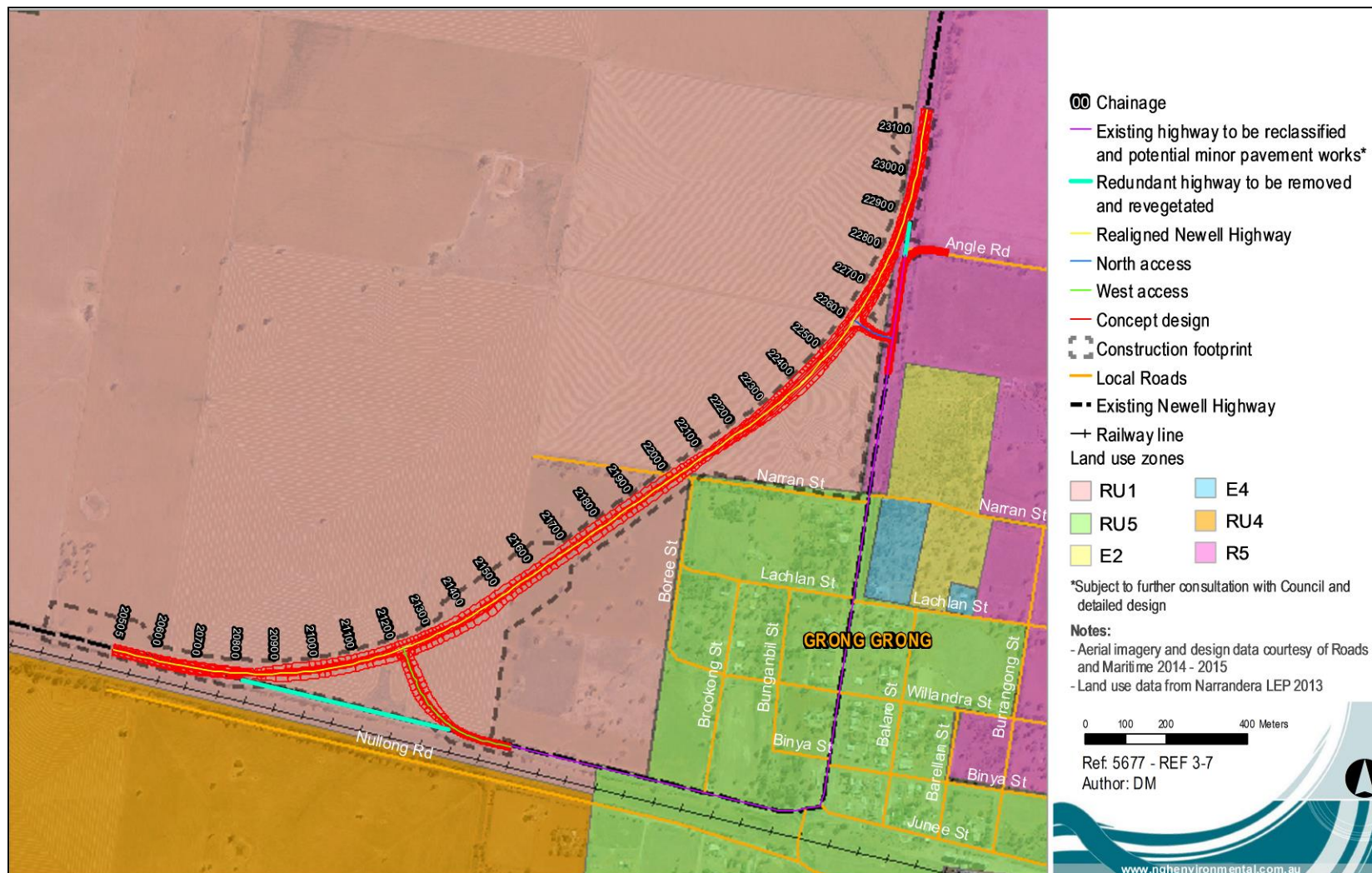


Figure 4-1: Land Use Zones (Source: Narrandera LEP 2013)



**Table 4-2: Land use zoning and permissibility under Narrandera LEP**

<b>Zone</b>	<b>Category</b>	<b>Relevant objectives</b>	<b>Relevant work activity</b>	<b>Permissibility</b>
<b>RU1</b>	Primary production	<ul style="list-style-type: none"> <li>To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.</li> <li>To encourage diversity in primary industry enterprises and systems appropriate for the area.</li> <li>To minimise fragmentation and alienation of resource lands.</li> <li>To minimise conflict between land uses within this zone and land uses within adjoining zones.</li> </ul>	Realignment of the Newell Highway at Grong Grong and ancillary facilities.	Roads are permitted without consent.
<b>R5</b>	Large Lot residential	<ul style="list-style-type: none"> <li>To provide residential housing in a rural setting while preserving. And minimising impacts on, environmentally sensitive locations and scenic quality.</li> <li>To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.</li> <li>To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.</li> <li>To minimise conflict between land uses within this zone and land uses within adjoining zones.</li> <li>To allow for a nature and scale of extensive agriculture that is compatible with residential use and the amenity of the locality.</li> </ul>	Realignment of the Newell Highway at Grong Grong.	Roads are permitted without consent
<b>RU5</b>	Village	<ul style="list-style-type: none"> <li>To provide for a range of land uses, services and facilities that are associated with a rural village.</li> </ul>	Realignment of the Newell Highway at Grong Grong.	Roads are permitted without consent.

Clause 6.4 of the LEP relates to terrestrial biodiversity and applies to land identified as “Biodiversity” on the Terrestrial Biodiversity Map. The requirements of this clause relate to determining development applications for development permissible with consent.

Parts of the road reserve along the Newell Highway where the realignment would intersect forms part of the land identified as “Biodiversity” (Figure 4-2). The objective of this clause is to maintain terrestrial biodiversity by:

- a) protecting native fauna and flora, and
- b) protecting the ecological processes necessary for their continued existence, and
- c) encouraging the conservation and recovery of native fauna and flora and their habitats.

The proposal is permissible without consent under the LEP and the ISEPP, so clause 6.4 does not apply. Nevertheless, impacts to biodiversity have been avoided through the concept design phase and are assessed in section 6.2 of this REF. Narrandera Shire Council have been consulted and consultation would continue during detailed design and construction.

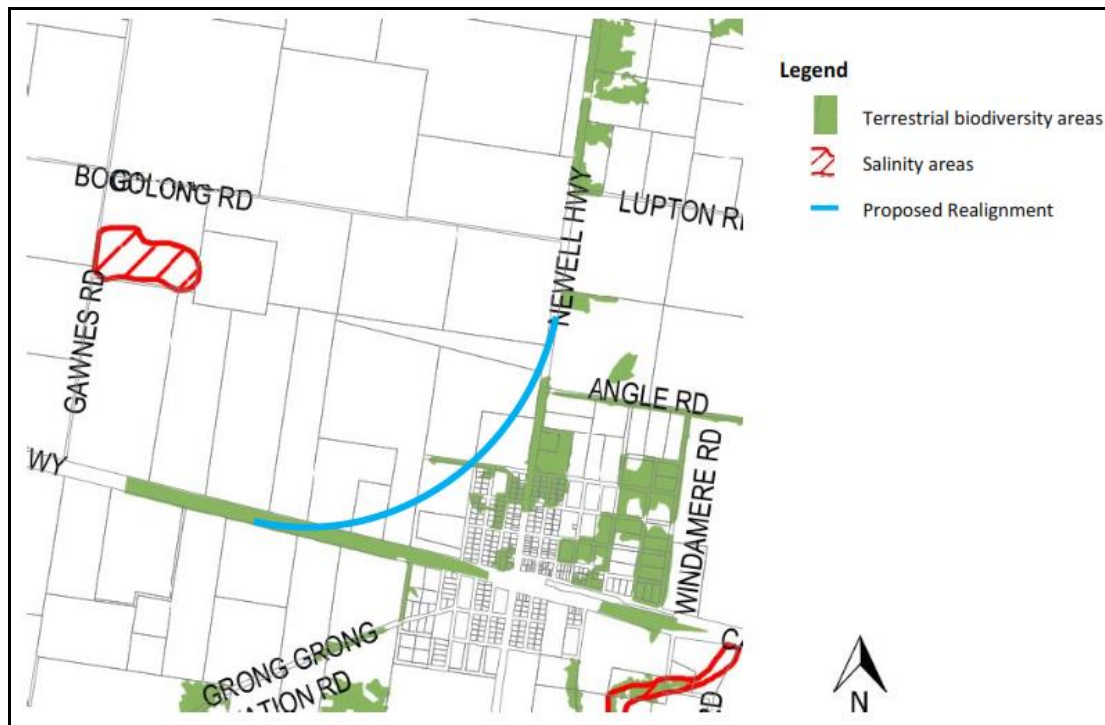


Figure 4-2: Map of Land classed as Terrestrial Biodiversity (Source: Narrandera LEP 2013)

### 4.3 Other relevant legislation

#### 4.3.1 *Threatened Species Conservation Act 1995*

The *Threatened Species Conservation Act 1995* (TSC Act) aims to conserve and protect certain classes of threatened, endangered and vulnerable species, populations and ecological communities.

Section 5A of the EP&A Act lists a number of factors to be taken into account when deciding if there is the likelihood of a significant impact on threatened species, populations and their habitat or on ecological communities. If there is a chance of an impact, then an Assessment of Significance would be required to determine the significance of the impact. If there is likelihood for a significant impact on threatened species, populations and their habitat or on ecological communities then a Species Impact Assessment is required. Further details about threatened species is located in section 6.2 and the Biodiversity Assessment.

#### 4.3.2 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NP&W Act) includes the protection of Aboriginal objects and places. The changes include new offences relating to harm, or desecration of, an Aboriginal object or declared Aboriginal Place. Harm includes destroying, defacing, damage or moving objects.

#### 4.3.3 *Water Management Act 2000*

The *Water Management Act 2000* (WM Act) provides for the sustainable and integrated management of water resources for the benefit of both present and future generations. It provides for the implementation of water sharing plans that establish rules for sharing a water resource while taking into account the environmental need

of the resource. The construction footprint for the proposal is covered by the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003. This plan includes Bundidgerry Creek. Water from this creek is likely to be used for the proposal.

Section 56 of the WM Act establishes access licences for the take of water within a particular water management area. Under section 18(1) of the Water Management (General) Regulation 2011 (Water Management Regulation), Roads and Maritime, as a roads authority, is exempt from the need to obtain an access licence in relation to water required for road construction and road maintenance.

Sections 89 to 91 of the *Water Management Act* establish three types of approvals that a proponent may be required to be obtained. These are water use approvals, water management work approvals (including water supply work approvals, drainage work approvals and flood work approvals) and activity approvals (including controlled activity approvals and aquifer interference approvals).

A water use approval under Section 91A(1) of the WM Act would be required for the use of water covered by the water sharing plans. However, under clause 31(1) of the Water Management Regulation, Roads and Maritime, as a roads authority, is exempt from requiring a water use approval for road construction and road maintenance.

Clause 38 of the Water Management (General) Regulation 2011 exempts Roads and Maritime, as a public authority, from obtaining approval under Section 91E(1) of the WM Act for controlled activities on waterfront land. Despite not requiring controlled activity approvals, NOW guidelines for controlled activities have been considered in this assessment and would be considered during the detailed design and construction phases of the proposal.

#### *4.3.4 Noxious Weeds Act 1993*

The *Noxious Weeds Act 1993* (NW Act) establishes control mechanisms to reduce the negative impacts of weeds on the economy, community and environment. Under Section 13 of the NW Act, Roads and Maritime, as a public authority, is required to control noxious weeds on land that it owns and prevent noxious weeds from spreading to adjoining properties.

One noxious weed species (African Boxthorn *Lycium ferocissimum*) (Class 4) was found to occur within the construction footprint. Class 4 weeds are locally controlled weeds that pose a threat to primary production, the environment or human health.

#### *4.3.5 Protection of the Environment Operations Act 1997 Act*

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes a regulatory framework for the protection and restoration of the environment. It provides a mechanism for licensing certain activities (scheduled activities), listed in Schedule 1 of the POEO Act.

The proposal may require an Environment Protection Licence (EPL) if it meets the definition of 'extractive activities' under clause 19 of Schedule 1. The need for an EPL for 'extractive activities' would be confirmed during detailed design.

#### *4.3.6 Land Acquisition (Just Terms Compensation) Act 1991*

The *Land Acquisition (Just Terms Compensation) Act 1991* applies to the acquisition of land (by agreement or compulsory process) by a public authority authorised to acquire the land by compulsory process. It provides a guarantee that when a public authority requires the acquisition of land, the amount of compensation will not be less

than the market value of the land. The *Land Acquisition (Just Terms Compensation) Act 1991* would apply to the acquisition of any land required for the proposal. Property acquisition is further discussed in section 3.7.

## 4.4 Commonwealth legislation

### 4.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Appendix C and chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

## 4.5 Confirmation of statutory position

The proposal is categorised as development for the purpose of a road and is being carried out by or on behalf of a public authority. Under clause 94 of the ISEPP the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Part 5 of the EP&A Act.

Roads and Maritime is the determining authority for the proposal. This REF fulfils Roads and Maritime's obligation under clause 111 of the EP&A Act to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment.

## 5 Stakeholder and community consultation

---

### 5.1 Consultation strategy

Community and stakeholder engagement aims to provide genuine opportunities for community and stakeholder involvement. Community consultation is guided by the following established consultation objectives:

- Build community understanding and acceptance of the decision making process including proposal phases, implementation strategy and influencers, such as funding.
- Continue to foster understanding and acceptance of the broader objectives and benefits of the proposal for the local community.
- Support potentially directly impacted property owners with proactive communication about concept design impacts, proposal determination and the property acquisition process.
- Address community and stakeholder concerns regarding potential issues such as changed access arrangements, traffic flow, potential loss of passing trade, and construction impacts.
- Update and inform the community on the REF, submissions process and determination for the proposal.
- Provide a range of contact and engagement opportunities during the REF display period.

The consultation strategy includes liaison with relevant landowners and local residents, local business owners, the Grong Grong progress association, Narrandera Shire Council, Department of Primary Industries (Fisheries Division and Office of Water), Office of Environment and Heritage (OEH) and Narrandera LALC.

### 5.2 Community involvement

Community involvement has been integral in the development of the concept design for the proposal. Roads and Maritime has engaged the community and stakeholders to increase public understanding of, and participation in, the development of the concept design. The proposal has benefited from the input of local knowledge provided through community engagement. The community has helped identify issues, potential mitigation measures and opportunities to improve the proposal outcomes.

The community's concerns and issues with the proposal have evolved throughout the various stages of the project. In the early consultation there was a strong preference for the highway to remain through the town as opposed to an outer bypass. With the change in objectives to cater for freight efficiency, HPV access and improved travel times in addition to road safety improvements, Roads and Maritime selected the outer option as the preferred option. While the community would still prefer an in-town option, the community has since accepted the need for the town bypass due to the projected increase of heavy vehicle volumes. The community's main concerns now are based around access arrangements, signage and long term survival of the local businesses and the town. Table 5-1 goes into the detail of the activities and the outcomes of the consultation process between 2011 and the present.

There have been several opportunities for the community to be informed of, and provide comments and feedback on, the proposal and design. Table 5-1 shows

community consultation to date. A summary of the issues raised is provided in Table 5-2.

**Table 5-1: Overview of community consultation and activities to date**

Date	Activity / Outcomes
May – September 2011	<ul style="list-style-type: none"> <li>• The (then) RTA took the preferred preliminary realignment option and four initial town access options to a Council-run meeting about the village strategy in May 2011. The RTA sought community feedback on those initial options. RTA received 22 feedback forms from the local community all stating preference for an in town realignment option.</li> <li>• In September 2011 Roads and Maritime received a petition with 170 signatures initiated by small business owners in Grong Grong. The petition stated <i>'We :- The residents of Grong Grong object strongly against the proposed Newell Highway Bypass at Grong Grong because we believe it will kill our small caring community due to loss of passing trade'</i> and <i>'We as travellers who travel through Grong Grong object strongly against the proposed Newell Highway bypass as we believe it will destroy this little town'</i></li> <li>• In response to the community feedback on the options in May 2011 and the petition in September 2011, Roads and Maritime decided to review the proposal objectives and scope, which included reconsidering the possible alternatives and options.</li> </ul>
September – December 2014	<ul style="list-style-type: none"> <li>• Roads and Maritime consulted with the Grong Grong community about the proposal. This included providing information about the preferred route option (community update September 2014) and seeking feedback on two town access options. The consultation included two drop in sessions and an information night. Community members were also invited to complete a survey specifically asking for feedback on the town access options and about the project's benefits and impacts, suggestions on how to limit the impacts and how to improve the entrance into Grong Grong. In total, 30 survey responses were received from the community. The drop in sessions in Grong Grong attracted around 16 visitors.</li> <li>• The feedback received stated a clear preference for the through town access to support local businesses and clear signage to attract motorists into town. In December 2014 Roads and Maritime letterbox dropped Grong Grong residents providing a question and answer sheet responding to the issues raised. Roads and Maritime selected the town access option preferred by the Grong Grong community as the preferred option.</li> </ul>

Date	Activity / Outcomes
November 2014	<ul style="list-style-type: none"> <li>• Elton Consulting contacted many of the local businesses and community groups on behalf of Roads and Maritime in November 2014 to discuss aspects of life and business in the town, changes over time, perceived effects (impacts and benefits) of the proposal and ideas to retain or increase the viability of local businesses and the town generally. All expressed concerns about the future of the town once the proposal is complete.</li> <li>• Discussions were also held between Elton Consulting and a representative of the Grong Grong Progress Association and the Earth Park coordinator in November 2014 to obtain an understanding of the types of community initiatives underway in the town and opportunities to promote visits and expand the economic base.</li> </ul> <p>The Progress Association is an active and productive community group responsible for promoting and organising a large number of activities and functions throughout the year.</p> <p>Earth Park is another initiative sponsored by Council on State Rail land near Grong Grong station, where donated and recycled materials, such as tyres, are adapted for play equipment, a community garden and other uses.</p> <ul style="list-style-type: none"> <li>• The issues raised in discussions are documented in the Socio-economic assessment report. A number of suggestions were included in the report to minimise the social-economic impact of the proposal. Central to these is ongoing consultation with Council, the Grong Grong Progress Association, the Earth Park coordinator, Narrandera Rotary Club and other interested community members to implement opportunities to attract new visitors to the town and its events, provide updates on progress and receive feedback on the effectiveness of measures implemented.</li> </ul>

A socio economic assessment report has been prepared for the proposal. Refer to Appendix D for this report.

**Table 5-2: Summary of issues raised by the community**

Issue raised	Where addressed in this REF
Concerns for the viability of local businesses within Grong Grong, particularly the future of the general store and the motor inn. Many are very concerned that the general store will close once passing traffic no longer comes into town. The project would also make the businesses more difficult to sell, thus further impacting on their viability.	Section 5.6. Signage and providing visual cues (eg plantings) for drivers to encourage them to stop in Grong Grong are part of the proposal and will be implemented, in consultation with the local community.
There is strong community preference for two access points in the north and west rather than a single central access point between the Newell Highway and the town of Grong Grong.	Two access points are included as part of the proposal, as described in section 3 and in further detail in section 3.3.2.

Issue raised	Where addressed in this REF
<p>The community would prefer the design of the access roads to be altered to provide slip lane entry to the town from the north and slip lane exit from the town to the west to make access to the town more attractive and easier for fully loaded grain trucks.</p>	<p>Slip lanes have been considered during development of the concept design.</p> <p>To provide slip lanes that meet safety requirements in this context they would need to start a long way back from the intersections of the highway and the north and west accesses. This would avoid confusion for drivers intending to stay on, exit or join the highway.</p> <p>At the north access the slip lane would use the old highway, making it easy for drivers to mistake the slip lane as the highway, resulting in safety risks.</p> <p>To construct safer slip lanes in this context would result in a considerably larger area of impact and additional land acquisition with additional costs. The costs and impacts are not considered to be justified given the expected use of slip lanes.</p> <p>Roads and Maritime will consult further with the community on the request for slip lanes and amended intersection layouts during development of the design. Operational road safety will be the main consideration.</p>
<p>The property owner whose land would be acquired for the project would need to change farming practices. The farmer currently moves sheep across the Newell Highway around 8-10 times each year. This would be less safe under the proposal, as approach speeds of highway traffic would be higher than at present</p>	<p>Section 6.4.4.</p> <p>Ongoing consultation will occur with the property owner to identify measures for the safe movement of animals.</p>
<p>The community has a strong interest in working with Roads and Maritime on signposting ideas, as well as exploring other ways to attract highway traffic into town</p>	<p>Section 5.6.</p> <p>Roads and Maritime will continue to engage with the community on the proposed signposting and ways of attracting visitors into town.</p>

Consultation with landowners and leaseholders affected by property acquisition is ongoing. During preliminary discussions, the private property owner identified that some areas of their land are likely to be unviable and they would prefer that Roads and Maritime purchased them. The landowner has indicated they are able to work around the changes. Details would be finalised through negotiations during detailed design.



### 5.3 Aboriginal community involvement

Roads and Maritime has undertaken Aboriginal community consultation and investigation since the proposal commencement in 2009. Up until April 2010, this consultation was undertaken in accordance with the requirements of the 'Procedure for Aboriginal Cultural Heritage Consultation and Investigation' (RTA, 2008) and the 'Interim Guidelines for Aboriginal Community Consultation' (Department of Environment and Conservation (DEC, 2005)).

In April 2010, the OEH published the 'Aboriginal Cultural Heritage Consultation Requirements for Proponents' (DECCW, 2010). These replaced the 'Interim Guidelines for Aboriginal Community Consultation' (Department of Environment and Conservation (DEC, 2005)).

The Narrandera Local Aboriginal Land Council (LALC) undertook a site survey in February 2009 for the proposal (survey results are provided at Appendix E). Roads and Maritime's Aboriginal Heritage Advisor attended the site survey and has traversed the construction footprint. No evidence of Aboriginal heritage was found to be present.

An updated Aboriginal Heritage Information Management System (AHIMS) search was carried out on the 20 November 2014 for the proposal. A 200 metre search radius of the construction footprint was examined. No recorded Aboriginal sites were identified during this search (Appendix G).

Roads and Maritime's Aboriginal Heritage Advisor confirmed in November 2014 that the proposal is unlikely to have an impact on Aboriginal cultural heritage (refer to Appendix E). As a result no further consultation with the Aboriginal community was considered necessary.

Refer to section 6.3 for a detailed assessment of Aboriginal heritage impacts.

### 5.4 State Environmental Planning Policy (Infrastructure) consultation

Under clauses 13 of ISEPP, Roads and Maritime is required to consult with the local council regarding potential impacts on council-related infrastructure for a consultation period of 21 days. As the proposal would not impact any council infrastructure, no consultation is required under ISEPP.

### 5.5 Government agency and stakeholder involvement

#### **Department of Primary Industries (Fisheries and NOW)**

The Department of Primary Industries (DPI), Fisheries Division and Office of Water Division (NOW) were consulted about extraction of water from Bundidgerry Creek for use during construction of the proposal. An email to both agencies was sent on the 4 November 2014.

NOW replied on the 6 November 2014 stating Roads and Maritime do not require an access license, however, a Works Approval may be required to carry out dust suppression and road works. Roads and Maritime would consult with NOW prior to the commencement of construction about any Works Approval requirements.

No response was received from Fisheries regarding the proposal.

### **Office of Environment and Heritage**

Roads and Maritime consulted with the NSW Department of Planning and Environment, Office of Environment and Heritage (OEH), about the proposal in November 2014. OEH did not provide specific comments on the proposal at the time but requested the opportunity to review the REF.

OEH will be sent a copy of the REF during the display period.

### **Department of Trade and Investment NSW (Crown Lands)**

Acquisition of Crown land would be required for the proposal (land acquisition details are provided in section 3.7). Roads and Maritime has consulted with the Department of Trade and Investment (Crown lands division) and sent a formal letter stating interest in this parcel of land for the proposal. Further negotiation and consultation would continue during detailed design and construction. In response the Crown Lands division acknowledged the letter and agreed to further discussion.

The Department of Trade and Investment NSW (Crown Lands) will be sent a copy of the REF during the display period.

### **Narrandera Shire Council**

Narrandera Shire Council has been consulted regularly about the proposal. Council's main concerns include:

- Ensure easy access in and out of Grong Grong.
- Implement a suitable signposting scheme to encourage drivers to Grong Grong.
- Implement good community engagement and community feedback and support.
- Undertake ongoing consultation with Narrandera Council regarding future road management of the existing highway.

These issues have been addressed through the concept design and environmental assessment. Consultation with Narrandera Shire Council would continue during detailed design and construction, should the proposal proceed. Narrandera Shire Council will be sent a copy of the REF during the display period.

## **5.6 Ongoing or future consultation**

This REF will be placed on public display and the community will be invited to provide comments. All comments received will be considered in a submissions report which will be made publicly available. The community would be kept informed of any further changes to the proposal resulting from the submissions report and any future consultation process.

If Roads and Maritime determines to proceed with the proposal, the following ongoing consultation would be undertaken:

- Engagement with directly impacted and adjacent property owners.
- Engagement with the Grong Grong business community and progress association about town access arrangements and signage.
- Regular updates as required to the Grong Grong community during detailed design and construction.
- Development and maintenance of a comprehensive complaints management system for the construction phase.
- Regular updates and information as required on the project's website ([www.rms.nsw.gov.au/roadprojects](http://www.rms.nsw.gov.au/roadprojects)).

## 6 Environmental assessment

---

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal.

All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guidelines *Is an EIS required?* (DUAP, 1999) and *Roads and Related Facilities* (DUAP, 1996), as required under clause 228(1)(b) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix C. Site-specific safeguards are provided to ameliorate the identified potential impacts.

### 6.1 Biodiversity

#### 6.1.1 Methodology

NGH Environmental Pty Ltd were engaged by Roads and Maritime to undertake a biodiversity assessment to inform the REF. A copy of the full report including a detailed scope and methodology is provided in Appendix F.

The general methodology included desktop review of flora and fauna likely to occur in the study area, targeted flora and fauna surveys and the assessment of impacts to flora, fauna and their habitats. For the purposes of the biodiversity assessment, the study area for the proposal includes the construction footprint (shown in Figure 1-1) and any areas immediately adjacent to the construction footprint that have biodiversity values that may be subject to indirect impacts. These areas were largely confined to the existing road reserves. An area of about 10 metres either side of the existing access track to Bundidgerry Creek (refer Figure 3-7) was also included in the study area for this assessment.

Prior to undertaking field investigations, previous studies conducted within the region and relevant databases were consulted. Background searches were undertaken in May 2014.

Literature relevant to this assessment was reviewed and included but was not limited to:

- A review of existing information on protected and threatened flora and fauna species, populations, EECs, and their habitats as defined by the TSC Act and EPBC Act that occur or are likely to occur.
- Analysis of topographic maps and aerial photographs to locate sensitive sites in proximity to the study area. The results of the database searches were also used to determine the location of any such sites.
- *The Bioregions of New South Wales, their biodiversity, conservation and history* (NSW 2003).
- OEH Threatened Species Profiles.
- Rare or Threatened Australian Plants list (CSIRO).
- Commonwealth Department of the Environment EPBC Act Species Profiles and Threats Database (SPRAT).
- *NSW Vegetation Classification and Assessment: Part 2 Plant Communities of the NSW South-western Slopes Bioregion* (Benson 2008).

A general flora and vegetation survey was undertaken by NGH Environmental in June 2009 as part of the ecological assessment for the options assessment. Additional general flora and fauna field surveys were undertaken on 19 May 2014 and 20 October 2014 to inform assessment of the proposal. The study area was surveyed using the “random meander” method as documented by Cropper (1993).

Targeted surveys for two orchid species, the Sand-hill Spider Orchid (*Caladenia arenaria*) and Pine Donkey Orchid (*Diuris tricolor*), were undertaken in September 2009 and on 17 September 2014. Areas surveyed for the orchids in 2014 are shown in Figure 6-1.

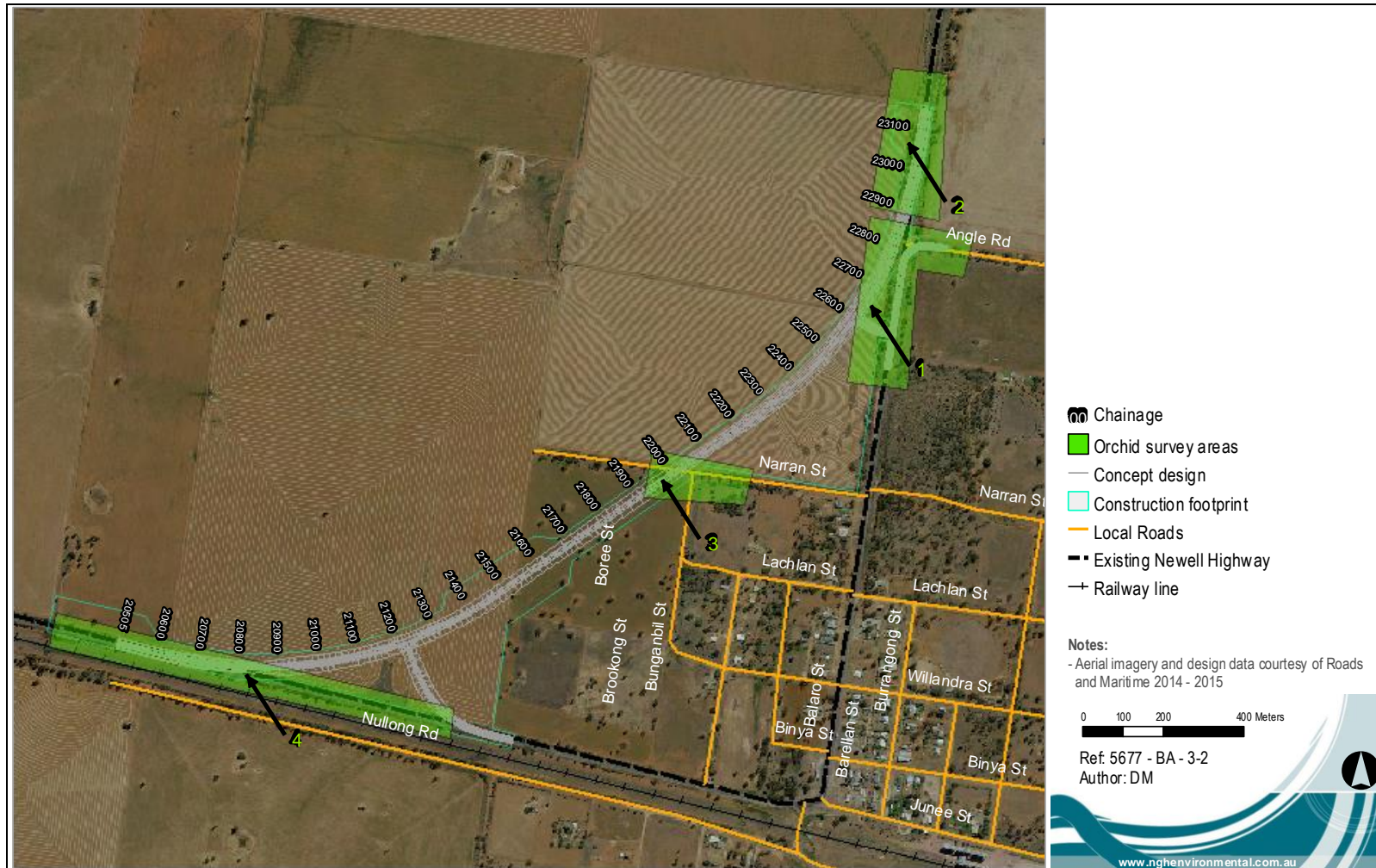


Figure 6-1: Survey areas for threatened orchids

## 6.1.2 Existing environment

### **Flora**

#### *General*

The proposal is located on the western edge of the NSW South Western Slopes (SWS) Bioregion, within the lower slopes sub-region and the Narrandera LGA. The proposal is located within an agricultural landscape with most of the surrounding areas being used for grazing and cropping purposes. As a result, vegetation within the study area is fragmented and isolated in the landscape.

The majority of the study area is used for cropping and grazing activities which, as a consequence, has reduced the dominance of native ground cover species in the area. These agricultural areas contain scattered mature remnant trees. Vegetated areas are present within the road reserve along the Newell Highway, along Narran Street, to the west of the highway and to the south of Narran Street within vacant residential blocks. These vegetated areas contain a good diversity of native species and structural diversity with exotic species being mostly restricted to previously disturbed areas along the road edges.

A total of 56 flora species were recorded within the study area during field investigations (refer to Appendix F). No threatened flora species were recorded within the study area.

#### *Vegetation Communities*

Biometric vegetation type mapping in the NSW Vegetation Information System (VIS) was used to identify existing vegetation communities within the study area. Four vegetation types are located within the study area including:

1. Native grassland complex.
2. Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes and Riverina Bioregions.
3. Yellow Box – White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina and western NSW SWS Bioregions.
4. River Red Gum herbaceous-grassy very tall open forest on inner floodplains in the lower slopes sub regions of the NSW SWS and Riverina Bioregion

Refer to Figure 6-2 for a map of the Biometric vegetation types identified through the NSW VIS.

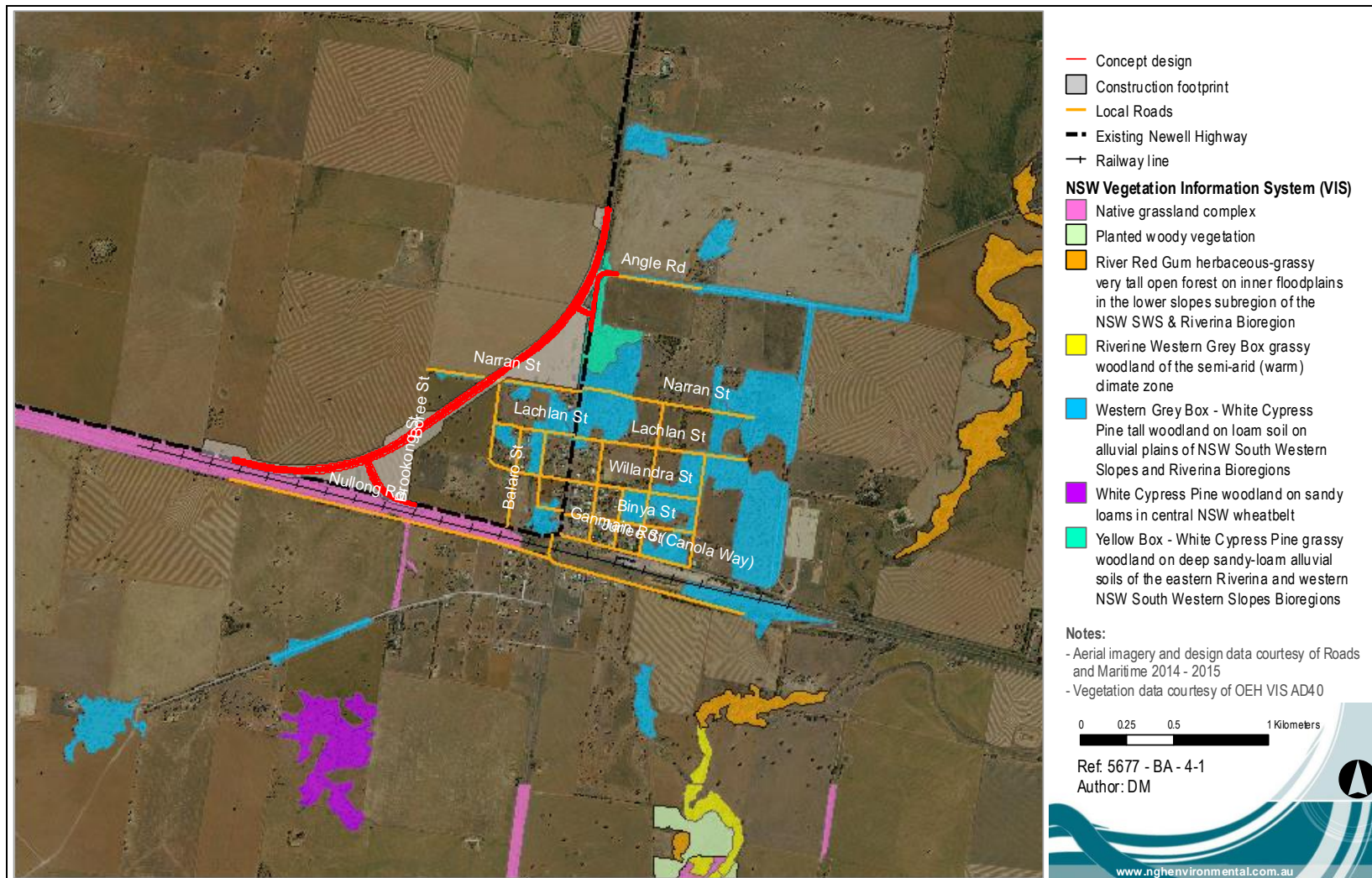


Figure 6-2: Vegetation communities identified through NSW VIS (OEH, 2014)

Six distinct vegetation types were identified within the study area during the site surveys.

1. Inland Grey Box Woodland
2. Inland Grey Box Woodland (highly modified)
3. Bimble Box and Inland Grey Box Woodland
4. Bimble Box and Dwyer's Red Gum with Grey Box
5. Modified Agricultural/cropping Land
6. River Red Gum Forest

Table 6-1 lists the vegetation types identified in the study area, their condition and identifies the equivalent Biometric vegetation types. The vegetation types as mapped in the NSW VIS are also provided for reference and demonstrate the discrepancies in this mapping compared to what was observed during the survey. Refer to Figure 6-3 for a map of the distribution of the vegetation types identified within the study area during the field surveys.

The River Red Gum Forest occurs along the existing access track to Bundidgerry Creek and has not been mapped.

The road reserve areas along the existing Newell Highway in the study area comprise of Inland Grey Box Woodland dominated by Grey Box (*Eucalyptus microcarpa*) and White Cypress Pine (*Callitris glaucophylla*) with a predominately native understory and groundcover. The VIS vegetation mapping identifies these areas as Native grassland complex along the Newell Highway, west of the low speed 90 degree bend and Western Grey Box – White Cypress Pine between Lachlan and Narran Streets.

Vegetation along Narran Street and within several vacant blocks to the south of Narran Street are dominated by Bimble Box (*Eucalyptus populnea subsp. bimbil*) with Grey Box and White Cypress Pine occurring occasionally. The VIS vegetation mapping identifies this area as Western Grey Box – White Cypress Pine.

There is also a small area of granite rock outcrops to the north of Grong Grong at the crest of the hill. Vegetation within this rocky rise consists of Bimble Box and Dwyer's Red Gum (*Eucalyptus dwyeri*) with Grey Box to a lesser extent and a sparse shrubby understory of *Senna* and *Acacia* species. These vegetated areas contain a good diversity of native species and structural diversity with exotic species being mostly restricted to previously disturbed areas along the road edges. The VIS vegetation mapping identifies this area as Yellow Box – White Cypress Pine.



**Table 6-1: Vegetation types within the study area.**

<b>Vegetation types identified during site surveys</b>	<b>Benson ID</b>	<b>Equivalent NSW Biometric Vegetation type</b>	<b>Biometric condition</b>	<b>Biometric vegetation type as mapped in the NSW VIS</b>	<b>Listed as an NSW or Cwth EEC</b>
Inland Grey Box Woodland	ID 80	Inland Grey Box - White Cypress Pine tall woodland on sandy loam soil on alluvial plains of NSW South-western Slopes and Riverina Bioregions (MR565)	Moderate to good	Native grassland complex (west of 90 degree bend). Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes and Riverina Bioregions.	Yes (NSW and Cwth)
Inland Grey Box Woodland (highly modified)	ID 80	Inland Grey Box - White Cypress Pine tall woodland on sandy loam soil on alluvial plains of NSW South-western Slopes and Riverina Bioregions (MR565)	Low	Not mapped	Yes (NSW)
Bimble Box and Inland Grey box Woodland	ID 82	Inland Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penepplain Bioregion (MR564)	Moderate to good	Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes and Riverina Bioregions.	Yes (NSW)
Bimble Box and Dwyer's Red Gum with Grey Box	ID 185/ID 82	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly of the NSW South Western Slopes Bioregion (MR558), intergrading with MR 564.	Moderate to good	Yellow Box – White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina and western NSW SWS Bioregions.	Yes (NSW and Cwth)
River Red Gum Forest (This vegetation type is found along the access track to the water extraction point shown on Figure 3-7)	ID 7	River Red Gum - herbaceous tall open forest of the Riverina and Murray Darling Depression Bioregions	Moderate to good	River Red Gum herbaceous-grassy very tall open forest on inner floodplains in the lower slopes sub regions of the NSW SWS and Riverina Bioregion	No
Modified Agricultural/cropping Land	N/A	N/A	NA (not considered native vegetation)	N/A	No

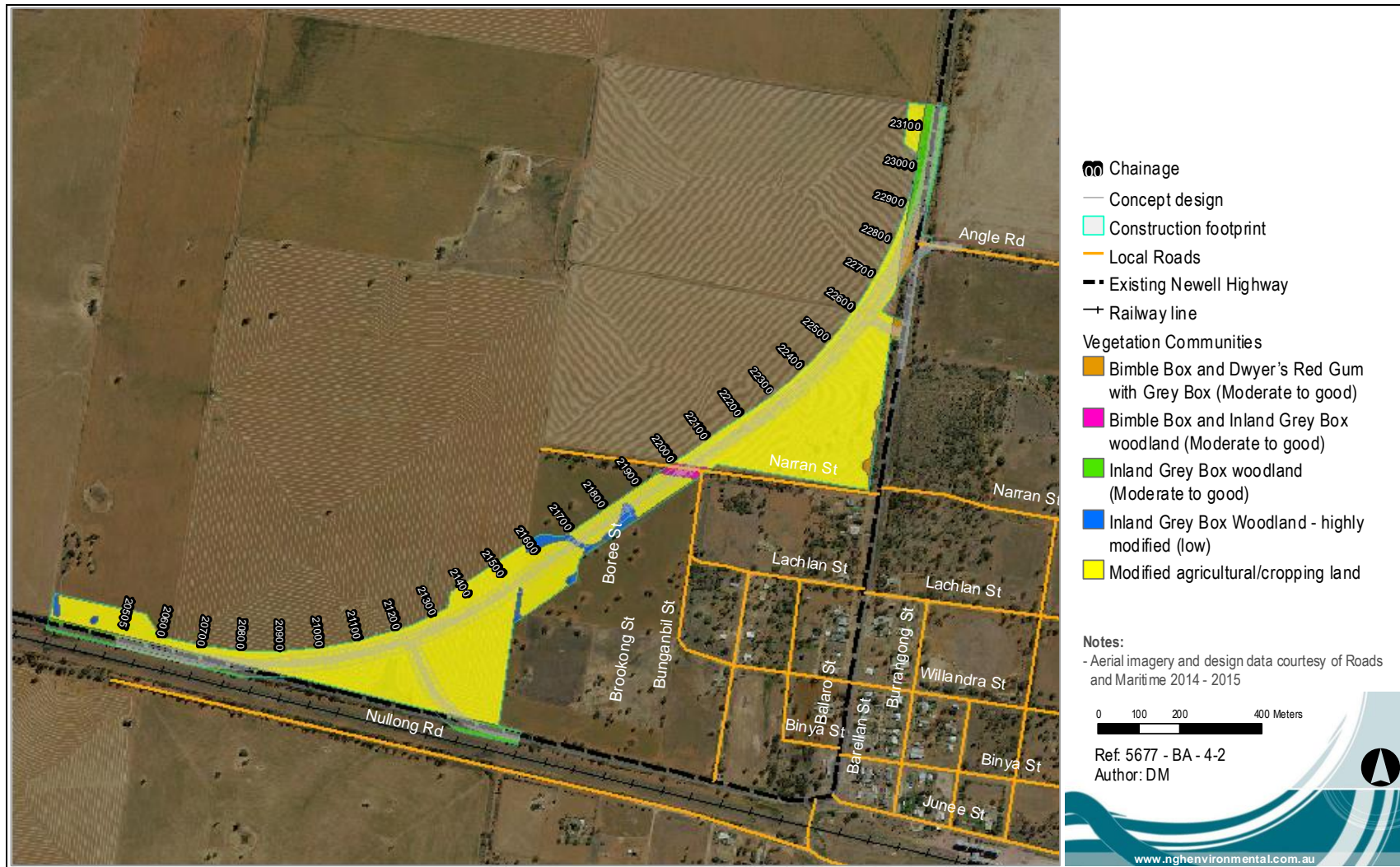


Figure 6-3: Vegetation types within the construction footprint.

## *Endangered Ecological Communities (EECs)*

### Communities listed under the TSC Act

One EEC listed under the TSC Act is located within the construction footprint of the proposal; *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions* (referred to as Inland Grey Box Woodland)

Figure 6-4 shows the distribution and quality of Inland Grey Box Woodland EEC listed under the TSC Act within the construction footprint of the proposal. Figure 6-2 identifies areas of Inland Grey Box Woodland Community from the NSW VIS; these are highlighted in blue. Figure 6-3 shows the distribution of the Inland Grey Box Woodland Community within the construction footprint that was identified through the site surveys from 2009 and 2014.

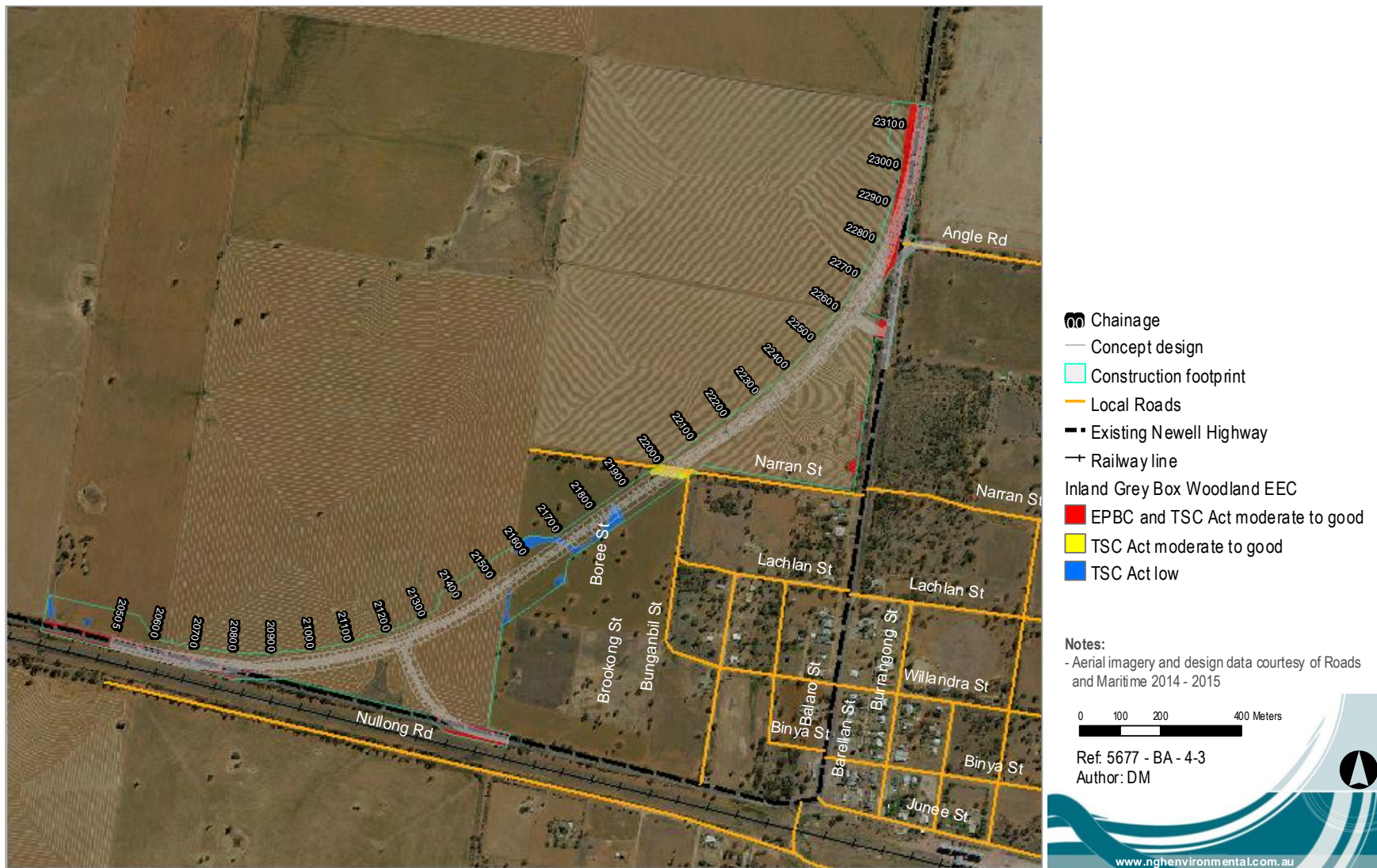
The scattered trees within the modified Inland Grey Box Woodland in Figure 6-3 are also identified as Inland Grey Box EEC under the TSC Act based on the presence of the overstorey. These areas are considered to comprise the EEC, however, it is identified as being in low condition and given the levels of degradation within the study area, its conservation value is substantially reduced.

### Communities listed under the EPBC Act

One EEC listed under the EPBC Act is located within the construction footprint of the proposal; *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (referred to as Inland Grey Box Woodland).

Figure 6-4 shows the distribution and quality of Inland Grey Box Woodland EEC listed under the EPBC Act within the construction footprint of the proposal.

Within the study area, this EEC is consistent with the distribution of the *Inland Grey Box Woodland* and *Bimble Box and Dwyer's Red Gum with Grey Box* communities. The *Bimble Box* and *Inland Grey Box Woodland* and Modified agricultural land with scattered trees that meet the definition of the EEC under the TSC Act, do not meet the criteria for the EEC under the EPBC.



**Figure 6-4: Distribution of the Inland Grey Box Woodland EEC within the construction footprint**

### *Threatened Flora*

Searches of the NSW OEH Wildlife Atlas database and the Commonwealth Protected Matters Search Tool were completed in May 2014 and revealed two orchid species that have the potential to occur within a 10 kilometre radius of the study area:

- Pine Donkey Orchid (*Diuris tricolor*), listed as Endangered under the TSC Act and EPBC Act.
- Sand-hill Spider Orchid (*Caladenia arenaria*), listed as Vulnerable under the TSC Act.

The Sand-hill Spider Orchid (*Caladenia arenaria*) was previously recorded about 3.5 kilometres north of Angle Road, 1.5 kilometres east of the Newell Highway. This species was considered to have the potential to occur within the study area.

The threatened species habitat evaluation identified potential habitat and the possibility of the occurrence of the two threatened flora species; the Sand-hill Spider Orchid and Pine Donkey Orchid.

Although not detected during targeted surveys, there is still some potential for these species to occur within the road reserve areas or along Narran Street where groundcover is predominately native. The survey report is included as an appendix to the Biodiversity Assessment (refer to Appendix F).

No flora species or populations listed as threatened under the TSC Act or EPBC Act were found to occur within the study area.

### *Noxious Weeds*

One noxious weed (African Boxthorn) (Class 4) under the *Noxious Weeds Act 1993* was recorded within the study area.

### *Groundwater Dependent Ecosystems*

The River Red Gum Forest vegetation along Bundidgery Creek is likely to rely on the base flow and associated shallow groundwater of the Creek. The vegetation in this area is considered to be a groundwater dependent ecosystem (GDE).

There are no other wetlands, estuarine or nearshore systems within the study area. None of the other vegetation types within the study area are considered likely to rely on groundwater resources.

## **Fauna**

### *General*

During the 2009 surveys, 13 fauna species were detected, 11 birds and two mammals. During the 2014 surveys, 21 species were detected, 18 birds, two mammals, and one reptile.

One primary Koala feed tree species was identified during the survey. This primary species was Bimble Box, mostly present along Narran Street. The proposal traverses a small section of this habitat (less than 0.1 hectares). Koalas were not detected within these trees and no Koala scats were detected around the base of these trees.

Five fauna habitat types were identified within the study area, ranging from predominantly cleared areas of low to moderate habitat value to fragmented small patches of native vegetation. Habitat values and features within and surrounding the study area are shown on Figure 6-5.

The study area does not contain any areas that have been declared as critical habitat

under the TSC Act and FM Act.

### *Fauna Habitats*

Five fauna habitat types were identified within the study area, ranging from predominantly cleared areas of low to moderate habitat value to fragmented small patches of native vegetation.

The majority of the vegetation that would be cleared to accommodate the construction footprint of the proposal is in poor condition or has been considerably altered and is considered to have low conservation significance. Regardless, both cleared areas and patches of remnant and native vegetation regrowth within the study area support habitat features for native fauna, including tree hollows and feeding resources.

### Woodland

Areas of Eucalypt woodland extend along the road reserves of the Newell Highway and Narran Street. Scattered areas of woodland are also present through the town and vacant lots located to the east of the proposal. The floristic diversity of these woodland areas is moderate and there is good structural diversity with some shrub species as well as native grasses and forbs in the groundcover. Dominant tree species recorded include Grey Box (*Eucalyptus microcarpa*), Yellow Box (*E. melliodora*), Bimble Box (*E. populnea subsp. bimbil*), Dwyer's Red Gum (*E. dwyeri*) and White Cypress Pine (*Callitris glaucophylla*).

Areas of fallen timber were also noted through these woodland areas, particularly along the Newell Highway road reserve to the west of town where recent lopping activities have been undertaken and timber has been placed within the road reserve, providing suitable habitat to a range of fauna species.

### Derived Grasslands

Derived grassland is widely dispersed within the study area and is in poor condition. Grassland was observed to provide foraging habitat for raptor species, with open areas providing prey such as rabbits and hares. Grassland is also considered to provide potential roosting and foraging habitat for microchiropteran bats in isolated hollow-bearing trees and stags. Grassland may also provide potential foraging habitat for reptiles, ground-dwelling mammals and nocturnal forest owls.

### Rocky Outcrop Areas

A small area of granite rock outcrops was noted to the north of the town along an east-west rise. The granite outcrops extend along the road reserve areas into adjacent cropping land to the west of the Newell Highway and into good woodland habitat to the east of the highway. There is a good diversity of native groundcover species as well as fallen timber surrounding these rocky outcrops within the road reserve. The area is likely to provide suitable habitat for small reptile species.

Refer to Figure 6-5 for a map of these habitat features.

### Hollow Bearing Trees

A number of hollow bearing trees are also evident throughout the woodland areas providing ideal habitat for a range of hollow dependant species. In total 26 hollow bearing trees were recorded within the study area, the majority of which were recorded along the road reserve of the Newell Highway, west of Grong Grong. The area of the road reserve near the western end of the proposal supports a particularly large number of hollow bearing trees. An additional three potential hollow bearing trees (may contain hollows that were not able to be verified from the ground) were

also identified. Of the 26 known hollow bearing trees, 13 are located within the construction footprint. All potential hollow bearing trees are outside of the construction footprint. It is unlikely that the proposal would impact on all 13 of these trees. There are around eight hollow bearing trees located within the new alignment that would be directly impacted by the proposal. Refer to Figure 6-5 for the location of hollow bearing trees within the study area.

### Wildlife Corridors

Within the study area, the landscape is highly modified and provides a low level of connectivity between areas of remnant vegetation and flora and fauna habitats situated outside the study area. These remnants include Bogolong Hills about six kilometres to the west, the Murrumbidgee River about eight kilometres to the south and narrow road reserve areas along the existing Newell Highway. In the immediate vicinity of the study area, wildlife movement would most likely be restricted to the existing road reserve areas and patches of remnant vegetation.

### *Threatened Fauna*

NSW Wildlife Atlas database searches completed on 15 May 2014 for threatened species listed on the TSC Act identified five threatened fauna species and no endangered populations within a 10 kilometre radius of the study area (Appendix G). These species include:

- Superb Parrot (*Polytelis swainsonii*) -- Vulnerable TSC act and EPBC Act
- Koala (*Phascolarctos cinereus*) – Vulnerable TSC Act and EPBC Act
- Brown Treecreeper (*Climacteris picumnus victoriae*) – Vulnerable TSC Act
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) – Vulnerable TSC Act
- Diamond Firetail (*Stagonopleura guttata*) – Vulnerable TSC Act
- Large footed Myotis (*Myotis macropus*) – Vulnerable TSC Act

The EPBC Act protected matters search tool revealed 14 threatened species, nine migratory species and five invasive fauna species with the potential to occur within a 10 kilometre radius of the study area (Appendix F of the REF). There is no suitable habitat at the site for the migratory species, therefore this group of species was not considered further in the biodiversity assessment.

Primary feed tree species for the koala were detected in the study area. However, no koalas (or evidence of koalas) were detected. The habitat is not considered core koala habitat but could be considered as potential koala habitat.

During the 2014 field surveys two threatened fauna species were recorded within the study area. The Superb Parrot was recorded flying over the study area, while the Grey-crowned Babbler was observed within the road reserve just north of the northern tie in area. The threatened species habitat evaluation (refer to Appendix F) identified potential habitat within the study area for one additional species, the Brown Treecreeper. No other threatened fauna species were considered likely to utilise the habitats in the study area.

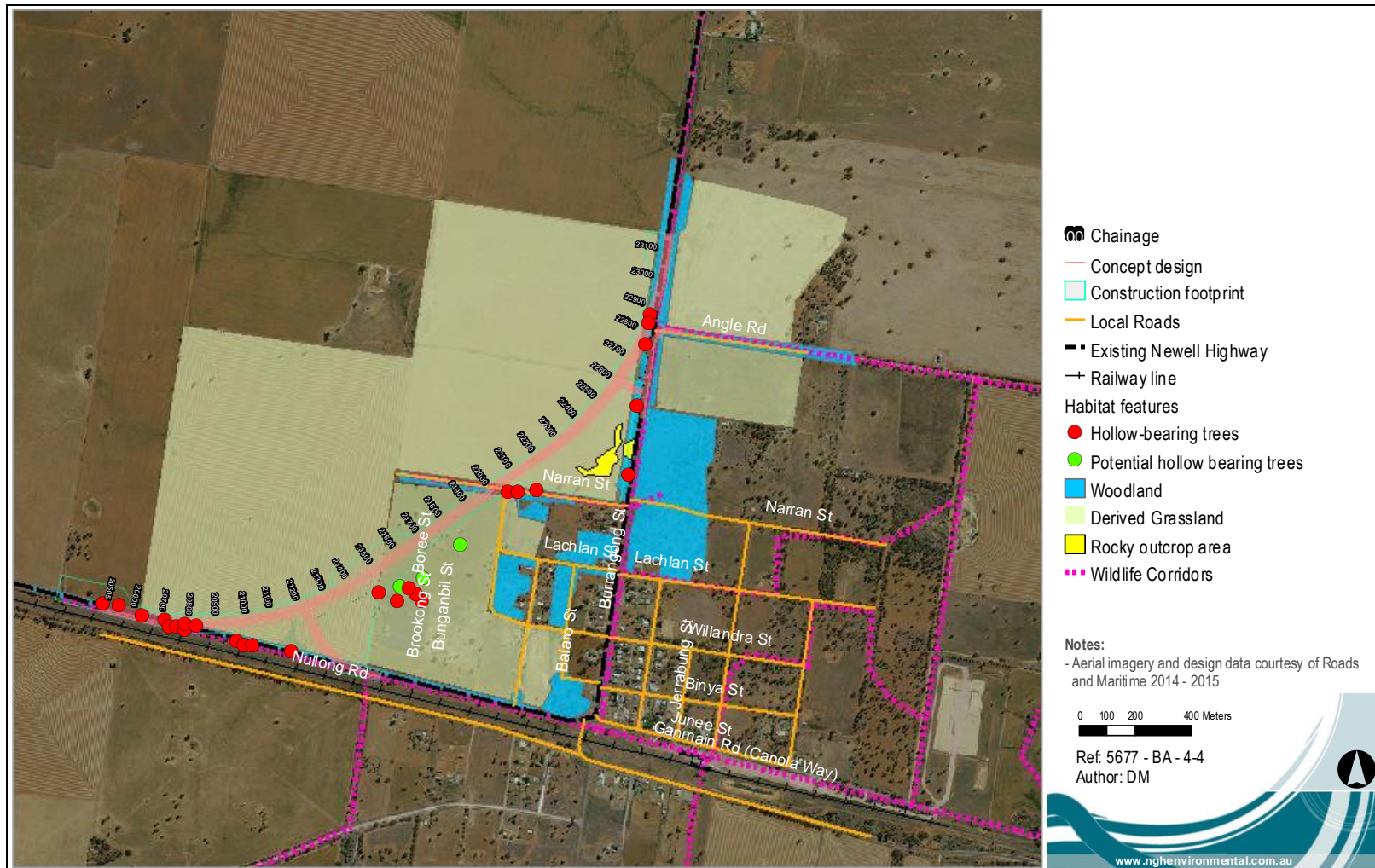


Figure 6-5: Location of habitat features within the study area



### 6.1.3 Potential impacts

#### Avoidance of Impacts

Impacts to biodiversity values have been avoided through development of the concept design. The concept design was revised to locate the merge back and tie-ins with the highway where there was a break in the roadside vegetation. The impact on vegetation in Narran and Boree streets was also minimised by moving the alignment west to avoid the need to cul-de-sac both streets, reducing the area of impact.

#### Construction

##### *Vegetation Clearance including Endangered Ecological Communities*

The proposal would require the removal of woodland vegetation, isolated trees and groundcover vegetation from within the construction footprint.

Direct impacts of the proposal would include clearing about 34 hectares of vegetation, the majority of which is already mostly cleared and highly modified. This includes clearing about 4.3 hectares of native vegetation, with the remainder of the area being modified agriculture and cropping land.

The proposal would result in clearing up to 4.3 hectares of Inland Grey Box Woodland EEC listed under the TSC Act. Of the 4.3 hectares of EEC to be cleared about 3.2 hectares is also considered to be listed as Grey Box Grassy Woodland EEC under the EPBC Act (which is referred to as Inland Grey Box Woodland).

The total area of each vegetation type and the Inland Grey Box Woodland EEC which would be removed as a result of the proposal is estimated in Table 6-2. These figures are an approximation only. This may be reduced during the detailed design phase.

**Table 6-2: Approximate area of each vegetation type and EEC within the construction footprint**

Vegetation Community	Biometric vegetation condition	Total area of vegetation communities to be cleared (hectares)	Inland Grey Box Woodland EEC to be cleared (hectares)	
			TSC Act (NSW)	EPBC Act (Cwth)
Inland Grey Box Woodland	Moderate to good	2.5	2.5	2.5
Inland Grey Boy Woodland (highly modified)	Low	0.8	0.8	Does not qualify
Bimble Box and Inland Grey Box Woodland	Moderate to good	0.3	0.3	Does not qualify
Bimble Box and Dwyer's Red Gum ( <i>Eucalyptus dwyeri</i> ) with Grey Box	Moderate to good	0.7	0.7	0.7
<b>Total Area of vegetation communities impacted</b>		<b>4.3</b>	<b>4.3</b>	<b>3.2</b>

An assessment of significance under the TSC Act and EPBC Act was undertaken for Inland Grey Box Woodland EEC and concluded that the proposal would remove 4.3 hectares of Inland Grey Box Woodland listed under the TSC Act, which includes 3.2 hectares of Inland Grey Box Woodland listed under the EPBC Act. Of the 4.3

hectares to be cleared, 3.5 hectares is in moderate to good condition and 0.8 hectares in low condition. Most of the community to be impacted occurs within an existing road reserve and modified cropping land that is surrounded by a largely cleared agricultural landscape. An estimated 133 hectares of the community occurs within 3 kilometres of the study area. The proposal is considered unlikely to reduce the extent, modify the community or remove habitat such that the local occurrence would be placed at risk of extinction. The habitat to be removed is not considered important to the long-term survival of the community in the locality nor is it considered likely to result in increased fragmentation.

The proposal is considered unlikely to have a significant effect on the Inland Grey Box Woodland EEC. Therefore, further assessment is not required, however, safeguards and mitigation measures have been recommended along with a biodiversity offset strategy (refer to Sections 6.1.4 and 6.1.5).

Based on the outcomes of the significance assessments undertaken, a Species Impact Statement is not required under the TSC Act and referral to the Federal Minister for the Environment is not considered to be necessary under the EPBC Act for the proposal with regards to potential impacts on listed EECs.

The proposal would also result in clearing of less than 0.2 hectares of regrowth understorey vegetation of River Red Gum Forest at Bundidgerry Creek to facilitate regular safe access for the extraction of water during the construction period. No trees would require removal within this 0.2 hectare area.

## Weeds

Spread of the Class 4 noxious weed species, African Boxthorn, observed in the study area may occur during vegetation removal and movement of vehicles and machinery into or out of the site. African Boxthorn is highly invasive and should be controlled as a priority. If this plant is not controlled prior to works commencing then there is potential for it to be spread throughout the site during and following construction.

Section 6.1.4 of this report recommends weed management measures to address potential weed impacts.

### *Loss of threatened flora species and their habitats*

No threatened flora species were recorded during the targeted surveys, however, around 0.6 hectares of marginal potential habitat for the Sand-hill Spider Orchid and Pine Donkey Orchid would be impacted by the proposal.

Assessments of Significance (refer to Biodiversity Assessment, Appendix F) were undertaken for the following species and communities, as shown in Table 6-3.

**Table 6-3: Assessments of significance undertaken for flora species**

Species	TSC Act	EPBC Act
<b>Orchids</b>		
Sand-hill Spider Orchid ( <i>Caladenia arenaria</i> )	Endangered	Endangered
Pine Donkey Orchid ( <i>Diuris tricolor</i> )	Vulnerable	Not Listed

Assessments of significance for these species under the TSC Act and/or EPBC Act concluded that it is considered unlikely that viable populations occur within the study area given the levels of disturbance and absence of orchid species during the targeted surveys. As such, the proposal is considered unlikely to result in the extinction of any viable populations. The removal of a very small area of marginal habitat (0.6 hectares) would not be removing habitat important to the survival of these species in the context of similar habitat within the study area and locality. The proposal would not result in any substantial increases to the fragmentation of habitat for these species. Significant impacts to the Sand-hill Spider Orchid or the Pine Donkey Orchid are considered unlikely as a result of the proposal.

Based on the outcomes of the significance assessments undertaken, a Species Impact Statement is not required under the TSC Act and referral to the Federal Minister for the Environment is not considered to be necessary under the EPBC Act for the proposal with regards to potential impacts on listed flora species or EECs.

### *Loss of threatened fauna species and their habitats*

Assessments of significance were carried out for threatened fauna species with a medium to high likelihood of occurrence in the study area. These are shown in Table 6-4.

**Table 6-4: Assessments of significance undertaken for fauna species**

Species	TSC Act	EPBC Act
<b>Woodland Birds</b>		
Superb Parrot ( <i>Polytelis swainsonii</i> )	Vulnerable	Vulnerable
Grey-crowned Babbler ( <i>Pomatostomus temporalis temporalis</i> )	Vulnerable	Not Listed
Brown Treecreeper ( <i>Climacteris picumnus victoriae</i> )	Vulnerable	Not Listed

The significance assessments found that it is unlikely that any of these threatened fauna species would be significantly impacted as a result of the proposal due to the limited scope and impact area and the availability of similar suitable habitat in the study locality. A Species Impact Statement is not required under the TSC Act and referral to the Federal Minister for the Environment is not considered to be necessary under the EPBC Act for the proposal with regards to potential impacts on listed fauna species.

Vegetation clearance to accommodate the footprint of the proposal would result in the direct removal of up to 4.3 hectares of terrestrial fauna habitat, as well as the loss or modification of fauna habitat features that occur in the construction footprint. This would include nesting habitat and roosting hollows, dead stags, fallen timber and bush rock as well as feeding and shelter resources provided by native and derived vegetation.

Potential impacts to fauna would be linked to disturbance and removal of habitat during construction. Impacts to fauna habitat would be linked to disturbance and removal of hollow bearing trees that are potentially used as nesting habitat. The majority of the study area only has minor habitat value due to past clearing activities, agricultural activities and fragmented nature within the landscape. The road reserve areas provide the most habitat value across the study area, with a diversity of flora species for foraging and hollow bearing trees for nesting/roosting. The small rocky outcrop area near the north ancillary site would also support habitat for a number of reptile species.

#### *Hollow bearing trees*

Up to 13 hollow bearing trees located within the construction footprint would be impacted by the proposal. This is a conservative figure and the precise number cleared may be reduced during detailed design and construction. The road reserve in other areas along the Newell Highway also provide nesting and roosting resources for hollow dependant fauna species. Refer to Figure 6-5 for a map of hollow bearing trees likely to be impacted by the proposal.

#### *Injury and mortality of individual fauna*

Construction works, particularly during periods of vegetation removal and earthworks could potentially result in the injury or death of resident or visiting fauna. Some species such as birds are more readily able to avoid injury. Many species are however unlikely to move quickly enough to avoid being caught such as nocturnal species that shelter during the day, and smaller, ground-dwelling species such as lizards and snakes.

#### *Wildlife Corridors*

The proposal would result in some fragmentation along the western and northern road reserves of the Newell Highway and along Narran Street. Impacts to fauna are, however, likely to be minor as the amount of vegetation to be removed is small in the

regional context and is located in a disturbed road environment.

#### *Groundwater Dependent Ecosystems*

The River Red Gum Forest vegetation along Bundidgerry Creek is likely to rely on the base flow and associated shallow groundwater of the Creek. Water extraction activities have the potential to alter this flow and affect the availability of water to this vegetation community. The proposal intends to first utilise water from construction water quality basins. Assuming a worst case scenario in which no water would be available from the on-site basins, around 6ML would be required to be extracted from Bundidgerry Creek during the construction period.

The extraction of around 6ML from the creek over the construction period of the proposal is considered to be minimal compared to the other demands on the water resource and is unlikely to alter current flows such that they would have an impact on the River Red Gum community.

#### *Impact on aquatic ecology of Bundidgerry Creek*

As discussed above, the extraction of up to 6ML of water from Bundidgerry Creek is not considered to be substantial. The extraction of water will be limited to the construction period and would not be ongoing. The extraction of 6ML of water would have negligible to minor impacts on the aquatic ecology of Bundidgerry Creek.

#### *Impact on relevant key threatening processes*

Under the TSC Act, a threat can be listed as a 'key threatening process' if it adversely affects threatened species, populations or ecological communities or if it could cause species, populations or ecological communities that are not threatened to become threatened.

Under the EPBC Act, A threatening process is defined as a key threatening process if it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community. Table 6-5 identifies key threatening processes under both the TSC and EPBC Acts that are relevant to the proposal.

**Table 6-5: Key threatening process relevant to the proposal**

Key Threatening Processes TSC Act	Key Threatening Processes EPBC Act	Relevance
Bushrock Removal		There are some large granite rock outcrops within the area identified to the north as a possible ancillary facility. These rocky outcrop areas may be removed to accommodate this ancillary facility. However, it is most likely that the site would be arranged around these due to the size and nature of the rocks.
Clearing of native vegetation	Land clearance	<p>The proposal would require the removal of woodland vegetation, isolated trees and groundcover vegetation from along the construction footprint and proposed tie in areas.</p> <p>Construction of the proposal would directly and indirectly impact on native vegetation as a result of vegetation clearance. Direct impacts would be via the clearance of 34 hectares of vegetation to accommodate the footprint of the proposal. The majority of this area is already predominately cleared.</p> <p>The main areas of native vegetation which would be impacted is the Inland Grey Box Woodland EEC (4.3 hectares under the TSC Act and 3.2 hectares under the EPBC Act). This impact area is a conservative estimation to take into account temporary access tracks along the alignment and the two proposed ancillary facilities. The final number would be reduced during the detailed design phase.</p>
Loss of hollow bearing trees		<p>A total of 26 hollow bearing trees were recorded within the study area, with an additional three potential hollow bearing trees (may contain hollows). Of these 26 trees, 13 are located within the construction footprint.</p> <p>It is unlikely that the proposal would impact on all 13 of these trees. There are about eight hollow bearing trees located within the new alignment that would be directly impacted by the proposal. The road reserve in other areas along the Newell Highway also provide nesting and roosting resources for hollow dependant fauna species.</p>
Removal of dead wood and dead trees		Areas of fallen timber are present within the woodland areas, particularly along the Newell Highway road reserve. There is a good diversity of native groundcover species as well as fallen timber surrounding the rocky outcrops within the road reserve to the north of Grong Grong.

## Operation

### *Fragmentation and loss of connectivity*

The proposal includes the construction of permanent, man-made barriers, including cuttings and road pavement, which can create and increase permanent barriers to flora and fauna connectivity. Given that the proposal would be located through relatively cleared and disturbed areas, the operation of the proposal is considered unlikely to exacerbate barrier effects within the study area.

### *Injury and mortality of individuals*

Fauna injury or death can occur during operation of the proposal. During operation, injury and mortality of fauna is largely due to road kills, which have the potential to affect local fauna species at the sub-population level.

The proposal is unlikely to result in an increase in traffic movements compared to those currently experienced on the existing Newell Highway. As such no substantial increase in fauna mortality due to collision is anticipated. Traffic speeds would be higher on a small section of the highway, which may result in collisions occurring that may have been previously avoided. However, as the proposal traverses open agricultural land (as opposed to having well vegetated road reserves), the ability to spot wildlife is likely to be increased which would facilitate earlier avoidance behaviours by motorists which could in fact lower fauna mortality rates.

### *Invasion of exotic species*

Along the edges of native vegetation communities and habitat, weed invasion can be a considerable issue. As a result of changed environmental conditions, weeds may be able to outcompete native flora species, resulting in the loss of native vegetation communities. The study area is generally highly disturbed and modified by large areas of agricultural land. Dispersal and establishment of weed species already established in the study area and dispersal and establishment of new weed species as a result of the proposal would be most likely to occur along the new edges of the proposal. The proposal is not likely to considerably increase the impact of weed invasion in the study area during operation.

## 6.1.4 Safeguards and management measures

<b>Impact</b>	<b>Environmental safeguards</b>	<b>Responsibility</b>	<b>Timing</b>
Pre-clearing	<ul style="list-style-type: none"> <li>• If unexpected threatened fauna or flora species are discovered, works will stop immediately and the <i>Roads and Maritime Unexpected Threatened Species Find Procedure</i> in the <i>Biodiversity Guidelines – Guide 1 (Pre-clearing process)</i> (RTA, 2011) will be followed.</li> <li>• The extent of the construction footprint will be clearly marked and the movement of vehicles and plant outside of these areas will be avoided. Any trees and native vegetation to be retained on-site will be protected and managed through the use of clearly marked exclusion zones. Exclusion zones will be implemented in accordance with the <i>Biodiversity Guidelines – Guide 2 (Exclusion zones)</i> (RTA, 2011).</li> <li>• Prior to any vegetation clearing the pre-clearance process outlined in <i>Biodiversity Guidelines – Guide 1 (Pre-clearing process)</i> (RTA, 2011) will be implemented.</li> </ul>	Contractor	Pre-Construction

Impact	Environmental safeguards	Responsibility	Timing
Clearing of native vegetation	<ul style="list-style-type: none"> <li>• Undertake vegetation clearance in accordance with <i>Biodiversity Guidelines – Guide 4 (Clearing of vegetation and removal of bushrock)</i> (RTA, 2011).</li> <li>• Restrict vegetation clearing to those areas where it is necessary.</li> <li>• Trees will be removed in such a way as not to cause damage to surrounding vegetation. This will ensure groundcover disturbance will be kept to a minimum.</li> <li>• Utilise areas already impacted by previous clearing or disturbance and minimise clearing where feasible. Trimming will be preferred over removal where feasible.</li> <li>• Hollow bearing tree removal is to be undertaken in a two stage clearing process as stated in the Roads and Maritime's <i>Biodiversity Guidelines – Guide 4 (Clearing of vegetation and removal of bush rock)</i> (RTA, 2011). Large trunks and logs would be placed into adjacent habitat.</li> </ul>	<p>Roads and Maritime Project Manager</p> <p>Contractor</p>	Construction
Fauna and habitat impacts	<ul style="list-style-type: none"> <li>• Fauna handling must be carried out in accordance with the requirements of the <i>Biodiversity Guidelines - Guide 9 (Fauna Handling)</i> (RTA, 2011).</li> <li>• Details of the local veterinary and/or wildlife carer (WIRES) will be available onsite.</li> </ul>	Contractor	Construction
Weed spread and establishment	<ul style="list-style-type: none"> <li>• Weeds will be managed in accordance with the <i>Biodiversity Guidelines – Guide 6 (Weed Management)</i> (RTA, 2011). Priority will be given to the control of noxious weeds such as African Boxthorn (<i>Lycium ferocissimum</i>).</li> <li>• Machinery will be cleaned prior to coming to site to ensure that weed seeds and propagules are not imported.</li> </ul>	Contractor	Construction
Disturbance to fallen timber, dead wood and bush rock	<ul style="list-style-type: none"> <li>• Re-use coarse woody debris on-site in accordance with the management requirements of the <i>Biodiversity Guidelines - Guide 5 (Re-use of woody debris and bushrock)</i> (RTA, 2011).</li> <li>• Avoid bushrock disturbance where practical. Where disturbance cannot be avoided remove the bushrock in accordance with the management requirements of <i>Biodiversity Guidelines - Guide 4 (Clearing of vegetation and removal of bushrock)</i> (RTA, 2011).</li> <li>• Bushrock will be re-used on-site where possible. Re-use bushrock in accordance with the management requirements of the <i>Biodiversity Guidelines - Guide 5 (Re-use of woody debris and bushrock)</i> (RTA 2011).</li> </ul>	Contractor	Construction



Impact	Environmental safeguards	Responsibility	Timing
Loss of mature trees including hollow bearing trees	<ul style="list-style-type: none"> <li>Hollow bearing trees to be removed are to be clearly marked prior to removal.</li> <li>Hollow bearing tree removal is to be undertaken in a two stage clearing process as stated in the <i>Biodiversity Guidelines – Guide 4 (Clearing of vegetation and removal of bush rock)</i> (RTA, 2011).</li> </ul>	Roads and maritime Project Manager Contractor	Construction
Removal of redundant highway areas	<ul style="list-style-type: none"> <li>Revegetation of the two areas of redundant highway to be removed and revegetated will be undertaken generally in accordance with <i>Biodiversity Guidelines – Guide 3 (Re-establishment of native vegetation)</i> (RTA, 2011).</li> </ul>	Roads and Maritime Project Manager Contractor	Construction and post-construction

### 6.1.5 Offset strategies

The Roads and Maritime *Guideline for Biodiversity Offsets* (RMS 2011b) sets out a set of criteria to determine if the residual impacts of the proposal are sufficient to warrant the consideration of offsets. The Guideline states offsets should be considered for works involving the clearing of vegetation of high conservation value, including Threatened Ecological Communities in moderate to good condition, where clearing exceeds 1 hectare. The proposal would involve impacting on 4.3 hectares of Inland Grey Box Woodland EEC, 3.5 hectares of which is in moderate to good condition.

The figures above are an estimation of the impacts of the proposal based on the concept design. The residual impacts are likely to be reduced during the detailed design phase, however, the current figures require biodiversity offset strategies to be considered. This will be reassessed once the final detailed design has been completed and impacts on vegetation re-calculated, but it is considered unlikely that the impacts to Threatened Ecological Communities can be reduced to below the 1 hectare threshold given the distribution of the Inland Grey Box Woodland EEC within the study area.

In accordance with the guideline, offsets shall be considered for the Inland Grey Box woodland EEC. A Biodiversity Offset Strategy shall be finalised prior to any works commencing to ensure that the proposal results in an outcome that maintains or improves biodiversity values in the long term. Actions to implement the strategy may occur during or after the project is completed.

## 6.2 Property and land use

### 6.2.1 Policy Setting

An overview of the legislative and policy framework relevant to property and land use within the Narrandera LGA is provided. This includes State and local government land use policies and strategies.

#### **Narrandera Local Environmental Plan 2013**

Land use and development in the vicinity of the proposal is subject to the provisions of the Narrandera Local Environmental Plan 2013 (Narrandera LEP). The Narrandera LEP is the local planning instrument for the Narrandera LGA. The proposal would be located on land zoned by the LEP as:

- RU1 Primary Production Zone
- R5 Large Lot residential and
- RU5 Village

Other land use zones in the area, but not traversed by the proposal, include:

- E2 – Environmental Conservation
- E4 – Environmental Living
- RU4 – Primary Production Small Lots

The south-western portion of the realignment (at the tie in with the existing Newell Highway) is within the land identified as “Biodiversity” on the Terrestrial Biodiversity Map (refer Figure 4-2).

Clause 6.4 of the LEP identifies the objective of land mapped as “Biodiversity” is to maintain terrestrial biodiversity by:

- a) protecting native fauna and flora, and
- b) protecting the ecological processes necessary for their continued existence, and
- c) encouraging the conservation and recovery of native fauna and flora and their habitats.

The proposal is permissible without consent under the LEP and the ISEPP, therefore clause 6.4 does not apply. Nevertheless, impacts to biodiversity have been avoided through the concept design phase and are assessed in section 6.2 of this REF. Narrandera Shire Council has been consulted and consultation would continue during detailed design and construction.

### 6.2.2 Existing environment

Grong Grong comprises a number of residential properties and is surrounded by rural areas used for agricultural activities such as cropping and grazing. The proposal would predominantly pass through agricultural land (RU1) to the west of the town, currently used for cropping and grazing.

Within the RU1 zone lot sizes are a minimum of 400 hectares. The town is serviced by the Narrandera to Junee railway line (nearest active station is Narrandera) and has an active grain silo.

About 20 dwellings and three businesses are located on the Newell Highway in the northern part of the town, including the Grong Grong Motor Inn (motel). Some

buildings are unoccupied. Grain silos are located adjacent to the train station. Refer to Figure 6-6.

Agricultural land to the west of the Newell Highway at Grong Grong is mostly privately owned and used for cropping and grazing, classed as suitable for regular (dryland) cultivation (Booth Associates, 2011), also known as Class 2 agricultural land, however, the land is of low quality. The proposal would pass through one privately owned farming property, incorporating three separate lots (identified as Areas 1 and 4 – refer Figure 3-11) which form part of the '*Woodlands*' property, Council land (Narran Street, identified as Area 3) and some Crown land (identified as Area 2), which is leased to a local farmer.



Figure 6-6: Location of businesses and other facilities in Grong Grong Source: PAA Design November 2014, p. 8

### 6.2.3 Potential impacts

The proposal would directly impact on two properties and a local road to the west of the current bend in the Newell Highway, through property acquisition for the proposal. One of the properties is Crown Land (leased to operate as a farm) and the other is a privately owned farm (known as '*Woodlands*'). The segment of local road (Narran Street) is owned by Narrandera Shire Council. Property acquisition areas have been identified in Figure 3-11 as follows:

- Area 1 (including Area 1.0 required for acquisition and Areas 1.1 and 1.2 for potential acquisition) – part of '*Woodlands*'.
- Area 2 (including Area 2.0 required for acquisition and Area 2.1 for potential acquisition) which is Crown Land.
- Area 3 (Area 3.0) which is Council land.
- Area 4 (including Area 4.0 required for acquisition and Area 4.1 for potential acquisition) – part of '*Woodlands*'.

#### **Construction**

Long - term impacts on property and land use would occur from the start of construction. These impacts would generally be related to property acquisition, changes to access between the highway and local roads and changes to property access. These impacts would occur as a result of:

- Construction of the new highway alignment and accesses.
- Construction ancillary facilities.
- Construction water quality basins.
- Changes to local roads.

Property access changes during construction include:

- Access to three privately owned paddocks (part of the property known as '*Woodlands*') – the present access from Narran Street would be closed with replacement accesses opposite the proposed north and west Grong Grong accesses (presently being discussed with the property owners).
- Closure of Narran Street west of Boree Street.
- Access to Crown land – the present access from Narran Street would be replaced with a new access from Boree Street.

The proposal would take the corners off two paddocks within two privately owned parcels of land (owned by the same landholder), known as '*Woodlands*' (as shown in Figure 3-11). The corners have been identified for potential acquisition as they would be unviable for the farmer to continue to use as they currently do, due to the large machinery they operate. Individual lot sizes would be reduced, however, the overall '*Woodlands*' property (currently 667 ha) would remain greater than 400 hectares and would remain viable. However, the areas identified for potential acquisition on this property would become unviable for continued cropping and grazing; it is likely that these unviable areas would be acquired, subject to consultation and agreement with the landowner.

The proposal would not result in major changes to how the remaining land can be used. However, the private property owner ('*Woodlands*') currently moves sheep across the Newell Highway from east of the highway to the shearing shed to the west of the highway around 8-10 times each year. These movements would be affected during construction and operation of the realignment. Roads and Maritime consulted

with the landowner during concept design to identify measures to help resolve these impacts. Consultation with the landowner would continue during detailed design to develop and implement feasible and reasonable mitigation measures in relation to sheep movements. One option for movement of sheep is the installation of large lockable fold out signage which can be opened when moving stock.

Narran Street would be severed west of Boree Street by the proposal. Depending on negotiations with Council and the owner of 'Woodlands', the western portion may be closed. This local road provides one access to the 'Woodlands' property. Replacement accesses opposite the proposed north and west accesses to Grong Grong are being discussed as part of acquisition negotiations with the owners of 'Woodlands'.

A parcel of Crown land is severed by the proposal. This land is currently leased for farming. The ongoing use of this land and access to it would be affected by the proposal. Roads and Maritime has consulted with the affected leaseholder and the Department of Trade and Investment during concept design and this consultation would continue during detailed design regarding future ownership of, and access to, this land.

#### *Ancillary facilities*

Temporary construction ancillary facilities would include site compounds for administration and construction support as well as stockpile sites. Two ancillary facility sites have been identified for the construction of the proposal, one at the northern end of the proposal and one at the western end. Refer to Figure 3-8 for photos and Figure 1-1 for a map of these ancillary locations.

Discussions would continue with owners of land on which temporary construction ancillary facilities are proposed in relation to leasing or potential acquisition of these sites during construction.

A maximum of seven construction water quality basins would be constructed for the proposal (Figure 1-1). The exact location and size of the construction water quality basins would be finalised during the detailed design phase. Some of the basins would be within land to be leased temporarily, as shown on Figure 1-1.

Property impacts would result from the establishment and operation of ancillary sites. These impacts would include clearing of land and disturbance and compaction of topsoils due to the operation of heavy machinery and equipment. Unmitigated these impacts would potentially impact on the land use of these properties. These impacts would be minimised through implementation of the management measures identified in section 6.2.4. During construction these sites would be taken out of agricultural production. Stockpiles would include erosion and sedimentation controls. Following construction, the ancillary areas would be rehabilitated including reinstating the stockpiled topsoil for ongoing agricultural use.

Temporary disruptions to local roads would be expected during construction of the proposal. Local roads that would potentially experience some delays during construction include Narran Street, Boree Street and Angle Road. These roads would be affected by the new alignment and would experience detours at some time during construction. These impacts would be minimised through the implementation of a traffic management plan as discussed in section 6.9.3.

### **Operation**

Operational impacts on property and land use as a result of the proposal would commence during construction. These impacts would be permanent impacts and include:

- Property acquisition impacts.
- Impacts to land use viability.
- Impacts to land access.

#### *Property acquisition*

The proposal would require acquisition of a minimum of 15.7 hectares and a maximum of 32.7 hectares of land, depending on the outcome of ongoing negotiations between Roads and Maritime and landowners, and decisions about whether to lease or purchase land that will become surplus once construction is complete. Land to be acquired includes Crown, Council and private land. Refer to Figure 3-11 for a map of property acquisition areas.

The minimum and maximum property acquisition scenarios for the proposal are described below. There may be other property acquisition outcomes between these two limits, depending on further consultation with affected landowners.

The minimum acquisition scenario is to acquire a 50-60 metre corridor of land (about 15.7 ha) for the proposal footprint (required acquisition areas) and lease the potential acquisition areas (as shown on Figure 3-11) from the landowners. Once works are complete the leased areas would be rehabilitated and returned to the landowners.

The maximum acquisition scenario is to acquire the 50-60 metre corridor of land for the proposal footprint (required acquisition areas) and also the potential acquisition areas (as shown on Figure 3-11) (totalling around 32.7 hectares). Once construction work is complete, the additional areas would be revegetated and remain the property of Roads and Maritime permanently or sold.

The areas of direct impact to property have been calculated using the proposed road reserve boundary, ground survey and cadastral overlay. This would be subject to further refinement during the detailed design phase of the proposal, which may alter the final acquisition requirements and estimates. All acquisitions would be undertaken in consultation with landholders and in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and Roads and Maritime's *Land Acquisition Information Guide* (Roads and Maritime, 2014).

#### *Impacts to land use viability*

The majority of land that would be required for acquisition as part of the proposal is agricultural land used for cropping and grazing. Refer to Figure 3-11 for a map of proposed acquisition and Table 3-4 regarding information of each parcel of land to be affected. The future of the section of Narran Street west of Boree Street (1 hectare in addition to the areas in Table 3-4) will be an integral part of the property acquisition discussions with Narrandera Shire Council and with the owner of 'Woodlands' and will be decided during the detailed design phase for the project. A new access to the Crown land to the south-east of the proposal would be provided from Boree Street to replace the Narran Street access. The western triangle of Crown land (Area 2.1) would only be accessible through the adjacent properties; it is possible that it will be acquired and amalgamated into the adjacent parcels of land, to become part of 'Woodlands', which would ensure access and ongoing viability as agricultural land. Ongoing consultation with the landowners will determine the future of this land.

A minimum of 15.7 hectares of agricultural land would be acquired for the new realignment (Areas 1.0, 2.0, 3.0 and 4.0, for the realignment only).

An additional 13.3 hectares of agricultural land would be acquired or leased for the proposed ancillary facilities (Areas 1.1, 1.2 and 4.1). Early indications from the private property ('Woodlands') owner is that they would prefer Roads and Maritime to purchase this land as it is too small to be useful to their operation, once separated

from the main paddocks.

A further 3.1 hectares of agricultural land would be leased for temporary sedimentation basins.

The proposal would also dissect one parcel of Crown land, which is currently leased privately for agriculture. The parcel would be split into two; the area to be acquired (4.0-7.7 ha), and the remainder of the site (20 ha). The area of acquisition of Crown land depends on which scenario Roads and Maritime pursue; the realignment area (ie. Area 2.0 in Figure 3-11) is 4.0 ha. If Roads and Maritime additionally purchases Area 2.1, the total acquisition will be 7.7 ha. Following acquisition, the remainder of the Crown land would be able to be used for agriculture. Further consultation would be undertaken to determine whether the Crown land would be acquired, and if it is acquired, whether it would be sold to adjoining landholders, further consolidating farmland. Access to the western triangle of Crown land (west of the proposal – Area 2.1) would also be part of this consultation.

Narran Street would be severed west of Boree Street by the proposal. Narran Street is a local road, providing access to the 'Woodlands' property. The future of the section of Narran Street west of Boree Street would be an integral part of the property acquisition discussions with Narrandera Shire Council and with the owner of 'Woodlands' and would be decided during the detailed design phase for the project.

Agricultural practices in areas outside of the acquisition and lease areas would remain viable during construction and operation.

As previously discussed in construction impacts, the remaining parcels of land remain viable, given the implementation of the mitigation measures including consultation with affected landowners and lessees regarding accesses.

#### 6.2.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Loss of quality soil from construction (ancillary sites)	<ul style="list-style-type: none"> <li>Strip and stockpile topsoil during the preparation of any ancillary sites.</li> <li>Reinstate topsoil as part of the rehabilitation of these areas for ongoing agricultural use.</li> </ul>	Contractor	Construction
Changes to property areas/ accesses	<ul style="list-style-type: none"> <li>Roads and Maritime will continue negotiations with landowners in relation to property access and acquisition to enable establishment of works zones and location of ancillary facilities</li> <li>Roads and Maritime will continue to consult with affected landowners and residents where temporary and permanent property access changes would be required</li> <li>Roads and Maritime will provide landowners and residents with advanced notification of construction schedules and any changes to local roads and property access</li> <li>Roads and Maritime will provide community updates on changes to</li> </ul>	Roads and Maritime Project Manager	Pre-construction Construction



Impact	Environmental safeguards	Responsibility	Timing
	<p>the local road network during construction, in accordance with a Traffic Management Plan</p> <ul style="list-style-type: none"> <li>Roads and Maritime will work with the owner of the 'Woodlands' property to plan for and enable safe stock movements in the vicinity of the highway. This may include the installation of large, lockable fold out signage which can be opened when moving stock. Details will continue to be developed in consultation with the landowner during detailed design.</li> </ul>		
Permanent loss of farm land	<ul style="list-style-type: none"> <li>Carry out property acquisition in accordance with Roads and Maritime's '<i>Land Acquisition Information Guide</i>' (Road and Maritime, 2014) and the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</li> <li>Continue consultation with all affected property owners regarding property acquisition during the detailed design of the proposal.</li> </ul>	Roads and Maritime Project Manager	Pre-construction  Detailed design phase

## 6.3 Traffic and transport

### 6.3.1 Existing environment

The Newell Highway forms part of the National Land Transport Network (NLTN) and the Melbourne-Brisbane transport corridor. It is a crucial road link for freight, passenger and tourist traffic between Queensland, NSW and Victoria. In 2007, the section of the Newell Highway between Narrandera and Moree (incorporating Grong Grong) experienced 1.2 million tonnes of regional freight movement over and above the estimated 2.5 million tonnes of road freight moving from Melbourne to Brisbane.

The existing Newell Highway through Grong Grong involves about 1.5 kilometres of travel through a 60km/h speed zone and a low speed 90 degree bend. There have been several truck rollovers and light vehicle incidents at the current 90 degree bend; two crashes have occurred at this location since safety works were completed in 2012. If there is no improvement in the highway alignment the crashes are expected to increase as heavy vehicle volumes rise (from around 600 to a predicted 1060 per day in 2031) with the increasing freight task on the highway.

The existing highway alignment and present crash history limit traffic efficiency, particularly for heavy vehicles, and prevent the operation of HPVs along this section of the Newell Highway. Since 2008, there have been four single vehicle crashes at the low speed 90 degree bend, with speed being the contributing factor for all four incidents. Three of the four vehicles were heavy vehicles. One of the crashes occurred in 2011, while the remaining three occurred in 2012.

HPV access on the Newell Highway is currently limited by the alignment at Grong Grong along with restrictions at West Wyalong and Narrandera. The largest currently

approved vehicles on this section of the highway are 26m B-Doubles operating at higher mass limits.

HPVs include B-Triple, AB-Triple and A-Double (road train) vehicles up to 36.5m long also operating at higher mass limits. Use of these larger vehicles reduce the number of heavy vehicles required to deliver a set freight task and therefore reduce transport costs and improve road safety by reducing the number of heavy vehicles on the road network.

The Newell Highway generally forms the boundary between approved areas for operation of HPVs (including Road Trains) in the west and those restricted to operation of B-Doubles in the east. Addressing the limitations of the Newell Highway at Grong Grong, West Wyalong and Narrandera would open up the potential for HPV access along the highway and to the east in the future. The proposal would address one of these limitations.

Existing traffic volumes for the sections of the Newell Highway to the north and west of Grong Grong are shown in Table 6-6.

**Table 6-6: Traffic volumes – Grong Grong, 2011 counts**

Location	Light vehicles	Heavy vehicles	Total traffic	% heavy vehicles
West of Grong Grong	1243	650	1893	34%
North of Grong Grong	736	534	1270	42%

Source: Roads and Maritime, 2014

Table 6-6 shows the high proportion of heavy vehicle traffic in total volumes (around 42 per cent) travelling the Newell Highway through Grong Grong daily. Based on current traffic levels, it is estimated that during much of the day and night around one heavy vehicle every two minutes would use the Newell Highway north of Grong Grong. This is in addition to the light vehicle traffic, which shows broadly similar volumes.

Traffic volumes measured to the west of town are higher than those to the north. This is due to traffic travelling in an east-west direction between Narrandera and Grong Grong or towns to the east, rather than turning north at Grong Grong towards Temora, West Wyalong and Brisbane. Drivers travelling in an east-west direction pass through the Newell Highway intersection at Grong Grong, but continue either to the east along Junee Street, or turn south into Berrembed Street and east into Ganmain Road. These turns require slow speeds.

There is no direct rail link between Melbourne and Brisbane so the amount of freight moved along the Newell Highway at Grong Grong will remain high. Predicted AADT (annual average daily traffic) levels for 2031 include an increase of 77 per cent of heavy vehicles (from 592 to 1043, on average) from the 2011 data, assuming compound growth (Transport for NSW, 2014), as shown in Table 6-7. It is expected that light vehicle numbers would increase 26 per cent from the 2011 data (from 1023 to 1283, on average).

**Table 6-7: Traffic volumes – Grong Grong, 2031 counts**

<b>Location</b>	<b>Light vehicles</b>	<b>Heavy vehicles</b>	<b>Total traffic</b>	<b>% heavy vehicles</b>
West of Grong Grong	1570	1140	2710	42%
North of Grong Grong	925	945	1870	50%

Source: Roads and Maritime, 2014

The Junee Hay Railway line extends in an east-west direction and runs along the southern edge of the highway up to the bend where it continues on to the east. The section from Junee to Narrandera is used for various freight trains including services to Griffith, while the section further to Wilbriggie sees the haulage of seasonal grain. The section beyond Wilbriggie to Hay is closed. The weekly passenger train service between Sydney, Narrandera and Griffith no longer stops at Grong Grong station.

There is limited public transport within the town. Grong Grong is accessible through a daily Junee to Griffith coach service that links the town with the Sydney to Melbourne train line.

Grong Grong Buses serves the Grong Grong and Narrandera district by three school bus runs. Mahoney's coaches also provide a school bus service.

Currently cyclists use the shoulder of the highway and pedestrians use the area between the road and the properties and cross the highway indiscriminately; there is no defined pedestrian crossing on the highway. Pedestrians and cyclists are required to compete with highway traffic including a large proportion being heavy vehicles. With the expected increases in traffic volumes, particularly heavy vehicles, the risk to these local road users is increased.

### 6.3.2 Potential impacts

#### **Construction**

The proposal would generate an increase in construction vehicles travelling to, from and within the proposal construction footprint, on the existing Newell Highway and local roads. This would include additional traffic demand generated by:

- Construction workers travelling to and from worksites.
- The delivery of heavy vehicles, machinery and other equipment required for highway construction.
- The delivery of construction materials including dry bulk such as cement, aggregates, steel and pre-fabricated structures.
- The movement of spoil generated by earthworks, including the movement of materials within worksites, transferral to stockpile sites and/or removed from the proposal area.

Property access to residences located along local roads within Grong Grong are unlikely to be affected by construction of the proposal, although some delays may be experienced at intermittent periods during construction and lane closures. Access to some properties (farmland without residences) would be altered during construction. Alternate arrangements would be implemented in agreement with the affected landholder/leaseholder.

Traffic would be maintained along the existing Newell Highway while the majority of the realignment is constructed. Some lane closures would be required during the construction of the realignment at the "tie-in" locations with the existing Newell Highway. During these times, local traffic delays would be kept to a minimum with

one lane of traffic open under traffic control along the Newell Highway.

Construction traffic would generally use the Newell Highway to get to and from the proposal. Construction access locations are to be finalised in consultation with the construction contractor. Access would be provided in a suitable location to provide safe entry and exit from the site including sufficient sight distance and signage, a low speed environment and minimising the impact on local traffic.

It is estimated that about 300 external vehicle movements per day would occur when construction commences. Haulage of materials would be undertaken within the construction footprint for the proposal where possible, with material deliveries generally utilising the existing Newell Highway. Internal haul routes would be established within the construction footprint once the alignment is cleared of vegetation. Internal haul routes would link excavation sites and temporary construction ancillary facility sites to the various work areas. Controlled construction traffic entry and exit points would be minimised. This may require the introduction of temporary traffic management measures.

Mitigation measures have been recommended to manage these potential minor impacts. No full road closures would be required as part of the work. Traffic management and access during construction would be managed in accordance with Roads and Maritime Traffic Control at Work Sites Manual, 2006. A traffic management plan and traffic control plan would be developed before construction work starting.

## **Operation**

The proposal would increase road safety and reduce travel times for all vehicles using the Newell Highway. In particular, this would benefit road freight as HPVs would be able to operate on this section of the highway. The proposal would enhance the NLTN and access between key freight origin and destination locations. This would support the vision of the draft Newell Highway Corridor Strategy and the NSW Freight and Ports Strategy of HPV operation along the full length of the Newell Highway. Operation of HPVs on the Newell Highway would provide a considerable increase in efficiency for north-south freight movements as this route forms a link between areas of NSW which have been approved for the operation of these vehicles and also for the interstate operation of HPVs.

Benefits from the realignment would also be experienced by light vehicles using the highway.

The proposal would provide consistent travel speed and times for the Newell Highway traffic at Grong Grong. It is estimated that the proposal would reduce the highway travel distance by about 810 metres and travel time by about 75 seconds for light vehicles and 90 seconds for heavy vehicles. The proposal allows for predicted growth in freight and other traffic over the next 20 years.

The removal of highway traffic from town, particularly heavy vehicles, would reduce conflicts between highway and local traffic, cyclists and pedestrians. This would improve safety for all road users. The proposal provides two accesses to Grong Grong, allowing movements in all directions. Highway traffic would be directed by signage and encouraged by landscaping to turn off into the town.

### 6.3.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Traffic and Access	<ul style="list-style-type: none"> <li>• Prepare and implement a traffic management plan (TMP) in accordance with Roads and Maritime QA Specification G10 Traffic Management. The TMP would be implemented in consultation with key stakeholders.</li> <li>• The local community would be notified in a timely manner prior to any works that may affect access to local roads and property accesses.</li> <li>• Private property access would be maintained at all times during the construction works, in consultation with landowners/leaseholders.</li> </ul>	Roads and Maritime Project Manager  Contractor	Construction

## 6.4 Socio Economic

### 6.4.1 Methodology

A socio-economic assessment of the proposal has been undertaken by Elton Consulting Group to inform the REF. The assessment has been undertaken in accordance with 'Environmental Impact Assessment Practice Note – Socio-economic assessment' (Roads and Maritime, 2013). A copy of the full socio-economic assessment report, including a detailed scope and methodology, is provided in Appendix D.

The socio economic assessment has involved the following tasks:

- Review of plans, policies and background studies prepared by the NSW Government, Roads and Maritime and Narrandera Shire Council.
- Analysis of the socio-economic context of Grong Grong, including demographic analysis of the population of Grong Grong and Narrandera Shire Local Government Area (using 2011 ABS census data).
- Site visit and face-to-face and telephone discussions with key business operators, community representatives and residents of the town.
- Review and analysis of information obtained by Roads and Maritime during community consultations in 2014.
- Discussions with officers from Narrandera Shire Council.
- Review of studies into the socio-economic effects of previous highway bypasses on small towns.
- Scoping of potential project impacts, using Roads and Maritime's scoping framework.
- Evaluation of socio-economic benefits and impacts of the proposal by stakeholder group.
- Consideration of opportunities to minimise or mitigate identified impacts.
- Development of mitigation and monitoring measures in consultation with relevant stakeholders.

A wide range of data sources have been used for the assessment. Key data sources have included:

- Australian Bureau of Statistics (ABS) 2011 Census of Population and Housing.
- Narrandera Shire Council policies, plans, website summaries.
- Google map searches, street view and images.
- Studies documenting impacts of highway bypasses.
- Discussions with business operators and members of the Grong Grong Progress Association.

#### 6.4.2 Existing environment

##### **The community**

The community has a strong and vibrant community spirit and is actively pursuing plans to diversify the local economy and secure the town's sustainable future. This is supported by the many social and sporting clubs, active community networks, active progress association, annual events (eg Rodeo and Gymkhana) and community initiatives such as the Earth Park.

While there are many activities, the town's population is ageing, businesses are consolidating and changing in line with broader economic trends or leaving the area. These changes are part of a long period of continuing social and economic change, which also include factors such as drought, property amalgamations and the recess of the local primary school in late 2012.

On average, the population living in Grong Grong are older than the LGA as a whole, with a median age of 47 years old, compared with a median of 43 for Narrandera Shire and 38 years for NSW.

##### **The economy**

Grong Grong is one of the four main settlements within Narrandera Shire, alongside Narrandera, Borellan and Binya. The main industry within the LGA is agriculture (crops, livestock and dryland farming), which accounts for one fifth of employment in the LGA (Narrandera Shire Council, 2012). Retail trade, manufacturing and health and community services each contribute another 10 – 13 per cent towards additional employment, as do industries which process agricultural produce. Only a very small proportion of the LGA is devoted to irrigated agriculture. The land surrounding the town is predominantly used for dryland agriculture.

Grong Grong's proximity to the intersection of the Newell and Sturt highways makes it a popular stop for tourists in the region. Newell Highway travellers, including touring vans and motorhomes, are the primary source of visitors to Grong Grong. Event attendees, regional campers and anglers, and travellers along the Canola Way are a secondary market for visitors to the town (Narrandera Shire Council, 2010).

A small number of businesses operate in the main centre of the town. A motor inn, mechanic and agricultural supply / stock and station agent are located on the Newell Highway. A general store is located on June Street and a hotel (on the Ganmain Road). Grain silos and a piggery are also located close to town.

Of these businesses the general store, motor inn and hotel would be dependent on or substantially benefit from passing trade or highway generated trade. Other businesses would rely more on rural industries in the region.

The motor inn is heavily patronised by local workers, regular travellers and people visiting local residents, but the owner estimates that around 50 per cent of its turnover is derived from passing trade.

The hotel is located to the south of the railway line and away from the north-south route through town. The hotel trade is traditionally less dependent on traffic from the highway, although the hotel has benefitted from a growth in tourists in RVs and caravans.

The general store, which also incorporates a newsagent, post office and accredited visitor information centre reports reliance on both local business and passing trade. Passing trade from the general store includes traffic travelling in an east-west direction between Narrandera and Ganmain, as well as those travelling to, or arriving from, the north. While it provides some of the day to day needs of residents and workers, it does not meet all their shopping needs, so most locals also travel to Narrandera for shopping and other services.

The general store plays a central role in the life of the town, providing essential services and supplies for residents and people working in the town's businesses. It is seen as the main focal point, or hub, of the town.

The store's location adjacent to Grong Grong Park and its amenities has proven to be an attractive destination for drivers wanting a rest break and for overnight tourists, including Recreational Vehicle (RV) and campervan users. The general store provides information about local activities and events, and a flyer with a map for those wishing to explore the town on a borrowed bicycle.

A growing source of income for the town is identified as tourists in recreational vehicles (RVs) or caravans who stop overnight in the town, in parking areas such as the rest area next to the general store or the hotel. This recreational activity is becoming increasingly popular amongst travellers with caravans or RVs. Many stop at Grong Grong because of its listing in the *Camps Australiawide Guidebook* and other online tourism and camping directories. Feedback indicates that the town offers a sense of security, with safety in numbers, an attractive location and a place to buy food and drink. The contribution of these travellers to the local economy is not known. However, anecdotal evidence indicates that several businesses, including the hotel, general store and the motor inn benefit from the expenditure of these tourists.

### **Traffic and road safety**

The Newell Highway is part of the National Land Transport Network (NLTN) and the Melbourne to Brisbane corridor. It is a crucial road link for freight, passenger and tourist traffic between Queensland, NSW and Victoria. It is also an important regional traffic route by linking towns and major centres in the region. The majority of the Newell Highway has a posted speed limit of 110 km/h. The highway in Grong Grong is reduced to 60 km/h and has a 90 degree bend. The advisory speed for the bend is 35 km/h. There have been several truck roll overs at this intersection. On average there has been one crash each year with the majority involving heavy vehicles.

The current road design through Grong Grong limits traffic efficiency and constrains travel times, particularly for heavy vehicles. The highway needs upgrading to safely cater for heavy vehicles and to enable access for HPVs. This section of the Newell Highway is used by large numbers of local heavy vehicles / farm vehicles, particularly during harvest time. Stock are also moved between properties several times each year and may cross the Newell Highway and local roads. These movements present the potential for conflicts with motor vehicles and other through traffic.

An analysis of crash data for this section of the Newell Highway provided by Roads and Maritime shows there were two crashes at this intersection since safety works were completed in 2012 where heavy vehicles were involved, resulting in injuries. In both cases, speeding on the curve was a factor. In addition, there have been a small number of other injury accidents within 10 kilometres of this intersection, mainly where vehicles have run off the road.

Additional information on existing traffic and transport in Grong Grong is provided in section 6.3.1.

### **Local amenity**

Grong Grong experiences high levels of traffic using the Newell Highway at present, with around half being heavy vehicles. This contributes to noise and vibration, as trucks pass through the town centre at most hours of the day and night. Measurements in 2009 quantified noise levels of up to 80 dB(A) and 78 dB(A) at two locations along the existing Newell Highway in the town (EMM 2015), although average noise levels and night time noise levels were lower. Noise measurements demonstrate the high proportion of heavy vehicles, especially in the late afternoons during sample periods (EMM 2015). For comparison purposes, these higher levels are consistent with noise at the kerbside of a busy city street.

### 6.4.3 Potential impacts

#### **Construction**

##### *Employment and income benefits*

The proposal has already contributed to employment during the planning and design of the realignment options. In addition, there would be employment created during construction. Roads and Maritime estimate that a total of 20-27 construction jobs would be created on site during the construction period.

There is potential for some short term increase in local economic activity associated with the presence of the construction workforce during the construction period. Construction worker expenditure throughout the construction phase would benefit local businesses such as the general store, motor inn and hotel, thus supporting employment in these local businesses.

##### *Construction impacts*

Construction of the proposal is expected to create socio-economic impacts such as noise, dust and vibration, heavy vehicle movements, detours, changes to local access and traffic delays. The noise and vibration assessment (EMM 2015) concludes that noise levels are likely to exceed 'noise management levels'<sup>1</sup> at sensitive receivers during construction and site establishment, although the levels would be below the "highly affected residential noise criterion" (EMM 2015) and in part reflect the relatively low background noise levels of this area. These impacts would also be short term, as construction moves along the length of the proposal.

Construction would primarily be off-line so would not directly affect traffic on the existing Newell Highway. The one exception would be for a short period when the new alignment is tied in to the existing Newell Highway late in the construction process.

Temporary disruptions to local roads would be expected during construction of the proposal. Local roads that would potentially experience some delays during construction include Narran Street, Boree Street and Angle Road. These roads would be directly linked to, or serviced by, the new alignment and would experience detours at some time during construction. These impacts would be minimised through the

---

<sup>1</sup> Noise management levels represent "the point above which there may be some community reaction to noise"



implementation of a Traffic Management Plan.

## **Operation**

### *Improvements to freight operations*

The major socio-economic benefits of the proposal would be the economic benefits arising from improvements to the road freight network. These benefits are articulated in the project objectives (Section 1.5).

Removing the need for highway traffic to slow for the 90 degree bend at Grong Grong would contribute to an increase in average journey speeds and reduction in average journey times for all drivers using the highway route. The proposal would also provide access to HPVs to this section of the highway.

These benefits would accrue to all drivers using this section of the Newell Highway, but given the high proportions of heavy vehicles using the route, the proposal would, in particular, directly benefit freight operators and businesses using the Melbourne to Brisbane route and using the highway for inter-regional transport. In addition, consumers would also be expected to receive economic and financial benefits through flow-on effects such as lower prices, improved business productivity and employment opportunities. As a result, the benefits to the freight network from this proposal could potentially extend to the wider NSW and Australian population.

### *Transport improvements for road users*

In addition to the benefits to the freight industry, the proposal would benefit all road users by enabling travel time savings, more consistent travel speeds and an easier drive through this part of their journey. By not having to slow for the 90 degree bend in the existing highway route, the proposal would benefit other road users, including residents of the region and tourists.

### *Reduced traffic in Grong Grong town*

The proposal would reduce the numbers of vehicles passing through Grong Grong, as most vehicles would continue through the district on the proposed new highway alignment. While it is not possible to accurately estimate the potential benefits that would be experienced in the town from reduced traffic levels, it would be reasonable to assume that the majority of heavy vehicles travelling on the north-south route would use the proposed route, and local traffic levels in the town would be expected to be reduced.

### *Local access and road safety*

Another major source of benefits from the proposal for all highway users would be social benefits associated with fewer crashes. The proposal would avoid the need for Newell Highway traffic to slow for the 90 degree bend in Grong Grong and would remove conflicts associated with turning traffic. Removing a large proportion of highway traffic from town would also assist in avoiding potential conflicts between local heavy vehicles / farm vehicles and through traffic.

In addition, reduced traffic levels and reclassification of Grong Grong's main street as a local road would create a safer environment, especially for pedestrians walking along or crossing the route in the town. While there are no forecasts of the expected reduction in traffic through the town, it would be expected that the great majority of heavy vehicles would use the highway. This would create benefits for pedestrians and other road users.

Changes to local access would require stopping and starting and turns across traffic at the access to town. Farm operating practices would need to be changed, such as movement of sheep across the highway, due to the alteration in access and the new

alignment with continuous 110 km/h speed zone.

The proposal includes access routes to Grong Grong to the north and west, providing dual movements in and out of town, to enable traffic to pass through the town without the need to back track. The proposal also includes signage and landscaping to direct passing traffic toward Grong Grong, to encourage greater visitation to the town.

The proposal would cross Narran Street, removing access to Narran Street west of Boree Street, which is Council owned land, providing access to the 'Woodlands' property. The future of the section of Narran Street west of Boree Street will be an integral part of the property acquisition discussions with Narrandera Shire Council and with the owner of 'Woodlands' and will be decided during the detailed design phase for the project.

#### *Amenity*

A large reduction in traffic volumes through the centre of Grong Grong would create a much improved local environment for residents of the town, with a reduction in associated traffic noise and dust. Those most likely to benefit from these improvements would be those living, working or staying on the current Newell Highway through town. This section of the route contains around 20 dwellings and 3 businesses, including the motel.

Even though there are few pedestrians using the Newell Highway in Grong Grong at present, the reduced local traffic levels attributable to the proposal could provide benefits to the local community and visitors as a quieter, rural feeling is restored.

More tourists may choose to stay overnight, attracted by the improved amenity associated with reduced road noise in the town, rest facilities adjacent to the general store, and the hotel and motel businesses once the proposal is operational.

There would be a considerable reduction in road traffic noise levels at sensitive receivers fronting the existing alignment through the town of Grong Grong (EMM, 2015). "Predicted noise levels associated with the proposal would comply with operational road traffic noise criteria at all sensitive receivers" (EMM, 2015). "However, some sensitive receivers further west nearer to the proposal will experience an increase in road traffic noise" (EMM, 2015). Night time noise levels along the proposed route would also be "below the maximum internal noise level associated with awakening reactions" (EMM, 2015).

#### *Loss of some passing trade*

While there are clear economic, traffic and safety benefits associated with the proposal, there is nevertheless the potential for negative impacts on the local community that would occur as a result of the proposal. By diverting a large component of existing and future traffic from the town, there is the potential for highway dependent businesses to experience a substantial loss of trade.

While a survey of regular guests of the hotel (undertaken by the owner) found that most reported they would continue to use the facility, the owner has expressed concerns there would be a decline in new business through loss of the passing trade component of business as a result of the proposal.

There is a strong argument that the general store and hotel businesses would continue to be patronised by drivers travelling in an east-west direction, as their journeys would not be affected by the proposal. In addition, the store would continue to be used by some local residents and by employees of the two largest agricultural businesses in the town – namely the silos and the piggery. The general store's attraction to tourists travelling in RVs and caravan users would also be expected to continue should the proposal be constructed, as many of these tourists specifically

seek out the site to stop for refreshments or an overnight stay. For these customers, the diversion of heavy vehicle traffic could actually increase the attractiveness of this rest stop and contribute to an increase in business for the general store, as the location may become more attractive for an overnight stay if noise levels in the town are reduced and amenity is improved.

The location of the hotel to the south of the railway line and off the north-south route through town would suggest that it would be less likely to suffer from a large loss of trade, in the same way as businesses located on or near the existing highway.

The inclusion of two accesses with dual movements at the north and west ends of the proposal would limit some loss of trade. However, as noted above, most traffic travelling in a north-south direction would be expected to use the highway, and a relatively small proportion of traffic would be expected to divert through the town. This would directly contribute to losses in passing trade for these businesses. Measures are proposed to continue to attract highway motorists to these businesses to maintain a sustainable customer base.

Roads and Maritime has commissioned several studies to examine the economic and social impacts of highway bypasses. A recent literature review (Parolin, 2011) found:

“general consensus from the myriad bypass literature is that a highway bypass is not associated with the death of a town, with the evidence suggesting that the impact on economic growth is positive in the long-term for the majority of communities bypassed” (p. 5).

“in the longer term, highway bypasses do not have adverse economic impacts (highway generated trade and employment) on towns that are bypassed; what economic impacts do occur tend to be minimal and of a short-term duration. The evidence suggests that in most cases highway bypasses have resulted in economic development benefits for towns which have been bypassed” (p. 1).

The realignment is expected to change the retail landscape of Grong Grong, however, there are a range of other factors that could also contribute to the decline of the town economy such as rural population decline or restructuring of industries and services, which would also alter the passing trade and local trade economy.

#### *Cumulative impacts on town identity and sense of place*

Concerns about the potential for adverse impacts on several key local businesses in Grong Grong raise deeper issues about the potential for cumulative impacts from the proposal on the social fabric of the community, and ultimately on the viability of the town itself.

While the analysis indicates that businesses in the town are relatively resilient to have withstood these changes over the past 8-10 years, the precise impacts of the proposal on local traffic levels and local business turnover will not be clear until it is built. However, the concerns raised hint at more than the loss of the few remaining local businesses and amenities for residents and visitors. There was indeed mixed feedback about the importance of the general store for the local population, and comments that many local people do not adequately patronise the local businesses.

But the role of the general store (and its newsagent, post office and visitor information services) is also symbolic, in that it (and arguably also the hotel) fulfils the role of a town centre, a meeting place, or community heart. The possibility of closure would represent a very important loss to the community of a key place, around which the town's identity is built. From this perspective, risk of losing the general store as a result of the proposal (if unmitigated) would have greater and cumulative impact than

simply the financial loss of trade or income for the owners.

The potential severity of these impacts would be minimised through measures identified in section 6.4.4, which would contribute to supporting the sustainability of this key local facility and would therefore assist in preserving community identity and the community's sense of place and attachment to their local area.

#### 6.4.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Potential loss of passing trade and potential cumulative impacts on the community identity and sense of place	<ul style="list-style-type: none"> <li>• Roads and Maritime will continue consultation and working with affected business owners, the Grong Grong Progress Association, the Earth Park coordinator, Narrandera Rotary Club, other interested community members and Narrandera Shire Council during detailed design and construction phases of the proposal to develop and implement measures to minimise and mitigate business and community impacts.</li> <li>• Roads and Maritime will undertake traffic counts on the Newell Highway to the north and west of Grong Grong and in the town centre at specified periods, such as one year and five years after opening, to evaluate the effectiveness of the signage in attracting visitors to the town.</li> <li>• Roads and Maritime will conduct follow-up discussions with highway-dependent business operators (the motel, general store and hotel) and key community members at 6 months and 1 year after opening, to evaluate the effectiveness of the proposal's socio-economic management and mitigation measures.</li> <li>• Implement urban design and landscape measures identified in section 6.5.</li> </ul>	Roads and Maritime project manager	Pre-construction, Construction and Operation
Construction impacts (traffic delays, noise, dust, changed access)	<ul style="list-style-type: none"> <li>• Roads and Maritime and its contractors will implement construction noise mitigation measures as outlined in section 6.6.5.</li> <li>• Roads and Maritime will keep the local community informed about the construction process, including project timing and periods when there will be changes to local traffic conditions.</li> </ul>	Roads and Maritime project manager  Contractor	Pre-construction and Construction

Impact	Environmental safeguards	Responsibility	Timing
Economic impacts to businesses and agriculture – town access	<ul style="list-style-type: none"> <li>In consultation with the Grong Grong community, Roads and Maritime will provide signposting to encourage highway traffic to visit Grong Grong. Signage would be consistent with Roads and Maritime signposting guidelines.</li> <li>In addition, Roads and Maritime will provide advertising signage visible from the Newell Highway for the general store and the motel, to mitigate against loss of trade and for the hotel, to contribute towards the town's ongoing viability.</li> </ul>	Roads and Maritime project manager	Operation

### Community and Council initiatives

The key factor in capturing potential benefits and minimising impacts of a bypass is cooperative planning between an impacted community, road authorities and the Government to develop mitigation measures that minimise adverse economic impacts and strengthen positive impacts and manage change (Parolin, 2011).

The Grong Grong community have expressed a range of ideas which show a strong desire to attract new visitors and tourists to the town or mitigate a loss of existing trade. Roads and Maritime have incorporated some of the community's suggestions in the proposal; Roads and Maritime will continue consultation with the community to further develop and implement measures to minimise and mitigate business and community impacts.

A number of the other suggestions could be implemented, separate from the proposal, driven by the local community in partnership with council and other stakeholders. One idea is to build on the interest being shown by the RV and caravanning tourist market segment that is attracted to the town for its quiet and attractive location and facilities available at the park or the hotel. Specific suggestions to attract visitors and improve the local amenity include:

- Upgraded waste / sewer dump facilities for RVs and caravans
- Upgraded public toilets in park
- Visitor Information Centre signage and brown tourism sign
- Wayfinding signage to direct visitors to the facilities
- Public art at Grong Grong Park and rest area (or other appropriate locations)
- A mural and signage on the general store
- A coffee shop.

The Earth Park project coordinator has also expressed an interest in working with Roads and Maritime and council to source materials and labour to further develop the Earth Park. Signage on the Newell Highway and in town was also seen as an important way to advertise the Earth Park to passing motorists.

Discussions with the Progress Association and Earth Park members identified several other community ideas that could also help support the future viability of the town:

- An automated teller machine (ATM).
- A large solar array alongside the new alignment.

- National Broadband Network (NBN) connection.
- Subdivision of lots near the town centre for sale as lifestyle lots.

While these are outside the scope of Roads and Maritime involvement, these community led initiatives demonstrate the strength of existing community networks, values and actions being pursued to expand the local economic base and develop a stronger, more diverse and sustainable local community.

## 6.5 Landscape character and visual amenity

### 6.5.1 Methodology

Peter Andrews + Associates Pty Ltd were engaged by Roads and Maritime to develop an urban design strategy for the proposal and to undertake an assessment of the landscape character and visual impacts of the proposal. A copy of the full report including a detailed scope and methodology is provided in Appendix H.

The methodology for the landscape character and visual impact assessment is in accordance with the *Environmental Impact Practice Note: Guideline for Landscape Character and Visual Impact Assessment* (Roads and Maritime, 2013).

A series of landscape character zones (LCZ) were identified that have a distinct character resulting from a similar combination of urban and landscape features that include landform, built form, vegetation and land use for the area subject to the proposal. The landscape character zones identified for the proposal include:

- LCZ 1 - Rural agricultural lands
- LCZ 2 - Village edge/remnant Woodland
- LCZ 3 - Grong Grong village centre.

Landscape character impacts were assessed through an analysis of sensitivity and magnitude measures. The sensitivity and magnitude for landscape character are defined as follows:

- Sensitivity refers to how sensitive the character of the setting is to the proposed change and its capacity to absorb the change.
- Magnitude refers to the scale, form and character of the proposal.

The rankings outlined in Table 6-8 have been used to determine the sensitivity and magnitude of the proposal on each landscape character zone identified in Figure 6-7.

**Table 6-8: Sensitivity and magnitude rankings**

Rank	Description
Negligible	Only a small part is discernible and is scarcely appreciated.
Low	The proposal constitutes a minor component of the overall landscape character.
Moderate	The proposal would form an immediately apparent part of the landscape that affects and changes its character.
High	The proposal would be the dominant feature in the landscape and would affect and change its character.

The combination of sensitivity and magnitude provides an impact rating for the proposal on the landscape character based on Table 6-9 prepared by Roads and Maritime, outlined in the Landscape character and visual impact guidelines.

**Table 6-9: Landscape character impact matrix**

		MAGNITUDE			
		High	Moderate	Low	Negligible
SENSITIVITY	High	High Impact	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low Impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

(Source: Roads and Maritime, 2013).

### Visual Impact Assessment

The potential visual impact of the proposal has been assessed in relation to the viewshed analysis and the key viewpoints. The assessment considered the magnitude of visual change in the landscape and the distance from the viewer, as well as the sensitivity (the quality of the view and how sensitive it is to the proposed change).

The categories of magnitude and sensitivity of visibility are defined in Table 6-10.

**Table 6-10: Magnitude and sensitivity of visibility**

Rank	Description
Negligible	Very minor loss or alteration to one or more key elements/features/characteristics of the baseline visual character and/or introduction of elements that are consistent with the existing visual character.
Low	Minor loss of/or alteration to one or more key elements/feature/characteristics of the baseline visual character and/or introduction of elements that are consistent with the existing visual character.
Moderate	Partial loss of/or alteration to one or more key elements/features/characteristics of the baseline visual character and/or introduction of elements that may be prominent but not considered to be substantially uncharacteristic.
High	Substantial to total loss of key elements/features/characteristics of the baseline visual character and/or introduction of elements considered to be totally uncharacteristic.

Key viewpoints were determined from the view shed analysis and from site investigations. An initial assessment of the sensitivity of each viewpoint was undertaken. The combination of sensitivity and magnitude then provides an overall impact rating for the visual impact based on Table 6-9, outlined in roads and Maritime’s *Landscape character visual impact guidelines*.

#### 6.5.2 Existing environment

Grong Grong is a small rural village with a population of 391 persons (identified in the 2011 Census). The town can be categorised into three landscape character zones (LCZ), described below and shown in Figure 6-7.

##### LCZ 1 - Rural agricultural lands

This LCZ incorporates the agricultural lands to the west and north of Grong Grong. The zone is highly modified by agricultural practices and the existing highway alignment. The agricultural lands are generally open and flat to gently sloping to the north. Exotic groundcover species are common with patches of *Austrostipa* grasses

and scattered mature remnant trees, eg. *Callitris glaucophylla*, Grey Box *Eucalyptus microcarpa* and Yellow Box *E. melliodora*. Vegetated areas are present within the road reserve along the Newell Highway including Inland Grey Box Woodland dominated by Grey Box *Eucalyptus microcarpa* and White Cypress Pine *Callitris glaucophylla* with a predominantly native understory and groundcover.

### LCZ 2 - Village edge/remnant woodland

This LCZ is characterised by large lots including vacant parcels and some dwellings, the cemetery and recreation grounds to the east. Features include scattered native woodland and informal, unformed rural roads. Remnant or regrowth Inland Grey Box Woodland are located throughout the LCZ on landholdings and along the road reserves.

### LCZ 3 - Grong Grong village centre

Grong Grong is a small town with a number of services and around 391 residents. The town includes a number of residential dwellings, vacant allotments, commercial enterprises, heritage buildings and recreational facilities. Landscape features include the remnant woodland the street tree planting, railway line and corridor. The landform is generally flat and gently rising to the north. The town of Grong Grong incorporates a general store and post office, hotel, motel and the recreational areas, including the unofficial rest area (Grong Grong Park).



**Figure 6-7: Landscape character zones (Source: Peter Andrews and Associates, 2014)**

Various signage is located on the western and northern approaches to Grong Grong indicating rest areas as well as the Grong Grong gateway signage.

The Newell Highway is a single carriageway with one lane in each direction, generally with a posted speed limit of 110 km/h, reducing to 60 km/h through Grong Grong. The existing low speed 90 degree bend in the highway at Grong Grong is signposted as a 35 km/h bend. The street network of Grong Grong is generally based on a grid street pattern and includes formed and unformed local roads.

Angle Road extends in an easterly direction off the Newell Highway to the north of the town. Angle Road provides access to rural properties and agricultural lands to the north and east of Grong Grong. The area contains residential properties within the town and is surrounded by rural areas that are predominately utilised for agricultural



purposes such as cropping and grazing.

The land form is generally flat in the south and gently slopes to the north. The native woodland vegetation is dominant within the road reserve of the existing Newell Highway, the local road network and throughout the town of Grong Grong.

The visual character of the study area is one of cleared agricultural land with scattered native vegetation. The construction footprint is predominately cleared for agricultural purposes. The middle section of the proposal (Crown Land) comprises of modified agricultural land with some scattered remnant trees such as Inland Grey Box and White Cypress Pine. Areas along the existing Newell Highway within the road reserve are well vegetated with Inland Grey Box and White Cypress Pine.

### 6.5.3 Potential impacts

#### Construction

Construction of the proposal would mostly be screened by existing vegetation and buildings, with the exception of viewpoint 5 and 7 (as shown in Figure 6-8). Parts of the proposal may be visible from dwellings at these viewpoints, depending on the amount of vegetation to be removed, the amount of cut and fill and the location of the ancillary facilities. However, the overall level of visual impact is moderate to low.



**Figure 6-8: Selected viewpoints for the proposal.**

**(Source: Peter Andrews and Associates, 2014)**

In terms of the landscape character zones (refer Figure 6-7), the proposal would have a moderate impact during construction including the following impacts:

- *LCZ1 Rural agricultural lands (Viewpoints 1 and 8):* Highway users may be able to see construction at the tie in points. Vegetation removal along part of the existing highway may alter existing views.
- *LCZ2 Village edge/remnant Woodland (Viewpoints 2, 3 and 7):* Alteration of views due to visibility of construction of the proposal and vegetation removal,

including the woodland. Partial visibility of construction from some dwellings to the west.

- *LCZ 3 Grong Grong Village Centre (Viewpoints 4, 5 and 6):* Parts of the new alignment may be visible during construction from dwellings to the south-east, depending on the amount of vegetation removal.

## Operation

When operational, the proposal would mostly be screened by existing vegetation and buildings, with the exception of viewpoint 5 and 7. Parts of the proposal may be visible from dwellings at these viewpoints, depending on the amount of vegetation to be removed and the amount of cut and fill.

Table 6-11 provides a summary of the visual impact from the key viewpoints shown in Figure 6-8.

**Table 6-11: Summary of visual impacts (Peter Andrews and Associates, 2014)**

Viewpoint	Visual sensitivity	Overall level of impact	Summary
1	Low	Negligible	The existing roadside vegetation would generally screen the proposal.
2	Low	Moderate to low	The highway alignment would be altered and vegetation removed. It would only impact on users of the highway who would be driving at a higher speed, however visual interest is still important.
3	Low	Negligible	The new alignment would generally be screened from dwellings located to the south of the existing Newell Highway by existing vegetation including within the road reserve.
4	Negligible	Negligible	The proposal is screened by existing vegetation and buildings.
5	Low	Moderate to low	Parts of the new highway alignment may be visible from the dwellings dependent on the amount of vegetation to be removed, however there is still substantial vegetation between the dwellings and the proposal.
6	Negligible	Negligible	No impact as the proposal is screened by existing vegetation and buildings.
7	Low	Moderate to low	Parts of the new alignment may be visible from the dwellings. The extent of the visibility would be dependent on the amount of cut and fill for this section of the alignment. Parts of the proposal would be screened by existing vegetation and other buildings.
8	Low	Moderate to low	The highway alignment would be altered and vegetation removed. It would only impact on users of the highway who will be driving at a higher speed, however visual interest is still important.

The existing Newell Highway that passes through the town of Grong Grong would remain in place and serve as part of the local road network through town. The

proposal would have a negligible impact on visual amenity for residents and businesses located along this existing section of the highway.

Visual impacts would be experienced by residents and property owners that are located near the proposal. The area would change from a predominately rural/agricultural area to that of a rural highway. The nearest resident would be about 300 metres from the proposal, which is also the distance to the existing highway from this residence.

Due to the existing vegetation and the topography, views to the proposal would be limited from the town itself. The proposal would be visible from the agricultural land to the west.

The proposal would have a moderate impact on the agricultural lands and the village edge as the proposal would travel through these lands and require removal of vegetation.

A moderate to low visual impact would occur on the western and northern approaches to the new alignment and from properties in close proximity. This is generally due to the proximity of the new alignment and access roads, loss of vegetation and the change in route direction.

#### *Landscape Character Zone Assessment*

Measurements of impact for each landscape character zone are summarised in Table 6-12. Refer to Appendix H for more detail.

**Table 6-12: Summary of impacts at each LCZ**

<b>Sensitivity</b>	<b>Magnitude</b>	<b>Overall level of impact</b>	<b>Impact Construction</b>	<b>Impact Operation</b>
<b>LCZ 1 – Rural agricultural lands (Viewpoints 1 and 8)</b>				
Moderate	Moderate	Moderate	Highway users may be able to see construction at the tie in points. Vegetation removal along part of the existing highway may alter existing views.	Views would be altered for highway users due to new alignment and removal of vegetation along part of the existing highway, providing new vistas.
<b>LCZ 2 - Village edge/remnant Woodland (Viewpoints 2, 3 and 7)</b>				

Sensitivity	Magnitude	Overall level of impact	Impact Construction	Impact Operation
Moderate	Moderate	Moderate	Alteration of views due to visibility of construction of the proposal and vegetation removal, including the woodland. Partial visibility of construction from some dwellings to the west.	Views would be altered for highway users due to the new alignment and removal of vegetation. New alignment generally screened by vegetation for dwellings to the south, but partially visible from some dwellings to the west.
LCZ 3 - Grong Grong village centre (Viewpoints 4, 5 and 6)				
Moderate	Moderate	Moderate	Parts of the new alignment may be visible during construction from dwellings to the south-east, depending on the amount of vegetation removal.	Parts of the new alignment may be visible from dwellings to the south-east, depending on the amount of vegetation removal.

#### 6.5.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Reduced visual amenity	<ul style="list-style-type: none"> <li>Prepare and implement a detailed urban design plan based on the urban design concept outlined in Section 5.3 of the Urban Design Strategy (PAA, 2014) and in consultation with the Grong Grong community and Narrandera Shire Council.</li> <li>The urban design plan shall include a landscape plan to revegetate the road reserve areas and reduce visual impacts to residences located to the east.</li> </ul>	Roads and Maritime Project Manager  Contractor	Pre-construction and construction
Signage	<ul style="list-style-type: none"> <li>Roads and Maritime will install town entrance signage at both the west and north accesses in consultation with Narrandera Shire Council and the local community.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction

## 6.6 Noise and Vibration

### 6.6.1 Methodology

EMGA Mitchell McLennan Pty Ltd (EMM) were engaged by Roads and Maritime to undertake a noise and vibration assessment in 2009 of three realignment options at Grong Grong (EMGA 2009). Following selection of a preferred option and further refinement of the design, EMM were then subsequently engaged to undertake an assessment of the noise and vibration impacts of the proposal. Refer to Appendix I for the full Noise and Vibration Assessment of the proposal by EMM dated 2015.

The assessment report includes:

- A review of the 2009 noise monitoring and traffic counts to justify their suitability for the use in this assessment.
- An operational road traffic noise assessment for the proposed alignment against contemporary standards, and recommendations for provision of appropriate mitigation where necessary.
- An assessment of the noise and vibration impacts during construction.
- Recommendations for provision of appropriate mitigation and management controls during construction where necessary.

The report has been prepared in accordance with the following policies and guidelines:

- *NSW Road Noise Policy (RNP)* (DECCW 2011).
- *Interim Construction Noise Guideline (ICNG)* (DECC 2009).
- *Assessing Vibration: a technical guideline (The Guideline)* (DEC 2006).
- *DIN 4150-3 Structural vibration - Effects of vibration on structures* (German Standard 1999-02).
- *Environmental Noise Management Manual (ENMM)* (RTA 2001).
- *Procedure for Preparing an Operational Traffic and Construction Noise and Vibration Assessment Report (Roads and Maritime 2014)*.

#### *Unattended noise monitoring*

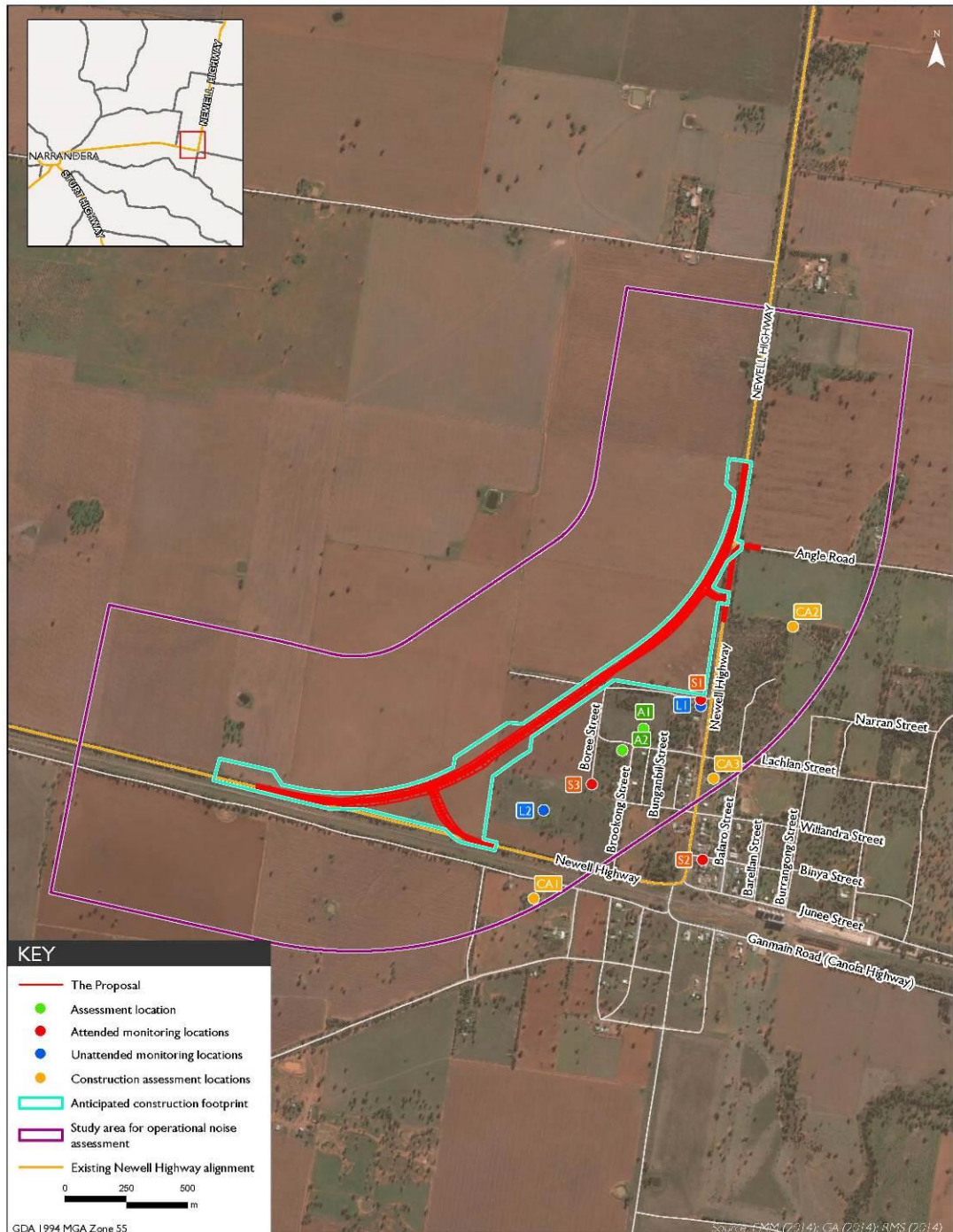
Unattended noise monitoring was completed between 19 May to 4 June 2009 to quantify the existing ambient noise environment and to collect data for model calibration and sensitivity analysis. Logger locations were limited due to access to properties and site security. The two unattended monitoring locations (L1 and L2) are shown in Figure 6-9.

The unattended monitoring was also used to determine the maximum noise level ( $L_{max}$ ) associated with road truck passbys during the day and night periods at these two locations.

Weather data (wind speed and rainfall) was obtained from the Bureau of Meteorology (BoM) weather station at Narrandera Airport (74148) for the survey period. The weather data was used to exclude periods when rain and winds (above 5 m/s) occurred.

The noise logger at L1 was installed at the closest residence to the highway, at the corner of Narran Street and the Newell Highway about 40 m from the highway centreline. This location is representative of properties fronting the Newell Highway which are exposed to relatively high traffic noise levels. Observations indicated that road traffic noise (particularly truck passbys) dominated the noise environment.

Logger L2 was installed in an open paddock, located 150 m north of the Newell Highway. This location is representative of residences removed from the highway.



**Figure 6-9: Noise monitoring locations**  
(Source: EMM, 2015)

*Attended noise monitoring*

EMM conducted 15 minute attended noise monitoring at three representative residential locations on 19 May 2009 to qualify the noise sources and characteristics in the area. Attended monitoring locations are shown in Figure 6-9.

Manual traffic counts were completed on 19 May 2009 at locations S1 and S2, including northbound and southbound lanes.

### *Sensitive Receivers*

Unattended (L1 and L2) and attended (S1 and S2) noise monitoring locations, with the exception of S3, have been adopted as representative sensitive receivers for the operation and construction noise and vibration assessment of the proposal, as well as two additional assessment locations (A1 and A2).

Three exclusive construction noise and vibration sensitive receiver locations (CA1, CA2 and CA3) have been adopted due to their position relative to the proposal. Representative sensitive receivers considered in the noise and vibration impact assessment are presented in Figure 6-9.

The adopted sensitive receivers are nearest to the proposal and would represent locations potentially worst affected by the proposal. Therefore, it is expected that other sensitive receivers within the study area at similar or greater distances will experience noise levels which are similar to or less than those predicted at the adopted representative locations.

### *Design Year*

Based on an intended opening date of mid-2016, the design year for assessment in accordance with the RNP (DECCW 2011) is 2026. Noise from the proposal was assessed for both the 'no-build' and 'build' scenarios for the year of opening and the design year (10 years from opening). A 2 dB tolerance for increased noise levels was considered.

### *Construction Noise*

The *Interim Construction Noise Guideline* (ICNG) (DECC 2009) provides guidance on the assessment and management of construction noise, and has been used to assess the construction stage of the proposal. The ICNG (DECC 2009) provides two assessment methods being quantitative and qualitative. This assessment has adopted a quantitative assessment approach as construction works are anticipated to occur over 10 months.

Noise calculations were completed to determine the potential noise levels associated with construction for the representative sensitive receivers for the proposal, where site establishment and road construction works would occur.

The motel is considered a noise sensitive receiver and accordingly has also been considered in the noise assessment.

Construction works have been assumed to be limited to normal construction hours of Monday to Friday 7am to 6pm and Saturdays 8am to 1pm.

### *Traffic Data*

Traffic volume data for 2011 was analysed to provide predictions for the year of opening (2016) to the design year (2026).

### *Noise Modelling*

Road noise from the existing Newell Highway was modelled at two sensitive receivers to validate the predictions.

Traffic noise monitoring from single points was used to create day  $L_{eq(15-hr)}$  and night  $L_{eq(9-hr)}$  road traffic noise contours for the existing alignment and the proposal for the year of opening and the design year.

Construction noise levels were predicted at representative noise sensitive receivers. The modelling predictions assume all plant operate simultaneously. The results are therefore conservative, presenting the worst case potential construction noise levels at sensitive receivers for the three construction scenarios.

The results were compared with the relevant Noise Management Levels (NMLs) to provide a guide as to screening potential noise impacts and the requirement for mitigation measures.

#### *Vibration assessment*

A review of potential structural vibration has been completed for residential receivers which are located at more than 200 m from the proposal construction activities. Vibration has been considered from continuous vibration (eg. Machinery, steady road traffic, continuous construction activity), impulsive vibration (infrequent activities, such as dropping of heavy equipment) and intermittent vibration (eg. Passing heavy vehicles, intermittent nearby construction activity).

### 6.6.2 Existing environment

The Newell Highway comprises a single lane in each direction as it passes through Grong Grong. The highway through Grong Grong contains a ninety degree bend with speed advisory signage of 35 km/h. The speed limit on the Newell Highway is generally 110 km/h, reducing to 60 km/h through Grong Grong.

The town of Grong Grong has a population of around 391. Fronting the Newell Highway there are about 20 residences, some small industrial operations and a motel.

Results of background noise monitoring indicate that the existing noise environment is fairly consistent, with levels around 30 db (A) to 31 db(A) recorded at L1 and L2.

Figure 6-10 and Figure 6-11 show the average noise levels (the ambient noise levels) for Grong Grong during the day and at night with the current highway alignment. Ambient noise levels closest to the existing Newell Highway through town are around 60-62 db(A) during the day and at night. Noise levels reduce with distance away from the highway. At representative receiver S3, which is the furthest representative receiver from the current highway, ambient noise levels are around 45 db(A) during the day and at night.

In Grong Grong the dominant noise source is road noise. Long haul freight represents a considerable proportion of the overall traffic on the highway, with heavy vehicles making up 42 per cent of the northbound traffic flow at Grong Grong.

The Draft Newell Highway Corridor Strategy (TfNSW 2014) indicates around 600 (650 towards Narrandera or 534 towards Ardlethan) heavy vehicles travel the Newell Highway (A39) through Grong Grong daily (42 per cent of all traffic). The amount of freight moved along the Newell Highway (A39) at Grong Grong is expected to remain high with heavy vehicle traffic predicted to increase by 77 per cent to 1060 trucks per day by 2031.

Traffic count data for 2006 also found that the daytime (7 am to 10 pm) and night time (10 pm to 7 am) volumes were 81 per cent and 19 per cent of the AADT respectively. This is consistent with typical traffic breakdowns for major roads (being 85 per cent and 15 per cent respectively). The proportion of heavy vehicles for the daytime and night time periods are 44 per cent and 67 per cent respectively.

The results of the manual traffic counts clearly demonstrate the considerable proportion of heavy vehicles, which are made up of semi-trailers, B-doubles or similar and comprise about 75 per cent of the total volume in the 15-minute samples recorded in the late afternoon as shown in Table 6-13. Refer to Figure 6-9 for monitoring locations.

The maximum ( $L_{max}$ ) noise levels associated with heavy vehicle movements were quantified at up to 80 dB(A), 78 dB(A) and 54 dB(A) at locations S1, S2 and S3



respectively, as shown in Table 6-13.

**Table 6-13: Attended 15-minute noise measurement summary (19 May 2009)**

Sensitive receiver ID	Start time (hh:mm)	Measured noise levels, dB(A)			Total traffic volumes (in 15 minutes)
		L <sub>90</sub>	L <sub>eq</sub>	Truck L <sub>max</sub>	
S1 - Narran Street / Newell Highway	18:00	33	62	70, 71, 72, 73, 74, 80	12 (3HV NB; 6 HV SB)
S2 - Binya Street / Newell Highway	18:30	45	60	63, 67, 75, 76, 77, 78 (Jake Brake)	11 (2HV NB; 6 HV SB)
S3 - Boree Street / Willandra Street	17:30	33	45	46, 50, 51, 52, 54	-

Notes: 1. HV = heavy vehicles.  
 2. NB = northbound; SB = southbound. The balance of the vehicle counts is small cars.  
 3. The noisiest L<sub>max</sub> events are provided for reference. Others were not able to be quantified amongst ambient noise.

Light vehicle numbers were assumed to increase by 2.5 per cent annually from 2011. Heavy vehicles were predicted to increase by 77 per cent from 2011 to 2031 as determined in the Draft Newell Highway Corridor Strategy (Transport NSW, 2014), and intermediate years interpolated correspondingly.

Traffic volumes of 81 per cent and 19 per cent of the ADT have been adopted for the day and night periods, respectively. The percentages of heavy vehicles were 44 per cent and 67 per cent for the day and night periods, respectively.

The modelled traffic volumes are presented in Table 6-14. Note that the above growth projections were adopted for both the 'no build' and 'build' scenarios. This is plausible given there is no alternate route in the area.

**Table 6-14: Modelled traffic volumes**

Time period	Vehicle class	Year of opening 'no build' scenario		Year of opening 'build' scenario		Design year 'no build' scenario		Design year 'build' scenario	
		Volume	%	Volume	%	Volume	%	Volume	%
Day	Light	679	56	679	56	847	56	847	56
	Heavy	533	44	533	44	666	44	666	44
	Total	1212	-	1212	-	1513	-	1513	-
Night	Light	94	33	94	33	117	33	117	33
	Heavy	190	67	190	67	238	67	238	67
	Total	284	-	284	-	355	-	355	-

Note: 1. Day is 7 am to 10 pm; night is 10 pm to 7 am.

Traffic volumes on local roads and access routes to the proposal have not been incorporated into the model as these volumes will be insignificant compared to the volumes on the Newell Highway. Furthermore, there are no sensitive receivers within the study area near the proposed access routes.

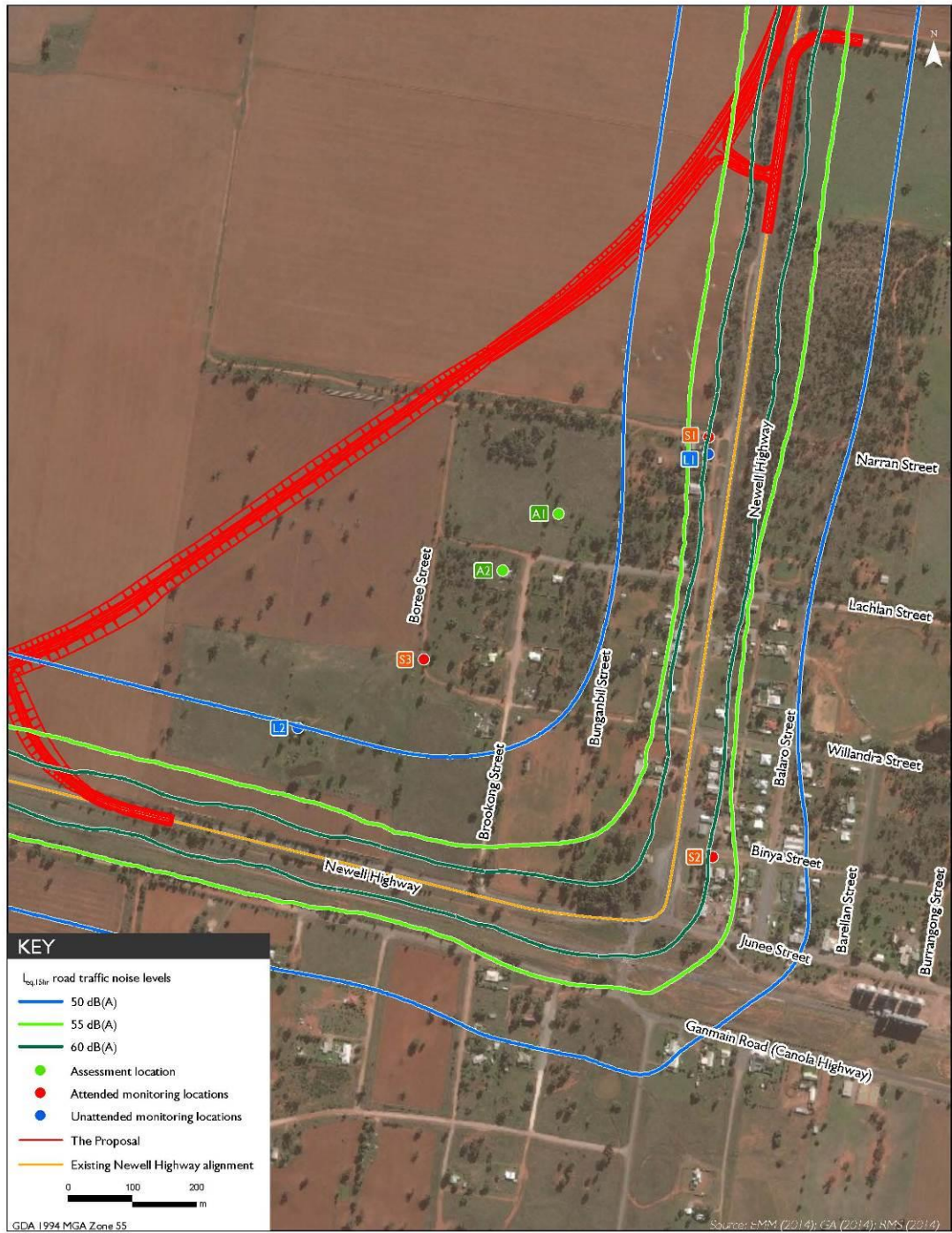


Figure 6-10: Existing Newell Highway  $L_{eq,15hr}$  daytime traffic noise levels, dB(A)

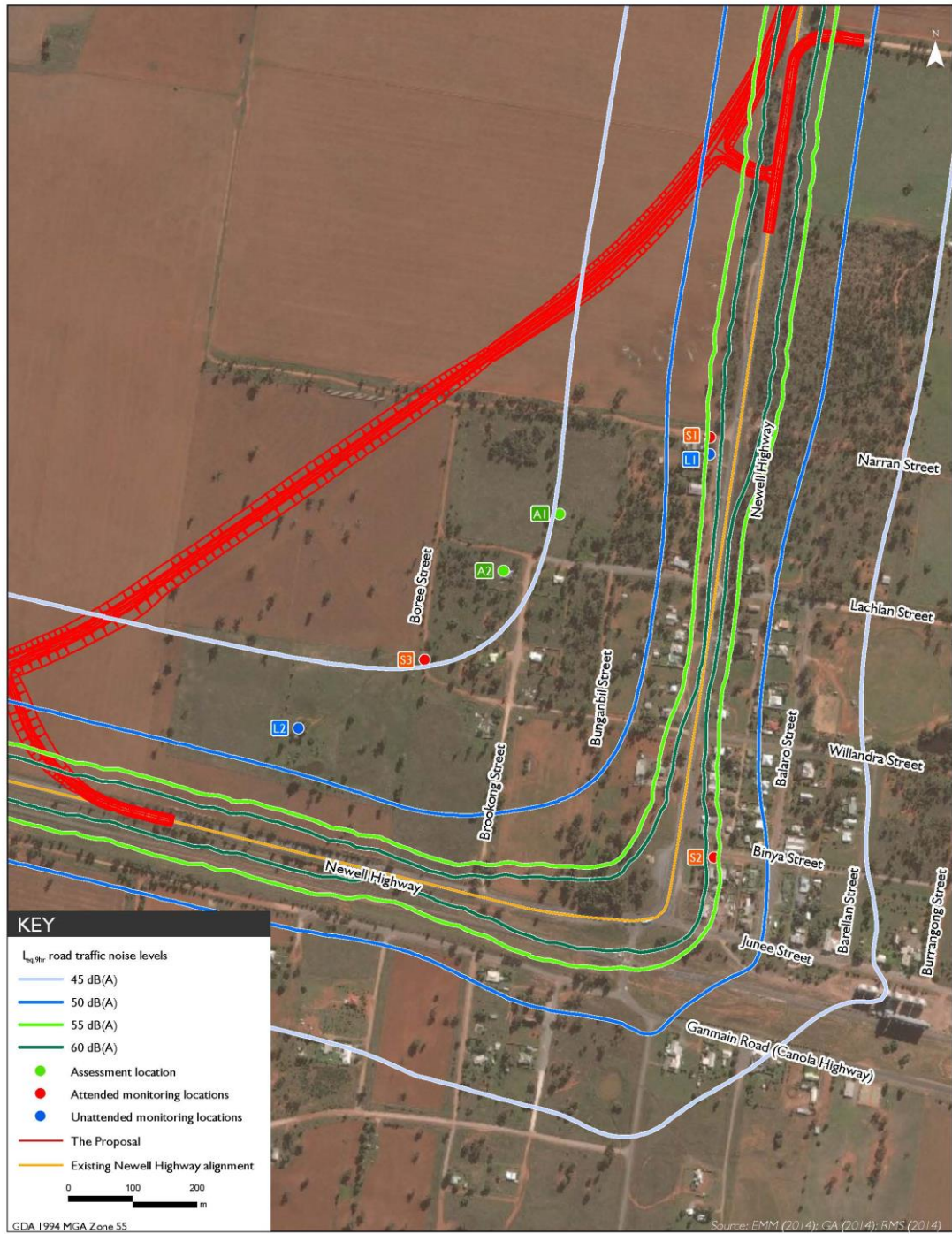


Figure 6-11: Existing Newell Highway Leq,9hr night-time traffic noise levels, dB(A)

## Vibration

The NSW Road Noise Policy (RNP) does not require the measurement of existing vibration levels. Appendix C of the RNP notes that ‘vehicles operating on a roadway are unlikely to cause a perceptible level of vibration, unless there are significant road irregularities. It is expected that existing vibration levels at Grong Grong would not be perceptible.

### 6.6.3 Criteria

#### Construction Noise

The *Interim Construction Noise Guideline (ICNG)* (DECC 2009) provides guidance on the assessment and management of construction noise, and has been used to assess the construction stage of the proposal. Table 6-15 reproduced from the ICNG, sets out the noise management levels and how they are to be applied for residential receivers.

**Table 6-15: Noise management levels at Residential receivers**

Time of Day	Management Level $L_{Aeq} (15 \text{ min})$	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected $RBL^* + 10dB(A)$	The noise affected level represents the point above which there may be some community reaction to noise.  Where the predicted or measured $L_{Aeq} (15 \text{ min})$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.  The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected $75dB(A)$	The highly noise affected level represents the point above which there may be strong community reaction to noise.  Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ul style="list-style-type: none"> <li>• Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences.</li> <li>• If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ul>

Sensitive land uses (other than residential) for the proposal include the motel. In accordance with the ICNG, the NMLs for motels are the same as for residential land uses ( $RBL + 10dB$  during standard hours).

The noise management levels (NMLs) have been developed for representative

sensitive receivers based on the standard hours for construction activities and are presented in Table 6-16.

**Table 6-16: Construction noise management levels (NMLs) – standard hours**

Sensitive receiver	Receptor type	RBL, dB(A)	NMLs, $L_{eq(15-min)}$ <sup>1</sup> (RBL+10 dB)
A1	Residential	30	40
A2	Residential	30	40
S1/L1/	Residential	31	41
S2	Residential	31	41
L2	Residential <sup>4</sup>	30	40
CA1	Residential	30	40
CA2	Residential	30	40
CA3	Motel	n/a	40 (internal) <sup>3</sup>

- Notes:
1. Standard construction hours.
  2. Locations S3 and L2 have not been assessed as they are vacant land.
  3. NML has been taken from Standards Australia 2000, Acoustics – Recommended design sound levels and reverberation times for building interiors, AS/NZS 2107 in accordance with guidance provided in the ICNG (DECC 2009) on other sensitive land uses.
  4. Structure identified here however residential status is unconfirmed.

### Operational Noise

The principle guidance for assessing the impact of road traffic noise on sensitive receivers is in the NSW *Road Noise Policy* (RNP) (DECCW 2011). Table 6-17 presents the road noise assessment criteria which apply to the proposal reproduced from Table 3 of the RNP (DECCW 2011).

**Table 6-17: Road traffic noise assessment criteria for residential land uses**

Road category	Type of project/development	Assessment criteria, dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub-arterial roads	Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{eq(15-hr)}$ 55 (external)	$L_{eq(9-hr)}$ 50 (external)

Source: RNP (DECCW 2011).

In addition to meeting the road noise assessment criteria, any increase in total traffic noise at sensitive receivers must be considered. Sensitive receivers experiencing increases in total traffic noise levels above the identified criteria should be considered for mitigation.

Reasonable and feasible noise mitigation must be reviewed where predicted noise levels above assessment criteria are identified from the proposal.

In addition to meeting the road noise assessment criteria, any increase in total traffic noise at sensitive receivers must be considered. Sensitive receivers experiencing increases in total traffic noise levels above those presented in Table 6-18 below should be considered for mitigation.

**Table 6-18: Relative increase criteria for residential land uses**

Road category	Type of project/development	Total traffic noise level increase, dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road.	Existing traffic $L_{eq(15-hr)}+12$ dB (external)	Existing traffic $L_{eq(9-hr)}+ 12$ dB (external)

Source: RNP (DECCW 2011)

### Maximum emergence levels

The ENMM (RTA 2001) recommends that road traffic assessments include the calculation of maximum noise levels, which involves determining how much the maximum noise levels for individual vehicle pass-bys exceed the  $L_{eq}$  for the night period and the number of such maximum noise events.

This assessment relates to the protection of residents from sleep disturbance.

Guidance on maximum noise levels and sleep disturbance is listed in the RNP (DECCW 2011). This guidance states that:

- maximum internal noise levels below 50 to 55 dB(A) are unlikely to wake sleeping occupants.
- one or two noise events per night, with maximum internal noise levels of 65-70 dB(A), are not likely to affect the health and well being of occupant's significantly.

It is commonly accepted by acoustic practitioners and regulatory bodies that a partially open window would reduce external noise levels by 10 dB(A). Therefore, external noise levels in the order of 60-65 dB(A) calculated at the facade of a residence are unlikely to cause sleep disturbance affects. The ENMM defines a maximum emergence level as an  $L_{max}$  event greater than 65 dB(A) and  $L_{max}-L_{eq-1hr}$  greater than or equal to 15 dB(A).

### Construction vibration

Vibration targets vary depending on whether the particular activities of interest are continuous in nature, impulsive or intermittent, and whether they occur during the day or night. The effects of vibration can be separated into two main categories:

- Structural damage of buildings, including superficial cracking in cement render or plaster.
- Human comfort, where the occupants or users of the buildings are inconvenienced or possibly disturbed by vibration.

The construction vibration criteria are described in detail in Appendix I.

## 6.6.4 Potential impacts

### Construction

#### Noise

To assess construction noise impacts a number of construction scenarios have been used involving typical plant and equipment. The scenarios included site establishment, ancillary facilities construction and road construction including access.

Based on these construction scenarios construction noise was modelled assuming all

plant and equipment would be operating simultaneously. This provided conservative results that represent the worst case.

Noise level predications for representative sensitive receivers are provided in Table 6-19. A range of predicted noise levels are provided to represent the varying noise levels experienced as construction moves closer or further away from each representative receiver.

**Table 6-19: Construction noise predictions, standard construction hours**

Scenario	Sensitive receiver	Approximate offset distance over 10 month construction period (m)	Predicted noise level	L <sub>Aeq,15min</sub> dBA	
				NML	Exceedance of NML
Site establishment	A1	250 - 1600	32 - 62	40	0 - 22
	A2	270 - 1500	35 - 62	40	0 - 22
	S1 (or L1)	280 - 1800	29 - 62	41	0 - 21
	S2	830 - 1830	29 - 47	41	0 - 6
	L2	300 - 1650	32 - 60	40	0 - 20
	CA1	250 - 1970	29 - 62	40	0 - 22
	CA2	270 - 2280	23 - 62	40	0 - 22
	CA3	560 - 1840	19 - 42 <sup>4</sup>	40 (internal)	0 - 2
Ancillary facilities construction	A1	180 - 1750	20 - 53	40	0 - 13
	A2	275 - 1650	20 - 50	40	0 - 10
	S1 (or L1)	30 - 1970	17 - 72	41	0 - 31
	S2	670 - 2030	14 - 38	41	0
	L2	220 - 1630	20 - 52	40	0 - 12
	CA1	310 - 1960	17 - 48	40	0 - 8
	CA2	310 - 2430	11 - 48	40	0 - 8
	CA3	320 - 2000	4 - 37 <sup>4</sup>	40 (internal)	0
Road construction including access	A1	250 - 1600	26 - 56	40	0 - 16
	A2	270 - 1500	29 - 56	40	0 - 16
	S1 (or L1)	280 - 1800	23 - 56	41	0 - 15
	S2	830 - 1830	23 - 41	41	0
	L2	300 - 1650	26 - 54	40	0 - 14
	CA1	250 - 1970	23 - 56	40	0 - 16
	CA2	270 - 2280	17 - 56	40	0 - 16
	CA3	560 - 1840	13 - 36 <sup>4</sup>	40 (internal)	0

- Notes:
1. Standard hours are 7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturday.
  2. Locations S3 and L2 have not been assessed as they are vacant land.
  3. Number of properties likely above the management levels include the majority of Grong Grong.
  4. Assumes a 10 dB facade reduction for open windows.

As shown in Table 6-16, construction noise levels are anticipated to exceed construction noise management levels (NML) at the majority of assessed residential sensitive receivers for all construction scenarios. These exceedances are generally highest during site establishment and road construction scenarios, where NML exceedances within a catchment of 1.2 km and 800 m respectively are predicted at some stage of the 10 month construction period. The degree of exceedance would largely depend on the position of the works to sensitive receivers. Notwithstanding,

the calculated levels are expected to remain below the highly affected residential noise criterion of 75 dB(A) at all locations.

These levels are associated with proximity to the proposal and the relatively low existing daytime background noise levels. Construction activities are expected to move along the length of the proposal therefore it is anticipated that the duration of exposure at the reported noise levels at any one sensitive receiver would be in the order of several weeks. At other times, construction noise would be present at lower levels.

### *Vibration*

A review of potential structural vibration has been completed for residential sensitive receivers which are located at more than 200 metres from the proposal construction activities. Generally vibration impacts from the above activities would not impact human comfort levels. The vibration assessment identified that some unmitigated activities have the potential to exceed the structural vibration criteria at sensitive receivers, ie. buildings. These activities would include impulsive vibration from excavator buckets and/ or intermittent vibration from tracked equipment (eg excavators, dozers).

Construction activities associated with the proposal are anticipated to satisfy human comfort and structural vibration criteria.

### **Operation**

There is a considerable reduction in operational road traffic noise levels at sensitive receivers fronting the existing highway due to the new road being almost 700 metres further away from the existing road. The modelled results for 2016 are shown in Figure 6-12 (daytime) and Figure 6-13 (night-time) and the results for 2026 are shown in Figure 6-14 (daytime) and Figure 6-15 (night-time).

Future traffic levels and associated noise levels from the existing Newell Highway through the town of Grong Grong would be negligible once the proposal is operational.

The noise assessment found that the predicted noise levels associated with the proposal would comply with the NSW Road Noise Policy (DECCW, 2011) operational road traffic noise criteria at all representative sensitive receivers (refer to Table 6-20).

Some sensitive receivers further west, nearer to the proposal, would experience an increase in road traffic noise levels. An increase in road traffic noise levels is predicted at A1 and A2 of 1 dB(A) and 2 dB(A) respectively. A change in noise level of up to 2 dB(A) is typically indiscernible to the human ear and therefore unlikely to be noticed at either of these representative sensitive receivers.

The maximum noise and emergence level from heavy vehicles would improve considerably for the majority of sensitive receivers as a result of the proposal. Predicted maximum noise levels at all sensitive receivers are below the trigger of 65 dB(A)  $L_{max}$ . Maximum noise levels are predicted to increase marginally at one sensitive receiver (A2), however, levels remain below the trigger level of 65 dB(A).

The largest reductions would be experienced at representative sensitive receiver S2, with reductions of between 18 dB(A), adjacent to the existing 90 degree bend, and S1/L1 with reductions of 10-11 dB(A). These sensitive receivers adjacent to the existing highway would experience an increased separation distance from the highway of almost 700 metres compared to the existing highway alignment. This reduction would be experienced generally for the town of Grong Grong.

All other sensitive receivers to the east of the proposal within the study area are predicted to experience either a reduction in maximum noise levels and/ or levels



below the trigger of 65 dB(A).

With windows closed and assuming windows are typically of single glazing, noise levels are typically 20 dB(A) lower inside the dwelling compared to external levels. Hence, residences would experience internal noise levels of up to 44 dB(A)  $L_{max}$  from trucks using the proposal. This is below the maximum internal noise level associated with awakening reactions (ie 50-55dB(A)  $L_{max}$ ).

Based on this, it can be concluded that sleep disturbance is unlikely to occur if windows are kept closed. Similarly, with open windows the internal noise levels are predicted to be up to 54 dB(A)  $L_{max}$ , and therefore within the recommended range for awakening reactions (ie 50-55 dB(A)  $L_{max}$ ).

It should be noted that future traffic levels and associated noise levels from the existing Newell Highway alignment through the town of Grong Grong would be negligible once the proposal is operational.

**Table 6-20: Operational noise predictions, dB(A)**

Sensitive receiver	Year of opening 2016 'no build' scenario		Year of opening 2016 'build' scenario		Design year 2026 'no build' scenario		Design year 2026 'build' scenario		RNP criteria		Change in noise level <sup>3</sup>			
	Day <sup>4</sup>	Night <sup>4</sup>	Day	Night	Day	Night	Day	Night	Day	Night	Year opening		Design year	
											Day	Night	Day	Night
A1 <sup>1</sup>	48	45	48	46	49	46	49	47	55	50	0	1	0	1
A2 <sup>1</sup>	47	44	49	46	48	45	50	47	55	50	2	2	2	2
S1/L1 <sup>1</sup>	<b>58</b>	<b>56</b>	48	45	<b>59</b>	<b>57</b>	49	46	55	50	-10	-11	-10	-11
S2 <sup>1</sup>	<b>58</b>	<b>56</b>	40	38	<b>59</b>	<b>57</b>	41	39	55	50	-18	-18	-18	-18
L2 <sup>1, 5</sup>	50	48	47	45	51	49	48	46	55	50	-3	-3	-3	-3

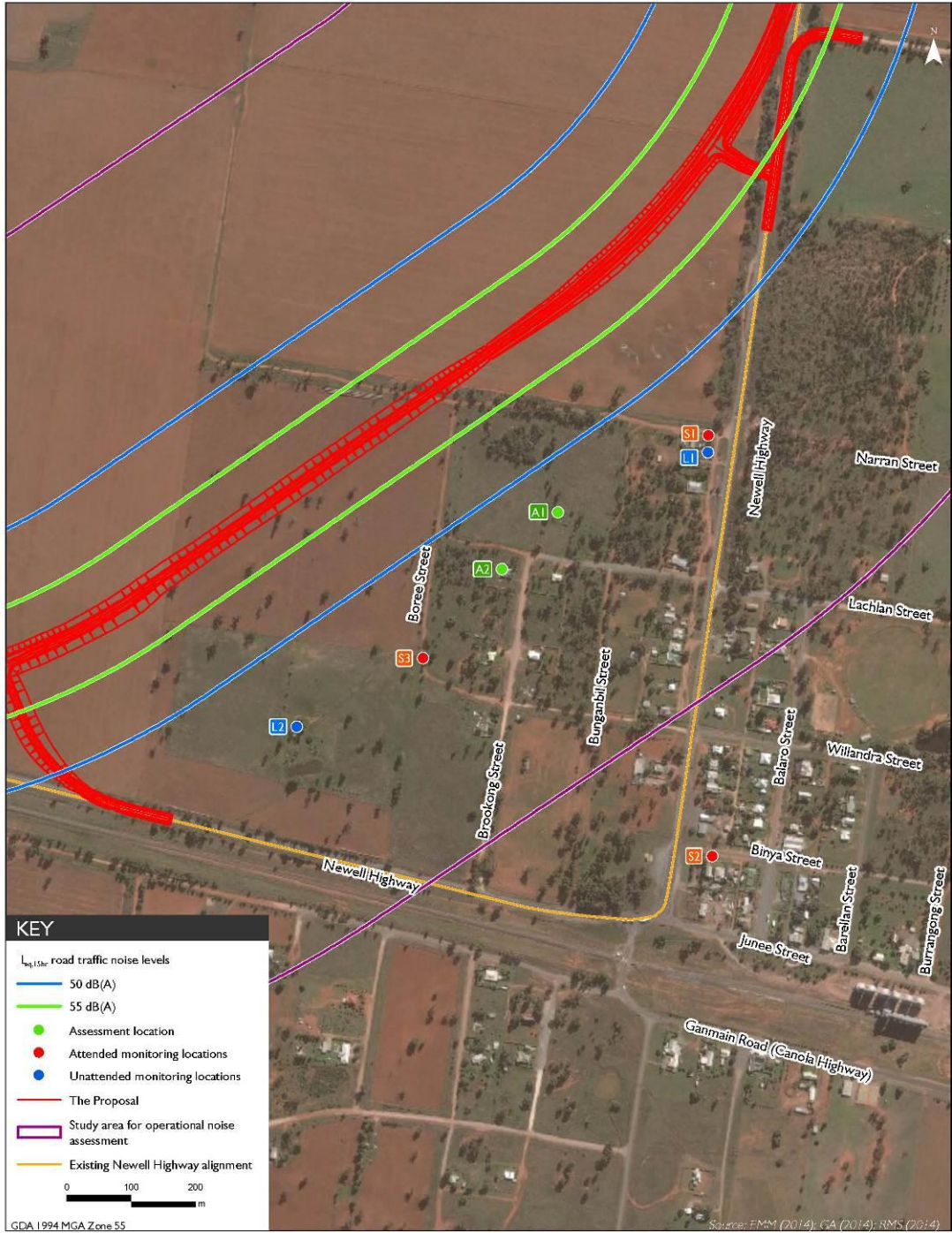
Notes: 1 Receiver ID: Black = meets RNP Criteria; Blue = exceeds RNP Criteria; Red = Acute level of noise.

2 Change in noise level between 'build' and 'no build' scenarios for year of opening and the design year.

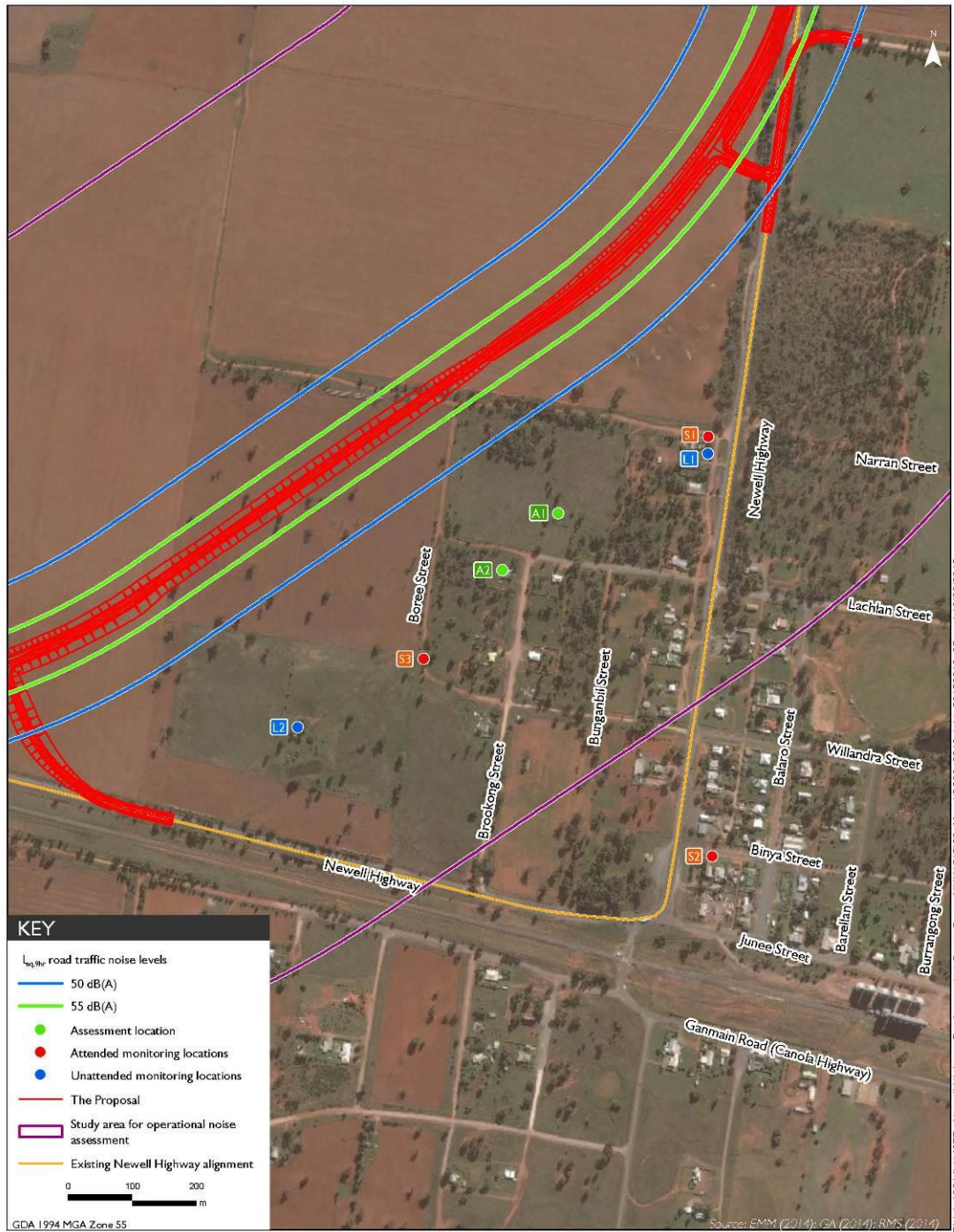
3 Change between 'no build' and 'build' options for the respective year (2016 or 2026) and period (day or night). Where either change in noise levels exceed 2dBA or predicted design year levels are acute consideration of additional mitigation is required.

4 Day = 7am – 10pm (15hrs); Night = 10pm – 7am (9hrs).

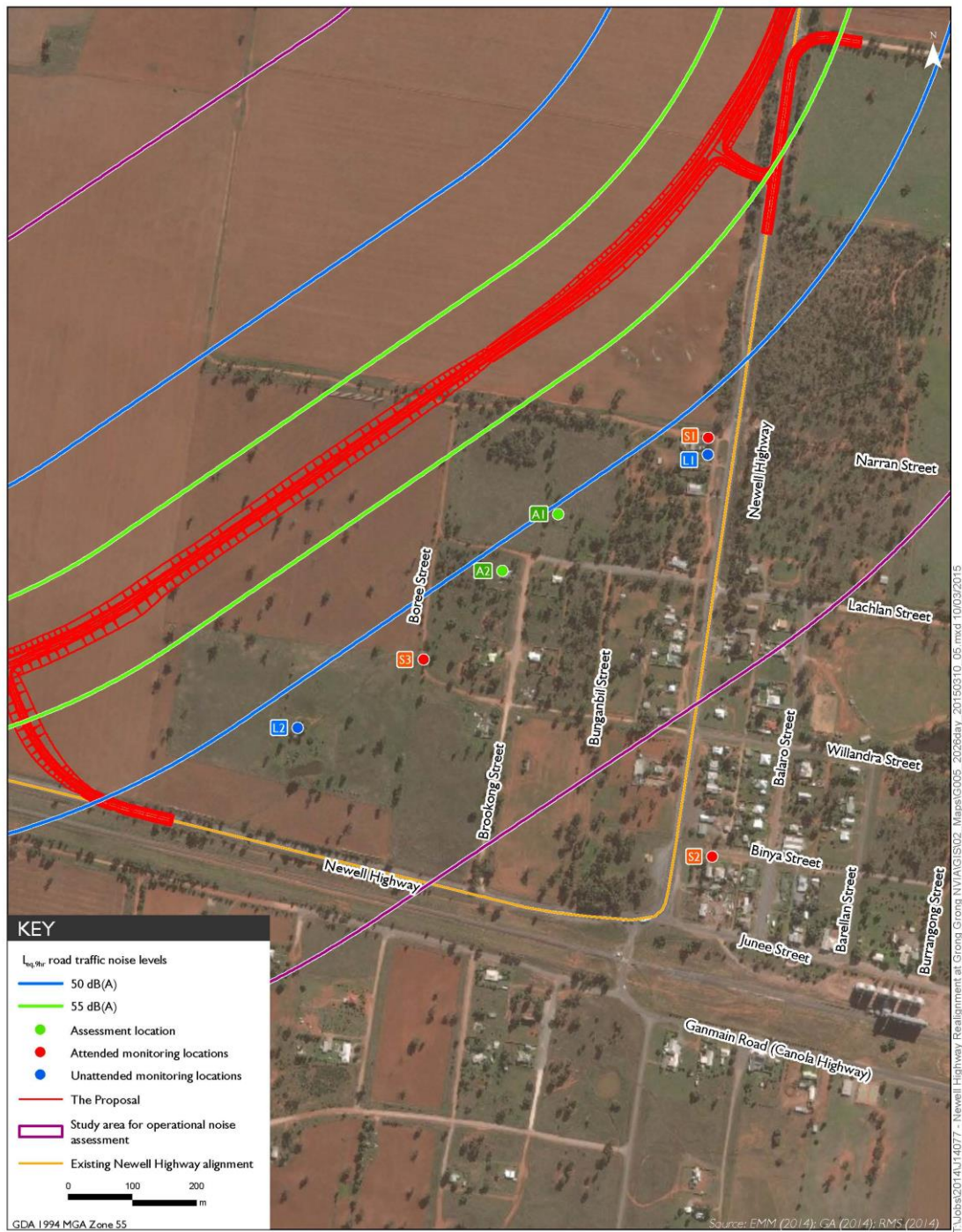
5. Structure identified however residential status is unknown.



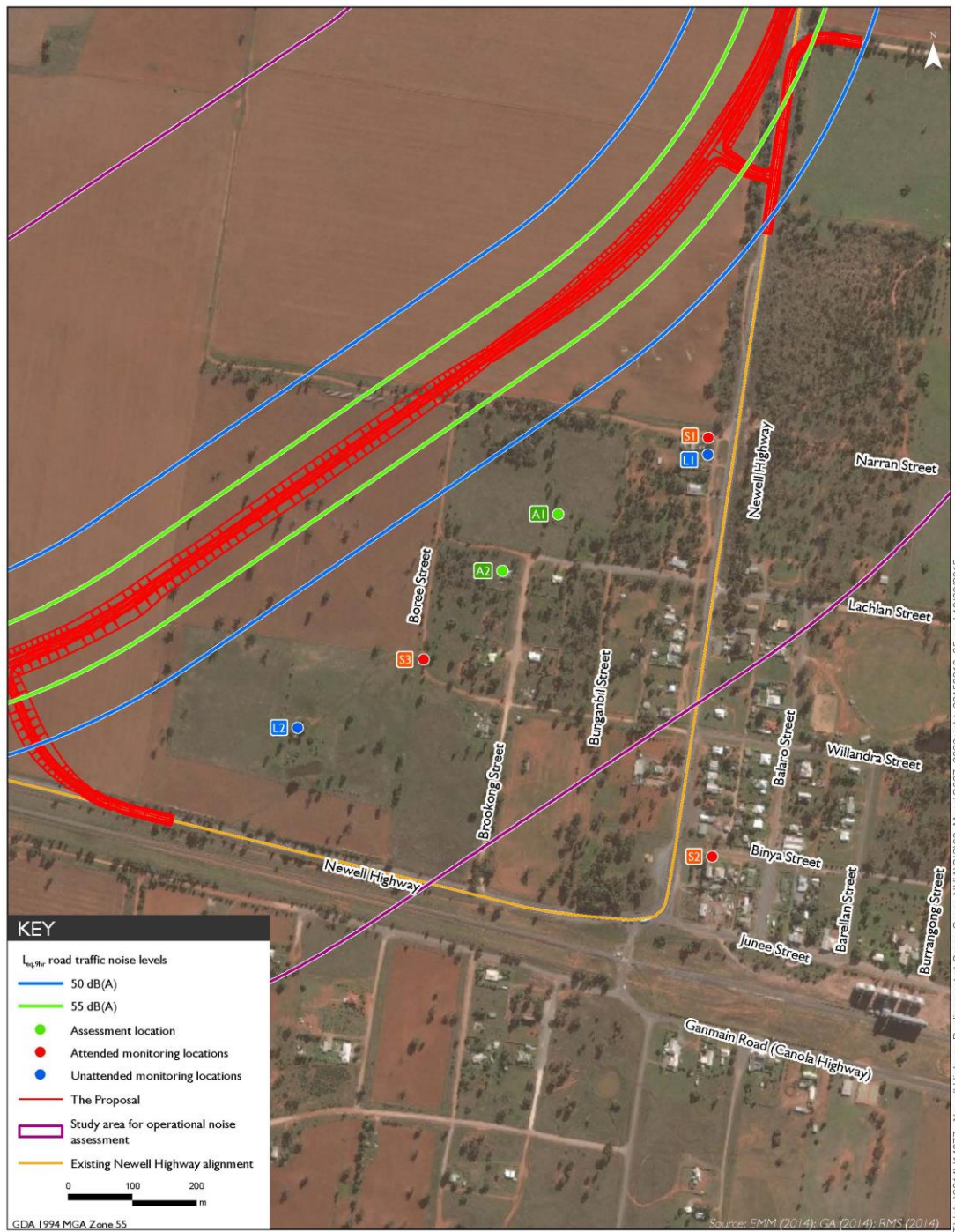
**Figure 6-12: Proposed 2016 Newell Highway Leq,15hr daytime traffic noise levels, dB(A)**



**Figure 6-13: Proposed 2016 Newell Highway  $L_{eq,9hr}$  night-time traffic noise levels, dB(A)**



**Figure 6-14: Proposed 2026 Newell Highway Leq,15hr daytime traffic noise levels, dB(A)**



**Figure 6-15: Proposed 2026 Newell Highway Leq,9hr night-time traffic noise levels, dB(A)**

### 6.6.5 Safeguards and management measures

No noise or vibration mitigation measures are required for the operation of the proposal.

Noise mitigation measures have been recommended for the construction activities to minimise the impacts at the sensitive receivers which exceed NMLs, outlined below. Adoption of these measures would generally result in good practices aimed at minimising noise emission as much as reasonably and feasibly practicable for the duration of construction activities.

Impact	Environmental safeguards	Responsibility	Timing
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Revise the noise and vibration assessment based on the final detailed design.</li> </ul>	Roads and Maritime Project Manager	Detailed design
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Prepare and implement a construction Noise and Vibration Management Plan (CNVMP) in accordance with Practice Note VI of the ENMM (RTA, 2001) and include as a minimum:               <ul style="list-style-type: none"> <li>- identification of nearby residences and sensitive land uses</li> <li>- description of approved hours of work and what work will be undertaken</li> <li>- description of what work practices will be applied to minimise noise</li> <li>- description of the complaints handling process</li> <li>- description of monitoring that is required</li> </ul> </li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Consult with residential noise sensitive receivers within 1.2 kilometres of the proposal prior to and during construction. This includes the majority of residential receivers within the town of Grong Grong, including those south of the rail line.</li> <li>• Implement a 24-hour hotline and complaints management procedure for noise and other construction related complaints.</li> <li>• Turn down radios when not in use and no yelling on site.</li> <li>• No slamming of doors.</li> <li>• Prohibit the use of air brakes and speed limit enforcement.</li> <li>• Drive all plant in a conservative manner (no over-revving).</li> <li>• Obtain site access via entry points most remote to noise sensitive receivers, where possible.</li> <li>• Do not permit plant to 'warm-up' before the nominated working hours.</li> <li>• Where possible, machinery is to be orientated to direct noise away from the closest noise sensitive receivers.</li> <li>• Undertake regular maintenance of machinery to minimise noise emissions. Maintenance would be completed away from noise sensitive receivers where possible.</li> </ul>	Contractor	Construction
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Select the quietest suitable machinery reasonably available for each work activity.</li> <li>• Maximise the offset distance between noisy items of plant/machinery and nearby noise sensitive receivers, where possible.</li> <li>• Where practicable, ensure the coincidence of noisy plant/machinery working simultaneously in close proximity to noise sensitive receivers is avoided.</li> </ul>	Contractor	Construction



Impact	Environmental safeguards	Responsibility	Timing
Construction vibration impacts on sensitive receivers	<ul style="list-style-type: none"> <li>Where construction activities involving impulsive vibration from excavator buckets or intermittent vibration from tracked equipment (eg. excavators, dozers) are undertaken close to sensitive receivers, an offset distance of at least five metres from buildings will be maintained to comply with the structural vibration criteria.</li> </ul>	Contractor	Construction

## 6.7 Soils and water

### 6.7.1 Existing environment

#### Soils

The OEH Landscapes of the Narrandera 1:100,000 map sheet identifies two soil types within and surrounding the proposal. These include:

- Red Chromosol soils. These soils are found in well-drained sites with rainfall between 350mm and 1400mm and have moderate agricultural potential with moderate chemical fertility and water-holding capacity.
- Red Podzolic soils. These soils occupy some 20 per cent of NSW and are used for grazing, cropping and vineyards.

The area within 200 metres of the construction footprint comprises mostly of sandy clay loam soils on alluvial plains. North of Narran Street the slope rises and soil comprises more of a clay loam, which is consistent with adjacent foot slopes and hill slopes.

#### Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring soils and sediments that contain iron sulphides. ASS are unlikely to occur within a 10 kilometre radius of the proposal construction footprint.

#### Contamination

A search of the EPA's Contamination Register undertaken on 2 February 2015 found no listed contaminated sites in the Narrandera LGA.

#### Topography

The regional topography near the proposal comprises of mostly flat alluvial plains. There is a gentle rise to the north of the proposal, peaking around chainage 22500. To the east of the proposal, Cowabbie Creek runs from north to south where it feeds into Bundidgerry Creek and the Murrumbidgee River, both located south of the proposal. The elevation of these flat alluvial areas ranges from 155 metres to 172 metres, with the lowest point of the proposed alignment at 166.5 metres and the highest point at 184 metres, south of the north access. About eight kilometres to the west of the proposal is Bogolong Hills with a maximum elevation of 297 metres.

#### Geology

The proposal comprises Ordovician sediments, Early Devonian sediments and

volcanics, 'Middle Devonian volcanics and Late Devonian clastic sediments and Silurian and Devonian granites.

The majority of the construction footprint consists of late Ordovician sediments largely obscured by residual and colluvial deposits. The area further north where the proposed north ancillary facility would be located comprises of Ardlethan Granite largely obscured by residual and Colluvial deposits.

### **Hydrology**

The nearest waterway to the proposal is Cowabbie Creek, located about 1.5 kilometres east of Grong Grong, and Bundidgerry Creek which is located about five kilometres south of Grong Grong. Soil hydrology at the proposal is slowly permeable and imperfectly drained. Run on and run off is low.

### **Catchment**

The proposal forms part of the Murrumbidgee Catchment which occupies an area of 84,000 square kilometres, extending west from Cooma to Balranald and south from Temora to Henty. It is centred around the Murrumbidgee River which is around 1,600 kilometres in length, from its source in the Kosciuszko National Park to its junction with the Murray River south west of Balranald.

Land use in the Murrumbidgee catchment is dominated by extensive agriculture. The largest industry is grazing which occupies 64 per cent of the catchment. Much of the remainder is used for dryland cropping and horticulture. Irrigated crops are economically very important for the catchment and cover five per cent of the land use (NSW Office of Water, 2011).

### **Water quality**

Current water quality of Cowabbie Creek, Bundidgerry Creek and the Murrumbidgee River is affected by agricultural runoff, which may contain fertilisers, farm chemicals and stock manure.

There are no specific water quality treatments on the existing Newell Highway at Grong Grong. Water from the pavement surface drains into an open drain adjacent to the highway which then flows towards the creeks and river system to the south of Grong Grong.

No registered groundwater bores are located in the construction footprint. Three registered bores are located within one kilometre to the east of the proposal. One of the bores is located on the '*Barraclear*' property and is known to be around 500 feet deep and was installed for a proposed barramundi farm (pers. comm. 6 Feb 2015).

The water sourced for *Barraclear* is from a bore adjacent to Bundidgerry Creek to the South of the proposal. The bore water is pumped to tanks and circulated to the farm from there. The properties have around 30 dams; most of these are empty or nearly empty; two currently have enough water to be used for stock.

There is no irrigation agriculture in the study area. Groundwater would not therefore be used for irrigation.

## **6.7.2 Potential impacts**

### **Construction**

Construction of the proposal would require the disturbance of the soil surface and subsurface, with a greater level of disturbance to soils and the underlying geology where the major cut area is proposed. The major cut is around 940 metres long from

chainage 22140 to chainage 23080. The maximum width of the cut would be about 40 metres at chainage 22415. The cut would be up to 4.5 metres deep at its deepest location.

The stockpiling of spoil and topsoil would pose a risk for erosion and sedimentation during construction of the proposal. Soil loss could occur due to the effects of wind or water.

Construction activities have the potential to cause soil contamination from accidental spills of fuels, oils and other hazardous materials such as bitumen. Some fuel and chemicals would be stored at the proposed ancillary facilities and used on site. During works, construction plant and equipment would require refuelling, and there is some potential for spills to occur on site, particularly if bulk refuelling tankers are present. In addition to the standard storage and handling practices for chemicals, several additional mitigation measures are proposed to avoid impact on soil and water quality from the proposal.

The proposed north ancillary site (refer Figure 1-1) is located on a small rocky ridge with some granite outcrops and loamy sandy soils. These large rocks may be removed to accommodate the north ancillary facility, but are likely to be avoided and therefore no removal would be necessary. Removal of the rocks would require deep excavation works, increasing the potential for erosion and sedimentation at this area.

Water extraction may be required from Bundidgerry Creek for the purpose of dust suppression and construction work. The Department of Primary Industries (DPI), Fisheries Division and Office of Water Division (NOW) were consulted about the proposed water extraction works. NOW replied stating Roads and Maritime do not require an access license, however may require a Works Approval to carry out dust suppression and road works. Roads and Maritime would consult with NOW regarding the Works Approval when construction works commence. No response has been received from Fisheries to date.

To safely access the extraction point along Bundidgerry Creek, some vegetation removal would be required to upgrade the existing access track. This would impact on less than 0.2 hectares of River Red Gum (*Eucalyptus camaldulensis*) vegetation. No trees would be removed. Refer to Photo 12 of Appendix A for a site photo of the proposed extraction point. Figure 3-7 shows a map of the water extraction point for the proposal. With the implementation of safeguards in section 6.1.3 the extraction of water from Bundidgerry Creek would not impact on creek flows or water quality.

A maximum of around 6ML would be required to be extracted from Bundidgerry Creek during the construction period.

Impacts to groundwater as a result of the proposal may result from the construction of the cutting, which would be up to 4.5 metres deep. However, given the depth to known groundwater resources in this location impacts to groundwater quality and hydrology would likely be negligible.

## **Operation**

### *Erosion and sedimentation*

The proposal would result in a larger surface area of pavement, which would increase runoff from hard surfaces. Without maintenance increased runoff may result in soil mobilisation and subsequent movement of sediment laden water into drainage channels, which could reduce water quality and block stormwater drainage structures.

### Contamination

The proposal would reduce the likelihood of crashes on the Newell Highway at Grong Grong by avoiding the 90 degree bend in the current highway alignment. Compared to the current alignment, this would reduce the potential for operational soil and groundwater contamination and would marginally improve water quality by decreasing spills of fuels and hazardous substances.

### 6.7.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Soils and water quality – erosion and sedimentation	<ul style="list-style-type: none"> <li>• Prepare and implement a Soil and Water Management Plan (SWMP) and site specific erosion and sediment control plans (ESCPs) as part of the CEMP.</li> <li>• Prepare and implement SWMP and ESCPs in accordance with Managing Urban Stormwater - Soils and Construction, Volume 2D (Landcom 2004).</li> <li>• Erosion and sediment control measures adopted will be designed to achieve short and long term stability of embankments and cuttings and other disturbed areas.</li> <li>• Erosion and sediment controls will be maintained on a regular basis during construction and until the works are complete and disturbed areas are revegetated.</li> <li>• Disturbed areas will be stabilised progressively during the works.</li> <li>• The maintenance of established stockpile sites during construction will be in accordance with the <i>Stockpile Site Management Guideline</i>, (RTA, 2011a).</li> </ul>	Contractor	Pre-construction  Construction

Impact	Environmental safeguards	Responsibility	Timing
Water quality	<ul style="list-style-type: none"> <li>• Refuelling of plant and equipment will occur in impervious bunded areas away from waterway and drainage lines.</li> <li>• Emergency spill kits for the management of accidental dry and wet chemical spills will be made available at the compound area. All personnel shall be made aware of their availability and trained in their use.</li> <li>• Vehicle wash down is to occur in a designated bunded area.</li> <li>• All staff shall be appropriately trained in the minimisation and management of accidental spills.</li> <li>• Roads and Maritime's Environmental Incident Classification and Management Procedure will be followed in the event an accidental spill occurs.</li> <li>• The Roads and Maritime Project Manager must be notified of the spill immediately after the person becomes aware of the spill.</li> </ul>	Contractor	Pre-construction  Construction
Water Extraction	<ul style="list-style-type: none"> <li>• Roads and Maritime would carry out further consultation about potential water extraction at Bundidgerry Creek with NOW prior to the commencement of construction. A Works Approval licence would be obtained where necessary.</li> <li>• If water is extracted from Bundidgerry Creek, minimise scour and creek instability at the extraction point at Bundidgerry Creek through minimising clearing and amount of bank disturbance, in accordance with the <i>Biodiversity Guidelines - Guides 4 and 10</i> (RTA, 2011). Water extraction methods used will minimise impacts to aquatic ecology, surrounding land uses and the visual amenity of the area.</li> </ul>	Roads and Maritime Project Manager	Pre-construction

## 6.8 Aboriginal Heritage

### 6.8.1 Methodology

Roads and Maritime recognises that the development and delivery of its projects has the potential to impact Aboriginal cultural heritage. As a result, Roads and Maritime have developed a Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime, 2012). There are four stages of investigations for investigating potential impacts to Aboriginal cultural heritage.

An initial review of the proposal was undertaken by the Roads and Maritime's Aboriginal Cultural Heritage Advisor including a search of the AHIMS database. Roads and Maritime and Narrandera LALC undertook a site survey with Roads and

Maritime, which was conducted in February 2009. A site survey report was prepared by the Narrandera Local Aboriginal Land Council (LALC) in 2009. This involved undertaking a survey with Aboriginal stakeholders to assess if the proposal would potentially harm Aboriginal cultural heritage. No further action was required. Refer to Appendix E for the report.

An updated search of the AHIMS database was requested on the 20 November 2014 with the search area focusing on a 200 metre radius of the construction footprint area (Refer to Figure 1-1 for a map of the construction footprint) (Appendix G). Roads and Maritime reviewed the findings of the Stage 1 assessment and the updated AHIMS search.

### 6.8.2 Existing environment

The proposal is located within the Wiradjuri Aboriginal Land Council Region and the Narrandera Local Aboriginal Land Council (LALC) area.

The first inhabitants of the area now known as Narrandera are the Wiradjuri people. The name "Narrandera" is said to be derived from the Wiradjuri word "Narrungdera" which means "place of lizard or goanna" (Narrandera Shire Council website, accessed 3 December 2014). The small farming town of Grong Grong was established as a cattle station in 1832. The town's name is reportedly an Aboriginal term meaning "bad camping ground" or "very bad camping ground" (Narrandera Shire Council website, accessed 3 December 2014).

The proposal is located in a highly disturbed area as a result of agricultural practices, residential development and road construction. Areas of least disturbance are located within the road reserve of the Newell Highway. During a site visit by NGH ecologists on 19 May 2014, all large native trees to be potentially impacted by the proposal were inspected for signs of scars. Particular attention was focused at the tie-in areas within the road reserve near the existing Newell Highway. No potential scar trees were noted within the study area at the time of the site inspection.

The AHIMS searches did not identify any recorded Aboriginal heritage (Appendix G). Similarly, the site survey found no items of cultural significance (Appendix E).

### 6.8.3 Potential impacts

It is unlikely that any items of Aboriginal cultural heritage would be present within the construction footprint given previous disturbances through farming and agricultural activities. Disturbances from the proposal would generally be confined to existing disturbed areas within the paddock area and at the designated tie in areas during construction.

Roads and Maritime's Aboriginal Cultural Heritage Advisor (South West) assessed the proposal as being unlikely to have an impact on Aboriginal cultural heritage. The assessment was based on the AHIMS searches, site visit and assessment by the Narrandera LALC (Appendix E).

#### 6.8.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Discovery of unexpected items of Aboriginal cultural significance	<ul style="list-style-type: none"> <li>Follow the <i>Standard Management Procedure: Unexpected Archaeological Finds</i> (RMS, 2012) in the event that construction related disturbance results in the discovery of Aboriginal objects or suspected human remains.</li> <li>The site induction for the proposal must include an overview of the procedure for unexpected archaeological finds.</li> </ul>	Roads and Maritime Project Manager  Contractor	Construction

### 6.9 Non-Aboriginal Heritage

#### 6.9.1 Existing environment

European settlers first moved to the area of Grong Grong in 1832, running cattle on what was known as Berrembed Station. Sheep and dairy farming were the main agricultural activities in the area. The discovery of gold at Lake Boree and Cowabbie nearby further increased the number of settlers in the area. Following the change of the Land Act in the late 1870s, population increased and the town of Grong Grong was established. In 1881 the line rail line was extended through the town. By 1921 680 people lived in the town.

The area has a long history of cattle grazing and farming practices, with much of the land cleared. A number of historical buildings and infrastructure remain in the town of Grong Grong.

A search of the Narrandera Local Environmental Plan 2013 (LEP), the NSW Heritage Register and the Australian Heritage Database was undertaken on 15 May 2014 to determine the location of any nearby listed heritage items. Search results are provided in Appendix G. There are 10 items of local environmental heritage significance within the suburb of Grong Grong that are listed on the LEP; however, no known items of heritage significance are located within the proposal construction footprint (refer to Figure 1-1 for a map of the construction footprint area). Items include infrastructure associated with the Berrembed Canal Bridge and Weir, the Police Station, residences, churches, school, Royal Hotel, residences and the railway platform.

#### 6.9.2 Potential impacts

There are no known heritage items located within the study area. No items of heritage significance were identified during the site visit. Therefore, there is unlikely to be any impact to non-Aboriginal heritage as a result of the proposal.

### 6.9.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Discovery of unexpected items of Non-Aboriginal cultural significance	<ul style="list-style-type: none"> <li>Follow the <i>Standard Management Procedure – Unexpected Archaeological Finds</i> (RMS, 2012) in the event that unexpected heritage/archaeological finds are encountered during construction of the proposal.</li> <li>The site induction for the proposal must include an overview of the procedure for unexpected archaeological finds.</li> </ul>	Roads and Maritime Project Manager  Contractor	Construction

## 6.10 Air Quality

### 6.10.1 Existing environment

The existing air quality at and around Grong Grong is typical of a rural area and is generally considered to be good. Air quality varies each season due to the dry nature of the area and the agricultural land use.

Sporadic dust storms during droughts or towards the end of summer when high wind conditions are prevalent would temporarily decrease air quality within the region. Emissions from vehicles and dwellings would be low due to the low density of housing and industry in Grong Grong.

Based upon annual wind data obtained from the Bureau of Meteorology website for the Narrandera Airport, located about 25 kilometres west of Grong Grong, the average wind direction from the past five years is predominately north-west, with an average wind speed of 12.2km/h.

During winter periods the average rainfall is between 38 – 40mm with a mean number of between six and nine rain days. Average temperatures during winter periods include a minimum of 3.1°C and a maximum of 15°C. During summer periods the average rainfall is between 36 – 40mm with a mean number of about four rain days. Average temperatures during summer periods include a minimum of 17°C and a maximum of 32.6°C. Average rainfall is similar for both winter and summer periods, however, rainfall is heavier during summer periods. This would improve air quality during sporadic dust storms in summer via natural dust suppression.

### 6.10.2 Potential impacts

#### Construction

The town of Grong Grong would be mostly downwind from the proposal given the region's predominant winds are north-westerly. Being downwind would increase the likelihood of the town experiencing lower air quality conditions as a result of construction.

The proposal would generate localised dust and fuel emissions from vehicles and



construction equipment, which would reduce local air quality during construction.

Construction activities that would generate dust include earthworks, stockpiling of materials, transporting materials and vegetation removal. Exhaust fumes from vehicle movements and construction equipment would similarly cause minimal impact to air quality.

With the implementation of standard safeguards and management measures, dust generated from these construction activities would be minimal and short term.

Overall, any reduction in air quality would be highly localised, short in duration and would not cause undue impact on the public or on the surrounding environment.

### Operation

While traffic on the Newell Highway is expected to increase over the next 20 years, the proposal itself would not generate additional traffic.

The realignment may result in more efficient travel times and uniform highway travel speed, leading to reduced fuel consumption (30,000L of petrol and 106,000L of diesel in the first year of operation) and hence lower vehicle emissions.

Air quality would improve marginally within the town of Grong Grong as the Newell Highway would bypass the town, reducing traffic movements through the town centre.

### 6.10.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
General air quality impacts	<ul style="list-style-type: none"> <li>Construction activities will be managed to minimise dust and fuel emissions.</li> </ul>	Roads and Maritime Project Manager  Contractor	Construction
Vehicle and other equipment emissions	<ul style="list-style-type: none"> <li>Plant and machinery will be maintained in accordance with manufacturer's specifications.</li> <li>Vehicles will not be left running when idle.</li> <li>Vehicles transporting waste or other materials that may produce dust are to be covered during transportation.</li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Dust	<ul style="list-style-type: none"> <li>• Dust minimisation measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution from disturbed areas, if required, and especially during hot and windy conditions.</li> <li>• Visual surveillance for visible dust generation will occur at all times. Works must cease when high levels of air-borne dust cannot be controlled.</li> <li>• Clearing of natural vegetation will be minimised where practicable.</li> <li>• Vegetation or other materials are not to be burnt on site.</li> <li>• Disturbed areas will be stabilised progressively during the works.</li> <li>• Stockpiles or areas that may generate dust are to be managed to suppress dust emissions in accordance with the <i>Stockpile Site Management Guideline</i> (Roads and Maritime, 2011b).</li> </ul>	Contractor	Construction

## 6.11 Waste Minimisation and Management

### 6.11.1 Policy Setting

#### Roads and Maritime Policies

The policies *Towards a more sustainable RTA* (RTA, 2010) and the *Waste Reduction and Purchasing Plan* (RTA, 2010b) commit Roads and Maritime to reduce the impact of its activities through the adoption of the waste hierarchy principles of waste avoidance, resource recovery, recycling and disposal which are consistent with the *NSW Waste Avoidance and Resource Recovery Act 2001* (WARR Act).

#### Waste Classification

In NSW all wastes are classified in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA, 2008). This guideline groups waste that would have similar risks to the environment and human health. There are six classes of waste:

1. Special waste.
2. Liquid waste.
3. Hazardous waste.
4. Restricted solid waste.
5. General solid waste (putrescible).
6. General solid waste (non-putrescible).

#### Resource recovery exemptions

Resource recovery exemptions are granted by the NSW Environmental Protection

Authority (EPA) where the land application or use of a waste material is a bona-fide fit for purpose, reuse opportunity that causes no harm to the environment or human health, rather than a means of waste disposal. An exemption facilitates the use of these waste materials outside of certain requirements of the waste regulatory framework. The following general resource recovery exemptions have been issued by the EPA and are of most relevance to road construction activities:

- Excavated natural material.
- Excavated public road material.
- Raw mulch.
- Reclaimed asphalt pavement.
- Recovered aggregate.

The utilisation of the above exemptions would aid the reuse of project wastes particularly excavated soils.

### 6.11.2 Potential impacts

#### **Construction**

The main waste materials likely to be generated as a result of construction activities include:

- Plant and vehicle maintenance.
- Excavation and earthworks.
- Vegetation removal.
- Pavement and bitumen material.
- General site office activities.
- Surplus construction material
- Packaging material from general construction and site office deliveries.

Potential waste materials likely to be generated as a result of construction of the proposal and their classification in accordance with the "Waste Classification Guideline" are detailed in Table 6-21.

Table 6-21: Potential type and sources of waste generated during construction of the proposal

Waste type (as per waste classification guidelines)	Waste material	Source activity
Liquid Waste	Fuel	Plant and vehicle maintenance
	Oil	
Hazardous Waste	Paints	General construction activities
	Solvents	
General Solid Waste (putrescible)	Food waste	General office activities
General Solid Waste (non-putrescible)	Pavement	Demolition
	Pipes (plastic, concrete and metal)	
	Fibrous material	
	Pavement	
	Spoil material	Excavation
	Rock	
	Fencing material	Surplus construction material
	Sediment	
	Concrete	
	Reclaimed asphalt	
	Sand bags	
	Scrap metal	
	Pallets	Packaging materials
	Crates	
	Cartons	
	Plastics	
	Wrapping materials	
	Vegetation	Green waste
	Noxious weeds	
	Chemical containers	Plant and vehicle maintenance
Paper	General office activities	
Cardboard		
Beverage containers		

## Operation

During the operational phase of the proposal, wastes would originate from routine maintenance and repair activities that are required over time. The nature and extent of maintenance and repair activities would be dictated by the types and volumes of waste generated. Waste is also expected to be generated from road users along the new alignment. Types of wastes generated throughout the operational phase of the proposal would include:

- General solid waste (non-putrescible), including:
  - Green wastes from vegetation trimming of landscaped areas along the new alignment and access areas.
  - Road waste including asphalt, aggregates and concrete from routine maintenance and repair activities.
  - Roadside litter
  - Silt and soil from cleaning the culverts and drainage structures along the new alignment.
- Liquid waste such as fuel and oils from routine maintenance activities.

These impacts would be minimised and appropriately managed through standard

safeguards and management measures as outlined in section 6.11.3.

### 6.11.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Management of waste	<ul style="list-style-type: none"> <li>• Manage and dispose of waste in accordance with applicable legislation and government policies, including:               <ul style="list-style-type: none"> <li>○ <i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act).</li> <li>○ <i>Waste Avoidance and Resource Recovery Strategy 2007</i> (DECC, 2007).</li> <li>○ <i>Waste Reduction and Purchasing Policy</i> (WRAPP) (RTA, 2010b).</li> <li>○ Compliance with relevant EPA resource recovery exemptions.</li> </ul> </li> <li>• Use recycled products in construction to reduce the demand on resources, in instances where the use of such material is cost and performance competitive (for example, where quality control specifications allow).</li> </ul>	Contractor	Pre-construction  Construction

## 6.12 Cumulative Impacts

There are currently no known plans for other developments in Grong Grong. As a result cumulative impacts from multiple project sources are not expected to arise. Synergistic (compounding) impacts have been assessed throughout chapter 6 of the REF.

## 6.13 Summary of beneficial effects

Beneficial outcomes resulting from the proposal would include:

- Improved freight productivity by providing a more efficient route and enabling access for HPVs at Grong Grong. The proposal would reduce the highway travel distance by 810 metres and travel time by more than 1¼ minutes.
- Improved cost efficiency for the transport industry by extending HPV access on the Newell Highway. The equivalent of 160 vehicles could be taken off the road, improving cost efficiency by 22 per cent (Infrastructure NSW, 2014).
- Improved road safety by reducing the risk of incidents between local and highway traffic.
- Reduced traffic volumes travelling through Grong Grong, which would reduce traffic noise and air pollution and improve general amenity.
- Reduced road traffic noise, particularly for sensitive receivers adjacent to the 90 degree turn. Noise levels are predicted to reduce by 8-18 dB(A) for S1/L1 and 17-28 dB(A) for S2, along the existing alignment. Operational noise levels are predicted to comply with the NSW Road Noise Policy (DECCW, 201) operational criteria at all representative sensitive receivers.
- More efficient travel times and consistent highway travel speed with additional benefits of reduced fuel consumption and carbon emissions.

## 6.14 Summary of adverse effects

The proposal would generate some short term adverse environmental and social impacts. This would include:

- Generation of dust and increased traffic during construction.
- Construction noise levels exceeding the NSW *Interim Construction Noise Guideline* (DECC, 2009) noise management levels at the majority of assessed residential sensitive receivers. The construction noise would be below the *highly noise-affected level* and would vary as work is carried out at different locations.

In the longer term, the proposal would result in some adverse social impacts that would require management including:

- Loss of some passing trade for three local businesses including the motel, general store and hotel due to the highway bypassing Grong Grong. Potential for associated cumulative impacts on the town's identity, unique character and sense of place.

Long term adverse impacts of the proposal on the physical environment include:

- Permanent acquisition of between 15.7 hectares and 32.7 hectares of land (mostly agricultural land) resulting in the loss of land available for agricultural use.
- Clearing of 4.3 hectares of Inland Grey Box Woodland, which is listed as an

endangered ecological community (EEC) under the TSC Act. Around 3.2 hectares of this area also meets the definition of the EEC listed under EPBC Act.

- Removal of up to eight hollow bearing trees which support nesting and roosting habitat for a variety of hollow dependent fauna.
- Changes to access between the Newell Highway and the town, requiring additional movements for highway traffic to access Grong Grong.
- Alteration to property access for acquired properties including changes to farming practices such as sheep movements across the highway.
- Impacts on the landscape character and visual amenity of the area as a result of clearing of woodland vegetation and because the new section of highway would be visible from some residences. The outlook would change from a mainly rural/agricultural area to a rural highway.

Impacts have been avoided or managed to an extent through selection of the preferred option and development of the concept design. For example, access between the highway and Grong Grong would be provided in the north and in the west. This dual access arrangement would provide through access to enable motorists to easily call into Grong Grong and return to the highway without the need to back track.

A number of safeguards and management measures have been identified in sections 6.1 to 6.11 to adequately address, manage and minimise potential adverse environmental impacts associated with the proposal. These management measures would be incorporated into the detailed design and applied during the pre-construction, construction and operation of the proposal.

## 7 Environmental management

---

### 7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. These plans will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared before construction of the proposal and must be reviewed and certified by the Roads and Maritime Environment Officer, South West Region, before the commencement of any on-site works. The CEMP is a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP will be developed in accordance with the specifications set out in *QA Specification G36 – Environmental Protection (Management System)*, *QA Specification G38 – Soil and Water Management (Soil and Water Plan)* and *QA Specification G40 – Clearing and Grubbing*.

### 7.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposal on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.



**Table 7-1: Summary of site specific environmental safeguards.**

<b>Impact</b>	<b>Environmental safeguards</b>	<b>Responsibility</b>	<b>Timing</b>
General	<ul style="list-style-type: none"> <li>• All environmental safeguards must be incorporated within the following:               <ul style="list-style-type: none"> <li>○ Detailed design stage</li> <li>○ Contract specifications for the proposal</li> <li>○ Contractor’s Environmental Management Plan</li> </ul> </li> </ul>	Roads and Maritime Project Manager	Pre-construction
General	<ul style="list-style-type: none"> <li>• A risk assessment must be carried out on the proposal in accordance with the Roads and Maritime Project Pack and PMS risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented.</li> <li>• A review of the risk assessment must be undertaken after the initial audit or inspection to evaluate if the level of risk chosen for the project is appropriate.</li> <li>• Any work resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration</li> </ul>	Roads and Maritime Project Manager and regional environment staff	Pre-construction After first audit
General	<ul style="list-style-type: none"> <li>• The environmental contract specification G36 must be forwarded to the Roads and Maritime Environment Officer South West Region for review at least 10 working days before the tender stage.</li> <li>• A contractual hold point must be maintained until the CEMP is reviewed by the Roads and Maritime Environment Officer South West Region].</li> </ul>	Roads and Maritime Project manager	Pre-construction
General	<ul style="list-style-type: none"> <li>• The Roads and Maritime Project Manager must notify the Roads and Maritime Environmental Officer South West Region at least five working days before work commences.</li> </ul>	Roads and Maritime Project manager	Pre-construction
General	<ul style="list-style-type: none"> <li>• All businesses and residents likely to be affected by the proposal must be notified at least five working days before the commencement of the proposed activities.</li> </ul>	Roads and Maritime Project manager	Pre-construction
General	<ul style="list-style-type: none"> <li>• Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors.</li> </ul>	Contractor	Pre-construction and during construction as required.

Impact	Environmental safeguards	Responsibility	Timing
Pre-clearing	<ul style="list-style-type: none"> <li>• If unexpected threatened fauna or flora species are discovered, works will stop immediately and the <i>Roads and Maritime Unexpected Threatened Species Find Procedure</i> in the <i>Biodiversity Guidelines– Guide 1 (Pre-clearing process)</i> will be followed.</li> <li>• The extent of the construction footprint would be clearly marked and the movement of vehicles and plant outside of these areas would be avoided. Any trees and native vegetation to be retained on-site will be protected and managed through the use of clearly marked exclusion zones. Exclusion zones will be implemented in accordance with the <i>Biodiversity Guidelines– Guide 2 (Exclusion zones)</i> (RTA, 2011).</li> <li>• Prior to any vegetation clearing the pre-clearance process outlined in <i>Biodiversity Guidelines – Guide 1 (Pre-clearing process)</i> (RTA, 2011) will be implemented.</li> </ul>	Contractor	Pre-Construction
Clearing of native vegetation	<ul style="list-style-type: none"> <li>• Undertake vegetation clearance in accordance with <i>Biodiversity Guidelines– Guide 4 (Clearing of vegetation and removal of bushrock)</i> (RTA, 2011).</li> <li>• Restrict vegetation clearing to those areas where it is necessary.</li> <li>• Trees will be removed in such a way as not to cause damage to surrounding vegetation. This will ensure groundcover disturbance will be kept to a minimum.</li> <li>• Utilise areas already impacted by previous clearing or disturbance and minimise clearing where feasible. Trimming will be preferred over removal where feasible.</li> <li>• Hollow bearing tree removal is to be undertaken in a two stage clearing process as stated in the <i>Biodiversity Guidelines – Guide 4 (Clearing of vegetation and removal of bush rock)</i> (RTA, 2011). Large trunks and logs would be placed into adjacent habitat.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Fauna and habitat impacts	<ul style="list-style-type: none"> <li>• Fauna handling must be carried out in accordance with the requirements the <i>Biodiversity Guidelines - Guide 9 (Fauna Handling)</i> (RTA, 2011).</li> <li>• Details of the local veterinary and/or wildlife carer (WIRES) would be available onsite.</li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Weed spread and establishment	<ul style="list-style-type: none"> <li>Weeds will be managed in accordance with the <i>Biodiversity Guidelines – Guide 6 (Weed Management)</i> (RTA, 2011). Priority will be given to the control of noxious weeds such as African Boxthorn (<i>Lycium ferocissimum</i>).</li> <li>Machinery will be cleaned prior to coming to site to ensure that weed seeds and propagules are not imported.</li> </ul>	Contractor	Construction
Disturbance to fallen timber, dead wood and bush rock	<ul style="list-style-type: none"> <li>Re-use coarse woody debris on-site in accordance with the management requirements of the <i>Biodiversity Guidelines - Guide 5 (Re-use of woody debris and bushrock)</i> (RTA, 2011).</li> <li>Avoid bushrock disturbance where practical. Where disturbance cannot be avoided remove the bushrock in accordance with the management requirements of <i>Biodiversity Guidelines - Guide 4 (Clearing of vegetation and removal of bushrock)</i> (RTA, 2011).</li> <li>Bushrock will be re-used on-site where possible. Re-use bushrock in accordance with the management requirements of the <i>Biodiversity Guidelines - Guide 5 (Re-use of woody debris and bushrock)</i> (RTA 2011).</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Loss of mature trees including hollow bearing trees	<ul style="list-style-type: none"> <li>Hollow bearing trees to be removed are to be clearly marked prior to removal.</li> <li>Hollow bearing tree removal is to be undertaken in a two stage clearing process as stated in the <i>Biodiversity Guidelines – Guide 4 (Clearing of vegetation and removal of bush rock)</i> (RTA, 2011).</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Removal of redundant highway areas	<ul style="list-style-type: none"> <li>Revegetation of the two areas of redundant highway to be removed and revegetated will be undertaken generally in accordance with <i>Biodiversity Guidelines – Guide 3 (Re-establishment of native vegetation)</i> (RTA, 2011).</li> </ul>	Roads and Maritime Project Manager Contractor	Construction and post-construction
Loss of quality soil from construction (ancillary sites)	<ul style="list-style-type: none"> <li>Strip and stockpile topsoil during the preparation of any ancillary sites.</li> <li>Reinstate topsoil as part of the rehabilitation of these areas for ongoing agricultural use.</li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Changes to property areas / accesses	<ul style="list-style-type: none"> <li>Roads and Maritime will continue negotiations with landowners in relation to property access and acquisition to enable establishment of works zones and location of ancillary facilities</li> <li>Roads and Maritime will continue to consult with affected landowners and residents where temporary and permanent property access changes would be required</li> <li>Roads and Maritime will provide landowners and residents with advanced notification of construction schedules and any changes to local roads and property access</li> <li>Roads and Maritime will provide community updates on changes to the local road network during construction, in accordance with a Traffic Management Plan.</li> <li>Roads and Maritime will work with the owner of the 'Woodlands' property to plan for and enable safe stock movements in the vicinity of the highway. This may include the installation of large, lockable fold out signage which can be opened when moving stock. Details will continue to be developed in consultation with the landowner during detailed design.</li> </ul>	Roads and Maritime Project Manager	Pre-construction Construction
Permanent loss of farm land	<ul style="list-style-type: none"> <li>Carry out property acquisition in accordance with Roads and Maritime's <i>Land Acquisition Information Guide</i> (Roads and Maritime, 2014) and the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</li> <li>Continue consultation with all affected property owners regarding property acquisition during the detailed design of the proposal.</li> </ul>	Roads and Maritime Project Manager	Pre-construction Detailed design phase
Traffic and Access	<ul style="list-style-type: none"> <li>Prepare and implement a traffic management plan (TMP) in accordance with Roads and Maritime QA Specification G10 Traffic Management. The TMP would be implemented in consultation with key stakeholders.</li> <li>The local community would be notified in a timely manner prior to any works that may affect access to local roads and property accesses.</li> <li>Private property access would be maintained at all times during the construction works.</li> </ul>	Roads and Maritime Project Manager  Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Potential loss of passing trade and potential cumulative impacts on the community identity and sense of place	<ul style="list-style-type: none"> <li>Roads and Maritime will continue consultation and working with affected business owners, the Grong Grong Progress Association, the Earth Park coordinator, Narrandera Rotary Club, other interested community members and Narrandera Shire Council during detailed design and construction phases of the proposal to develop and implement measures to minimise and mitigate business and community impacts.</li> <li>Roads and Maritime will undertake traffic counts on the Newell Highway to the north and west of Grong Grong and in the town centre at specified periods, such as one year and five years after opening, to evaluate the effectiveness of the signage in attracting visitors to the town.</li> <li>Roads and Maritime will conduct follow-up discussions with highway-dependent business operators (the motel, general store and hotel) and key community members at 6 months and 1 year after opening, to evaluate the effectiveness of the proposal's socio-economic management and mitigation measures.</li> <li>Implement urban design and landscape measures identified in section 6.5.</li> </ul>	Roads and Maritime Project Manager Contractor	Pre-construction, Construction And Operation
Construction impacts (traffic delays, noise, dust, changed access)	<ul style="list-style-type: none"> <li>Roads and Maritime and its contractors will implement construction noise mitigation measures as outlined in section 6.6.5.</li> <li>Roads and Maritime will keep the local community informed about the construction process, including project timing and periods when there will be changes to local traffic conditions.</li> </ul>	Roads and Maritime project manager Contractor	Pre-construction and Construction
Economic impacts to businesses and agriculture – town access	<ul style="list-style-type: none"> <li>In consultation with the Grong Grong community, Roads and Maritime will provide signposting to encourage highway traffic to visit Grong Grong. Signage would be consistent with Roads and Maritime signposting guidelines.</li> <li>In addition, Roads and Maritime will provide advertising signage visible from the Newell Highway for the general store and the motel, to mitigate against loss of trade and for the hotel, to contribute towards the town's ongoing viability.</li> </ul>	Roads and Maritime Project Manager	Pre-construction and operation
Reduced visual amenity	<ul style="list-style-type: none"> <li>Prepare and implement a detailed urban design plan based on the urban design concept outlined in Section 5.3 of the Urban Design Strategy (PAA, 2014) and in consultation with the Grong Grong community and Narrandera Shire Council.</li> <li>The urban design plan shall include a landscape plan to revegetate the road reserve areas and reduce visual impacts to residences located to the east.</li> </ul>	Roads and Maritime Project Manager Contractor	Pre-construction Operation

Impact	Environmental safeguards	Responsibility	Timing
Signage	<ul style="list-style-type: none"> <li>• Roads and Maritime will install town entrance signage at both the west and north accesses in consultation with Narrandera Shire Council and the local community.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Revise the noise and vibration assessment based on the final detailed design.</li> </ul>	Roads and Maritime Project Manager	Detailed design
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Prepare and implement a construction Noise and Vibration Management Plan (CNVMP) in accordance with Practice Note VI of the ENMM (RTA, 2001) and include as a minimum:               <ul style="list-style-type: none"> <li>○ identification of nearby residences and sensitive land uses</li> <li>○ description of approved hours of work and what work will be undertaken</li> <li>○ description of what work practices will be applied to minimise noise</li> <li>○ description of the complaints handling process</li> <li>○ description of monitoring that is required</li> </ul> </li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Construction noise impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Consult with residential noise sensitive receivers within 1.2 kilometres of the proposal prior to and during construction. This includes the majority of residential receivers within the town of Grong Grong, those south of the rail line.</li> <li>• Implement a 24-hour hotline and complaints management procedure for noise and other construction related complaints.</li> <li>• Turn down radios when not in use and no yelling on site.</li> <li>• No slamming of doors.</li> <li>• Prohibit the use of air brakes and speed limit enforcement.</li> <li>• Drive all plant in a conservative manner (no over-revving).</li> <li>• Obtain site access via entry points most remote to noise sensitive receivers, where possible.</li> <li>• Do not permit plant to 'warm-up' before the nominated working hours.</li> <li>• Where possible, machinery is to be orientated to direct noise away from the closest noise sensitive receivers.</li> <li>• Undertake regular maintenance of machinery to minimise noise emissions. Maintenance would be completed away from noise sensitive receivers where possible.</li> <li>• Select the quietest suitable machinery reasonably available for each work activity.</li> <li>• Maximise the offset distance between noisy items of plant/machinery and nearby noise sensitive receivers, where possible;</li> <li>• Where practicable, ensure the coincidence of noisy plant/machinery working simultaneously in close proximity to noise sensitive receivers is avoided.</li> </ul>	Contractor	Construction
Construction vibration impacts on sensitive receivers	<ul style="list-style-type: none"> <li>• Where construction activities involving impulsive vibration from excavator buckets or intermittent vibration from tracked equipment (eg. excavators, dozers) are undertaken close to sensitive receivers, an offset distance of at least five metres from buildings will be maintained to comply with the structural vibration criteria.</li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Soils and water quality – erosion and sedimentation	<ul style="list-style-type: none"> <li>• Prepare and implement a Soil and Water Management Plan (SWMP) and site specific erosion and sediment control plans (ESCPs) as part of the CEMP.</li> <li>• Prepare and implement SWMP and ESCPs in accordance with Managing Urban Stormwater - Soils and Construction, Volume 2D (Landcom 2004).</li> <li>• Erosion and sediment control measures adopted will be designed to achieve short and long term stability of embankments and cuttings and other disturbed areas.</li> <li>• Erosion and sediment controls will be maintained on a regular basis during construction and until the works are complete and disturbed areas are revegetated.</li> <li>• Disturbed areas will be stabilised progressively during the works.</li> <li>• The maintenance of established stockpile sites during construction will be in accordance with the <i>Stockpile Site Management Procedures</i> (RTA, 2011a).</li> </ul>	Contractor	Pre-construction  Construction
Water quality	<ul style="list-style-type: none"> <li>• Refuelling of plant and equipment will occur in impervious bunded areas away from waterway and drainage lines.</li> <li>• Emergency spill kits for the management of accidental dry and wet chemical spills will be made available at the compound area. All personnel shall be made aware of their availability and trained in their use.</li> <li>• Vehicle wash down is to occur in a designated bunded area.</li> <li>• All staff shall be appropriately trained in the minimisation and management of accidental spills.</li> <li>• Roads and Maritime's Environmental Incident Classification and Management Procedure will be followed in the event an accidental spill occurs.</li> <li>• The Roads and Maritime Project Manager must be notified of the spill immediately after the person becomes aware of the spill.</li> </ul>	Contractor	Pre-construction  Construction



Impact	Environmental safeguards	Responsibility	Timing
Water Extraction	<ul style="list-style-type: none"> <li>Roads and Maritime would carry out further consultation about potential water extraction at Bundidgerry Creek with NOW prior to the commencement of construction. A Works Approval licence would be obtained where necessary.</li> <li>If water is extracted from Bundidgerry Creek, minimise scour and creek instability at the extraction point at Bundidgerry Creek through minimising clearing and amount of bank disturbance, in accordance with the <i>Biodiversity Guidelines - Guides 4 and 10</i> (RTA, 2011). Water extraction methods used will aim to minimise impacts to aquatic ecology, surrounding land uses and the visual amenity of the area.</li> </ul>	Roads and Maritime Project Manager	Pre-construction
Discovery of unexpected items of Aboriginal cultural significance	<ul style="list-style-type: none"> <li>Follow the <i>Standard Management Procedure: Unexpected Archaeological Finds</i> (RMS, 2012) in the event that construction related disturbance results in the discovery of Aboriginal objects or suspected human remains.</li> <li>The site induction for the proposal must include an overview of the procedure for unexpected archaeological finds.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Accidental discovery of items of Non-Aboriginal cultural significance	<ul style="list-style-type: none"> <li>Follow the <i>Standard Management Procedure – Unexpected Archaeological Finds</i> (RMS, 2012) in the event that unexpected heritage/archaeological finds are encountered during construction of the proposal.</li> <li>The site induction for the proposal must include an overview of the procedure for unexpected archaeological finds.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
General air quality impacts	<ul style="list-style-type: none"> <li>Construction activities will be managed to minimise dust and fuel emissions.</li> </ul>	Roads and Maritime Project Manager Contractor	Construction
Vehicle and other equipment emissions	<ul style="list-style-type: none"> <li>Plant and machinery will be maintained in accordance with manufacturer's specification.</li> <li>Vehicles will not be left running when idle.</li> <li>Vehicles transporting waste or other materials that may produce dust are to be covered during transportation.</li> </ul>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Dust	<ul style="list-style-type: none"> <li>• Dust minimisation measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution with dust from disturbed areas, if required and especially during hot and windy conditions.</li> <li>• Visual surveillance for visible dust generation will occur at all times. Works must cease when high levels of air-borne dust cannot be controlled.</li> <li>• Clearing of natural vegetation will be minimised where practicable.</li> <li>• Vegetation or other materials are not to be burnt on site.</li> <li>• Disturbed areas will be stabilised progressively during the works.</li> <li>• Stockpiles or areas that may generate dust are to be managed to suppress dust emissions in accordance with the <i>Stockpile Site Management Guideline</i> (Roads and Maritime, 2011b).</li> </ul>	Contractor	Construction
Management of waste	<ul style="list-style-type: none"> <li>• Manage and dispose of waste in accordance with applicable legislation and government policies, including: <ul style="list-style-type: none"> <li>○ <i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act).</li> <li>○ <i>Waste Avoidance and Resource Recovery Strategy 2007</i> (DECC, 2007).</li> <li>○ <i>Waste Reduction and Purchasing Policy</i> (WRAPP) (RTA, 2010b).</li> <li>○ Compliance with relevant EPA resource recovery exemptions.</li> </ul> </li> <li>• Use recycled products in construction to reduce the demand on resources, in instances where the use of such material is cost and performance competitive (for example, where quality control specifications allow).</li> </ul>	Contractor	Pre-construction  Construction

### 7.3 Licensing and approvals

The proposal may require an Environment Protection Licence (EPL) if it meets the definition of ‘extractive activities’ under clause 19 of Schedule 1 of the POEO Act. The need for an EPL for ‘extractive activities’ would be confirmed during detailed design.

Prior to construction Roads and Maritime would consult with NOW regarding a Works Approval to extract water from Bundidgerry Creek for dust suppression and construction works.

## 8 Conclusion

---

### 8.1 Justification

The Newell Highway is part of the National Land Transport Network (NLTN) and the Melbourne-Brisbane transport corridor. It is a crucial road link for freight, passenger and tourist traffic between Queensland, NSW and Victoria. It is also an important regional traffic route by linking towns and major centres in the region.

There are a number of reasons why the proposal is required, including:

- Access for HPVs: the current highway at Grong Grong does not provide access for HPVs, which is necessary for improved freight efficiency.
- Freight efficiency: the current highway restricts freight efficiency as all traffic is required to travel at low speeds through town.
- Road safety: there are ongoing safety concerns because of the 90 degree bend on the current highway.
- Road user conflicts: highway traffic currently travels through the town of Grong Grong creating conflicts with local traffic, cyclists and pedestrians.
- Predicted traffic increases: traffic volumes are predicted to continue to increase by 2.5 per cent each year (77 per cent increase in heavy vehicles by 2031).

The current alignment of the Newell Highway at Grong Grong includes a low speed 90 degree bend at an intersection, posted at 35 km/h. The low speed 90 degree bend restricts traffic efficiency and constrains travel times for all vehicles, in particular freight vehicles. Several truck rollovers and light vehicle incidents at the bend have been recorded including two crashes since new signage and line marking safety works were completed in 2012.

Due to the current alignment restrictions and crash history, operation of HPVs through Grong Grong cannot be allowed. Currently, the largest approved vehicles along this section of the highway are Higher Mass Limit (HML) B-Doubles. If left untreated, this location would prevent improved efficiency of long-haul movement once adjacent sections are approved for HPV operation.

The freight task for the Newell Highway is substantial. In 2007, 61 per cent of the 4.5 million tonnes of annual freight movement between Melbourne and Brisbane occurred by road. In addition, the section of the Newell Highway between Narrandera and Moree (encompassing Grong Grong) experienced 1.2 million tonnes of regional freight movement. About 600 heavy vehicles travel the Newell Highway through Grong Grong on average each day (32 per cent of all traffic). As there is no direct rail link between Melbourne and Brisbane, the amount of road freight along the Newell Highway will continue to remain high. It is estimated that heavy vehicle traffic will increase by 77 per cent to about 1060 trucks per day by 2031.

The proposal is consistent with a number of state and local plans including:

- *NSW 2021: A Plan to Make NSW Number One* (Department of Premier and Cabinet, 2011)
- *NSW State Infrastructure Strategy* (Department of Premier and Cabinet, 2012)
- *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) *NSW Freight and Ports Strategy* (Transport for NSW, 2013)
- *Regional Transport Plan for Murray-Murrumbidgee* (Transport for NSW, 2013a).
- *Draft Newell Highway Corridor Strategy* (Transport for NSW, 2014)

- *Riverina Regional Plan 2013 - 2016* (Regional Development Australia - Riverina, 2013)

The benefits of the proposal include:

- Improved freight productivity by providing a more efficient route and enabling access for HPVs at Grong Grong. The proposal would reduce the highway travel distance by 810 metres and travel time by more than 1¼ minutes.
- Improved cost efficiency for the transport industry by extending HPV access on the Newell Highway. The equivalent of 160 vehicles could be taken off the road, improving cost efficiency by 22 per cent (Infrastructure NSW, 2014).
- Improved road safety by reducing the risk of incidents between local and highway traffic.
- Reduced traffic volumes travelling through Grong Grong, which would reduce traffic noise and air pollution and improve general amenity.
- More efficient travel times and consistent highway travel speed with additional benefits of reduced fuel consumption and carbon emissions.

The views of the community have been taken into account in consideration of the public interest. Some members of the Grong Grong community are ultimately opposed to bypassing the town due to concerns about reducing passing trade for local businesses. However, there is now greater acceptance within the community of the need for a bypass based on the projected increases in heavy vehicle traffic volumes by 2031. Town accesses have been designed in consultation with the local community to minimise the reduction of passing trade for Grong Grong businesses. The proposal would provide acceptable access between the Newell Highway and the town of Grong Grong.

## 8.2 Objects of the EP&A Act

Table 8-1 identifies the objects of the EP&A Act 1979 and their relevance to the proposal.

**Table 8-1: Objects of the EP&A Act and relevance to the proposal**

Object	Comment
<p>5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.</p>	<p>The proposal would improve road safety and reduce conflicts between vehicles and vulnerable road users such as pedestrians and cyclists. The new alignment would reduce travel times and enable HPVs access, improving freight efficiency and reducing natural resource use. While the realignment would result in the loss of some agricultural land through acquisition, the remaining land would continue to be viable.</p> <p>The proposal has been designed to minimise impacts on the community and vegetation loss, particularly EECs; biodiversity offsets would be investigated to offset the loss of EECs. Consultation will continue with the community regarding opportunities to promote and improve the town and regarding access and acquisition arrangements.</p> <p>Two accesses would provide access to Grong Grong with signage and landscaping directing highway traffic to the town, to support social and economic activity in the town.</p>
<p>5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.</p>	<p>The socio-economic assessment (section 6.4) has included an assessment of the socio-economic factors of the locality. In consultation with the community the proposal has been developed to minimise impacts to agriculture and local businesses. This coordinated approach to development of the land has therefore fulfilled this objective.</p>
<p>5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.</p>	<p>Development of the proposal involved consultation with affected utilities to minimise impacts on their operations. The proposal would require the relocation of Nextgen fibre optic cable services. Impacts are minimal.</p>
<p>5(a)(iv) To encourage the provision of land for public purposes.</p>	<p>The proposal is intended to be used for public purposes.</p>

Object	Comment
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	Consultation with the community has identified a number of opportunities to improve facilities in Grong Grong. As a result Roads and Maritime has committed to the implementation of new signage to encourage travellers to stop in Grong Grong and utilise the local services. Roads and Maritime will continue to engage with the community, including Council, about other opportunities.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The proposal would require some vegetation clearing (maximum of 34 hectares) including the potential clearing of 4.3 hectares of Inland Grey Box Woodland, an endangered ecological community. Impacts would be minor and unlikely to significantly impact threatened species and communities (Refer to section 6.1). Landscaping and rehabilitation works would be undertaken following completion of works.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	There have been several opportunities for the community to be informed of, and provide comments and feedback on, the proposal and design. Table 5 1 shows community consultation to date.

To further address the objects of the EP&A Act in relation to ecologically sustainable development (Object 5(a)(vii)), the principles of ESD are further discussed below, as defined in the Environmental Planning and Assessment Regulation 2000, Schedule 2, Part 7, Section 4:

(a) the ***precautionary principle***, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be

guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
  - (ii) an assessment of the risk-weighted consequences of various options,
- (b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- (c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- (d) **improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
- (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
  - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
  - (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

### 8.2.1 The precautionary principle

In developing the proposal a number of alternative design options were considered. Options have been assessed with the purpose of reducing risk of serious and permanent impacts on the environment. Assessments included field surveys by specialists, desktop assessments and specialist reports; the findings assisted in identifying the best performing option. Further changes have been made to the proposal through development of the concept design and during the preparation of the REF to minimise the overall impact of the proposal.

The detailed assessment is located in chapter 6 of the REF and recommendations for environmental management are described in chapter 7.

### 8.2.2 Intergenerational equity

The proposal would potentially remove up to 4.3 hectares of native vegetation comprising EEC. This may be reduced during the detailed design phase. However, the REF has concluded that the proposal would not impact on natural features to a level that would compromise the health, diversity or productivity of the environment to a level that would impact on future generations.

The proposal would benefit future generations delivering improved road safety and travel times, reduce travel distances, improve freight efficiency and improve amenity within Grong Grong. The proposal would improve conditions for pedestrians and cyclists in the local town by reducing the number of vehicle movements through town.

### 8.2.3 Conservation of biological diversity and ecological integrity

An assessment of the existing local environment has been undertaken to identify and manage any potential impact of the proposal on local biodiversity. The concept design has been refined to reduce impacts on local biodiversity, such as realigning the corridor and locating ancillary facilities away from high conservation areas, where possible.

Construction of the proposal would directly and indirectly impact on native vegetation as a result of vegetation clearance. Direct impacts would be via the clearance of 34 hectares of vegetation to accommodate the footprint of the proposal. The majority of this area is already predominately cleared agricultural land.

The main areas of native vegetation which would be impacted is the Inland Grey Box Woodland EEC (4.3 hectares). This impact area is an over estimation to take into account temporary access tracks along the alignment and the two proposed ancillary facilities. The final number would be reduced during the detailed design phase.

The proposal would not significantly fragment or isolate any existing large patches and would not compromise biological diversity or ecological integrity. No significant impacts to flora and fauna species were identified. Furthermore, safeguards have been developed that would assist in protecting fauna and flora at the site that could potentially be impacted by the proposal.

### 8.2.4 Improved valuation, pricing and incentive mechanisms

Improved valuation, pricing and incentive mechanisms provide that costs to the environment should be factored into the economic costs of a proposal. The REF has examined the environmental consequences of the proposal and identified mitigation measures for areas which have the potential to experience adverse impacts.

Requirements imposed in terms of implementation of these mitigation measures would result in an economic cost to Roads and Maritime. The implementation of mitigation measures have been incorporated into the capital and operating costs budget for the proposal. The concept design has been developed with an objective of minimising potential impacts on the surrounding environment. During the development of the design, opportunities for further improvements and potential efficiency savings would be investigated. During the preparation of the REF design improvements have occurred, minimising impacts and, therefore, costs to the environment, the community and the project.

The social and economic benefit of the proposal overall outweighs any adverse impacts that cannot be satisfactorily mitigated. The proposal provides value in that it would improve road safety and traffic efficiency along the proposal route.

This review of environmental factors was prepared with careful attention to the minimisation or avoidance of impacts on the natural, built and social environments in recognition of those impacts. In doing so, the cost of impacts associated with the proposal have been minimised as far as reasonably practical.



### 8.3 Conclusion

The proposal of the realignment of the Newell Highway at Grong Grong is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal. This has included consideration of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impact on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

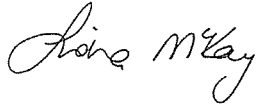
A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the proposal objectives but would still result in some impact on local businesses, social infrastructure and biodiversity. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also improve road safety by reducing total crashes due to the bypassing of the low speed 90 degree bend, providing a safer environment for the local community with a reduction in heavy vehicles travelling through town, therefore also reducing traffic noise and fuel emissions, increasing the visual amenity within Grong Grong. The proposal would also reduce travel distances and speeds along this section of the Newell Highway. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to significantly affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to significantly affect Commonwealth land or have a significant impact on any matters of national environmental significance.

## 9 Certification

---

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.



Fiona McKay  
Senior Consultant  
NGH Environmental  
Date: 26/03/2015

I have examined this review of environmental factors and the certification by Fiona McKay from NGH Environmental and accept the review of environmental factors on behalf of Roads and Maritime.



Dean Howard  
Senior Project Development Officer  
Roads and Maritime  
South West Region  
Date:

26/03/2015

## 10 References

---

- Australian Bureau of Statistics (2011) *Census of Population and Housing*
- Booth Associates (2011) *Narrandera Shire Council Rural Lands Study – Annexure 3 Land Capability Map*.
- Department of Environment and Conservation (DEC) (2005) *Interim Guidelines for Aboriginal Community Consultation*
- Department of Environment and Climate Change (DECC) (2007) *Waste Avoidance and Resource Recovery Strategy*, Sydney.
- Department of Environment and Climate Change (DECC) (2007a) *Atlas of NSW Wildlife Database*. <http://wildlifeatlas.npws.gov.au>
- Department of Environment and Climate Change (DECC) (2007b) *Threatened species, populations and ecological communities* [http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home\\_species.aspx](http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx)
- Department of Environment and Climate Change (DECC) (2008) *Managing Urban Stormwater – Soils and Construction, Volume 2D – Main Road Construction* (known as the Blue Book), NSW DECC, Sydney.
- Department of Environment and Climate Change (DECC) (2009) *Interim Construction Noise Guideline*.
- Department of Environment and Climate Change (DECC) (2009a) *Waste Classification Guidelines Part 1: Classifying Waste*, Sydney
- Department of Environment, Climate Change and Water (DECCW) (2011) *NSW Road Noise Policy* (RNP).
- Department of Premier and Cabinet (2011) *NSW 2021 A Plan to Make NSW Number One*, <http://2021.nsw.gov.au/>
- Department of the Environment and Water Resources website, EPBC Act Protected matters search tool (<http://www.environment.gov.au/erin/ert/epbc/index.html>)
- Department of Primary Industries (DPI) website <http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed>
- Department of Urban Affairs and Planning (DUAP) (1996) *Roads and Related Facilities*
- Department of Urban Affairs and Planning (DUAP) (1999) *Is an EIS Required?*
- Elton Consulting (2015) *Newell Highway Realignment at Grong Grong - Social impact assessment*.
- EMGA Mitchell McLennan (2015) *Newell Highway Grong Grong Realignment: Operational road noise and construction noise and vibration assessment*.
- Environment Protection Authority (EPA) (1999) *Environmental Criteria for Road Traffic Noise*.

Environment Protection Authority (EPA) (2008) *Waste Classification Guidelines: Part 1 Classifying Waste*

Environment Protection Authority (EPA) (2011) *Road Noise Policy*.

Infrastructure NSW (2012) *State Infrastructure Strategy: First things first*.

Infrastructure NSW (2014) *State Infrastructure Strategy Update 2014*.

Narranderra Shire Council (2010) *Narranderra Shire Product Development & Destination Marketing Strategy, Diagnostic Report*.

Narranderra Shire Council (2012) *Economic Development Strategy*.

Narranderra Shire Council website (accessed 25 August 2014)  
[http://www.narranderra.nsw.gov.au/cp\\_themes/default/home.asp](http://www.narranderra.nsw.gov.au/cp_themes/default/home.asp)

NGH Environmental (2015) *Realignment of the Newell Highway at Grong Grong. Biodiversity assessment*. For Roads and Maritime.

National Parks and Wildlife Service (1999) *Threatened species management - Species information*. National Parks and Wildlife Service, Hurstville, NSW.  
[http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home\\_species.aspx](http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx)

NSW Government. BioNet website (accessed 15 May 2014)  
<http://www.bionet.nsw.gov.au/Area.cfm>

NSW Office of Water (2011) *Water resources and management overview Murrumbidgee catchment*, ISBN 978 0 7313 3480 3

NSW SIS (2011) *NSW State Infrastructure Strategy*, Infrastructure NSW

NSW State Heritage website (accessed 15 May 2014)  
[http://www.heritage.nsw.gov.au/07\\_subnav\\_04\\_1.cfm](http://www.heritage.nsw.gov.au/07_subnav_04_1.cfm)

PAA Design (2014) *Newell Highway Realignment Urban Design Strategy*, prepared for Roads and Maritime

Parolin, Bruno (2011) *Economic Evaluation of Town Bypasses: Review of Literature*. For the Roads and Maritime Services. ISBN 978-1-922040-15-2.

Roads and Maritime (2012) *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI), Roads and Maritime, Sydney.

Roads and Maritime (2013) *Guidelines for landscape character and visual impact assessment EIA-N04*, Version 2.0

Roads and Maritime (2014) *Land Acquisition Information Guide*

Roads and Traffic Authority (2001) *Environmental Noise Management Manual (ENMM)*

Roads and Traffic Authority (2008) *Procedure for Aboriginal Cultural Heritage Consultation and Investigation*

Roads and Traffic Authority (2010) *Towards a more sustainable RTA*

Roads and Traffic Authority (2010a) *Traffic Control at Work Sites Manual*

Roads and Traffic Authority (2010b) *Waste Reduction and Purchasing Policy*

Roads and Traffic Authority (2011) *Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects*. RTA Sydney.

Roads and Traffic Authority (2011a) *Stockpile Site Management Guideline*, RTA Sydney.

Transport for NSW (2012) *NSW Long Term Transport Master Plan*, State of New South Wales through the Director General of Transport for NSW, 2012. ISBN: 978-1-922030-31-3.

Transport for NSW (2013) *NSW Freight and Ports Strategy*, November 2013, State of New South Wales through the Director General of Transport for NSW, 2013. ISBN: 978-1-922030-36-8

Transport for NSW (2013a) *Regional Transport Plan for Murray-Murrumbidgee*, December 2013, State of New South Wales through Transport for NSW, 2013. ISBN: 978-1-922030-53-5

Transport for NSW (2014) *Draft Newell Highway Corridor Strategy*, April 2014, State of New South Wales through Transport for NSW, 2013. ISBN: 978-1-922030-35-1

## Terms and acronyms used in this REF

AADT	Average annual daily traffic. The total volume of traffic passing a roadside observation point over a period of a year, divided by the number of days per year. It is calculated from mechanically obtained axle counts
Aggregate	A uniform sized material from sand, gravel, rock or metallurgical slag by screening, blasting or crushing. Used in concrete production and for bitumen sealing
AHIMS	Aboriginal Heritage Information Management System
Alignment	The geometric layout (eg of a road) in plan (horizontal) and elevation (vertical)
Asphalt	A dense, continuously graded mixture of coarse and fine aggregates, mineral filler and bitumen usually produced hot in a mixing plant
Batter	The constructed slope of road embankments and cuttings usually expressed as a ratio of x horizontal to 1 (one) vertical. A fill batter is where the road is above the existing surface on a filled embankment and refers to the sloping sides of the embankment. A cut batter is where the road is below the existing surface
CEMP	Construction environmental management plan
Chainage	Any point on a control line selected to provide more detailed information about the cross - section or any other feature mentioned in the drawings
Clearing	The removal of vegetation or other obstacles at or above ground level
Construction compound	Facilities used to support the operation of a construction site including (but not limited to) site offices, workshops, delivery areas, storage areas, crib sheds, staff vehicle parking, materials, plant and equipment
Construction footprint	The construction footprint for the proposal includes the area that would be directly impacted by the proposal (new alignment), including temporary construction ancillary facilities and construction sediment basins, haulage roads, stockpile sites, north and west access areas and tie ins
Culvert	A stream or drain
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact considered alone
Cut	The material excavated from a cutting
Cutting	Formation resulting from the construction of the road below existing ground level – the material is cut out or excavated.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock

EEC	Endangered Ecological Community
ENMM	Roads and Maritime Environmental Noise Management Manual
Environment	All aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings (from EP&A Act)
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPA	NSW Environment Protection Authority (formerly part of DECCW, now part of OEH)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process
ESCP	Erosion and sediment control plan
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
Footprint	The extent of impact that a development makes on the land
Freight task	The amount of freight being (or to be) moved.
GDE	Groundwater dependent ecosystems (GDEs) are ecosystems which have their species composition and their natural ecological process determined by groundwater (NOW, 2002).
Grubbing	The removal of roots or stumps from below ground level
Habitat	The place where a species, population or ecological community lives (whether permanently, periodically or occasionally). Habitats are measurable and can be described by their flora and physical components
Haul route	A designated route, often temporary, used for moving materials (often used when new infrastructure is being constructed)
Heavy vehicle	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System
Heritage Act	<i>Heritage Act 1977</i> (NSW)

HML	Higher Mass Limit. HML provides a significant increase in the productivity of road freight transport vehicles. HML access on NSW roads is dependent on the vehicle type of operation enrolled in the Intelligent Access Program (IAP) and granted on the access permit
HPV	Higher Productivity Vehicles are vehicles approved to carry loads above standard mass limits. These vehicles have restricted access to the network and can operate under a Performance Based Standards systems, or a Restricted Access Vehicle System
ICNG	NSW Interim Construction Noise Guidelines
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
INP	NSW Industrial Noise Policy
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LALC	Local Aboriginal Land Council
Landscape	1. A tract of land 2. A prospect or piece of scenery or land which may include villages, towns, cities and infrastructure
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features
Lane	A portion of the carriageway allotted for the use of a single line of vehicles
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act
LGA	Local government area
Longer heavy vehicles	A plain English term for higher productivity vehicles
Lot	A parcel of land defined by measurement as a lot in a deposited plan (DP) or as a Crown portion or allotment.
Median	The central reservation which separates carriageways from traffic travelling in the opposite direction
NLTN	National Land Transport Network is a single integrated network of land transport linkages of strategic national importance, which is funded by Australian, State and Territory Governments. The National Network is based on national and inter-regional transport corridors including connections through urban areas, links to ports and airports, rail, road and intermodal connections that together are of critical importance to national and regional economic growth development and connectivity
NES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>



NOW	NSW Office of Water
Noxious Weeds Act	<i>Noxious Weeds Act 1993 (NSW)</i>
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
OEH	Office of Environment and Heritage (NSW – since April 2011)
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
Pavement	The portion of a carriageway placed above the subgrade for the support of, and to form a running surface for vehicular traffic
POEO Act	<i>NSW Protection of the Environment Operations Act 1997</i>
Pollutant	Any measured concentration of solid or liquid matter that is not naturally present in the environment
Proponent	The person or organisation that proposes carrying out the project or activity
RBL	Rating background level. The median value of the assessment background levels value for the period over all of the days measured. There is therefore an RBL value for each period daytime, evening and night - time
Receptor/receiver	An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, work place, school or other place where people spend some time. An elevated receptor is a point above ground level
REF	Review of Environmental Factors
Road reserve	A legally defined area of land within which facilities such as roads, footpaths and associated features may be constructed for public travel
RTA	Roads and Traffic Authority, NSW – until early 2012 (now known as Roads and Maritime)
RMS	Roads and Maritime Services (NSW – since early 2012) now Roads and Maritime, since November 2013)
Scour	The erosion of material by the action of flowing water
Sediment	Material, both mineral and organic, that is being or has been moved from its site of origin by the action of wind, water or gravity and comes to rest either above or below water level
Water quality basin	An area where runoff water is ponded to allow sediment to be deposited
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act
SEPP 44	<i>State Environmental Planning Policy No.44 – Core Koala Habitat</i>

Shoulder	The portion of the carriageway beyond the traffic lanes adjacent to and flush with the surface of the pavement
Spoil	Surplus excavated material
Stockpile	Temporarily stored materials such as soil, sand, gravel and spoil/waste.
Terrestrial	Relates to flora and fauna whose habitat is on land as opposed to in water, or on the ground as opposed to on another plant
Threatened	As defined under the <i>Threatened Species Conservation Act 1995</i> , a species, population or ecological community that is likely to become extinct or is in immediate danger of extinction
Tie-in point	A location where the highway connects with the local road network or a location where the upgraded highway connects with immediately adjacent sections of highway
TMP	Traffic Management Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW)
QA Specifications	Specifications developed by Roads and Maritime for use with roadworks and bridgeworks contracts let by Roads and Maritime
Verge	That portion of the formation not covered by the carriageway, the median or the footpath
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
Waterway	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent)
WM Act	<i>Water Management Act 2000</i>