Ellerton Drive Extension

Addendum review of environmental factors

Queanbeyan-Palerang Regional Council | August 2018

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August 2018

Prepared by WBHO Infrastructure Pty Ltd and NGH Environmental Pty Ltd

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Approval and authorisation

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1. Introduction

1.1 Background

Queanbeyan City Council (QCC), now Queanbeyan-Palerang Regional Council (QPRC), completed a review of environmental factors (REF) of the Ellerton Drive Extension in December 2014 (SMEC, 2015). The REF described the project, assessed the potential environmental and social impacts associated with the construction and operation of the project and identified safeguards and management measures to avoid, mitigate or manage those potential impacts.

The REF was placed on public display between 12 December 2014 and 9 February 2015. A total of 357 formal submissions were received in response to the public exhibition of the REF. The project design was then amended in early 2016. Consequently, SMEC revised the REF in April 2016 (SMEC, 2016) (Appendix A). This included addendum reports and revised specialist studies to assess the changed design and project footprint.

The revised REF included the following revised documents:

- Species Impact Statement (SIS) Addendum, prepared by NGH Environmental, February 2016. The SIS and addenda assessed the impacts of the project on threatened species, populations and communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).* The survey area was extended in the SIS addendum to account for the change in project footprint. The SIS Addendum was placed on public exhibition from 4 March 2016 to 3 April 2016.
- Squirrel Glider Survey, prepared by Australian Research Centre for Urban Ecology (ARCUE), March 2016. Office of Environment and Heritage (OEH) requested additional targeted surveys for the species, in response to unconfirmed sightings within the project vicinity.
- Social Impact Assessment, prepared by RM Planning, March 2016. Qualitative assessment of impacts on the local communities in the project area.
- Updated Noise Report, prepared by SLR, February 2017. The report included a review of the effectiveness of the noise mitigation measures (noise wall) and found noise levels at 41 properties still exceeded the RNP guideline noise. Commitments were given by QPRC in the last Submissions Report to further consult with affected individual homeowners to determine any additional reasonable and feasible noise mitigation measures, including potential at-property acoustic treatments.
- Submissions Report, prepared by QPRC, April 2016.

In April 2016, following public exhibition of the SIS Addendum, QPRC prepared the Ellerton Drive Extension Submissions Report for inclusion in the Determination Report (Queanbeyan City Council, 2016). The Submissions Report addresses the submissions received during the REF public exhibition period, the submissions received up to and after a Community Forum held on 28 April 2015, and the submissions received during exhibition of the SIS Addendum.

After consideration of the revised REF and the Submissions Report, QPRC commissioned AECOM to prepare a Determination Report (AECOM, 2016). The Determination Report provided a review of the revised REF and provided recommendations for QPRC's consideration. The determination report recommended that the Proposal proceed, as described in the REF and supporting documentation. QPRC made a decision to proceed with the project in June 2016.

The following approvals/ licences/ permits have been obtained for the determined project:

- Aboriginal Heritage Impact Permit (AHIP) No: C0002305 and variation No: C0002441.
- EPBC 2014/7304 approval, decision 10 January 2017.

- EPBC 2014/7304 approval variation, decision 22 December 2017.
- OEH concurrence, letter dated 10 June 2016.
- Environment Protection Agency (EPA) Environmental Protection License (EPL 20852), 22 November 2016.
- EPA EPL 20852 transfer license from QPRC to WBHO Infrastructure Pty Ltd, 6 October 2017.
- EPA EPL 20852 licence variation, 28 February 2018.
- Department of Primary Industries Fisheries Permit (PN 17/59), 28 February 2017.
- Department of Industry Water Supply Works Approval (40WA417282).

In May 2018, a Consistency Review against the determined REF was prepared, after the commencement of construction (NGH Environmental, 2018). The Consistency Review relates to changes to the design and construction methodology of the bridge over the Queanbeyan River, from a Super-T bridge to a continuous post-tensioned box girder bridge. The changes allow completed segments of the bridge to be incrementally launched from the north to the south side of the river. The review concluded that the design and construction methodology of the post-tensioned box girder bridge was consistent with the determined REF conditions and did not contribute to any additional negative impacts.

The contractor now proposes a further modification to the project, to enable light vehicular access to the bridge launching site via the local road network, namely Lonergan Drive. This Addendum REF aims to assess the likely impacts from this project modification.

1.2 Proposed modification overview

The Ellerton Drive Extension Review of Environmental Factors (REF) (SMEC, 2016) allows for construction access to the northern section of the project from the Ellerton Drive entrance only. Section 3.1 of the determined REF (SMEC, 2016) describes the site access arrangements during construction: "*All access on the northern section would be off Ellerton Drive. All access for the southern section would be from Old Cooma Road".*

Section 3.1 also states: "QCC would continue to investigate opportunities for suitable access points, stockpile sites and compound areas to facilitate effective and efficient delivery of the project".

The proposed modification involves one additional light vehicle site access point located at the end of Lonergan Drive, Greenleigh. An existing gate at the end of Lonergan Drive would be used to gain access to the bridge launching site on the northern side of the Queanbeyan River (see Figure 2). There would be no construction works required outside of the approval Project boundary to formalise the access.

This additional access point would be used by workers to access the bridge launching site to start their working day and then leave the site to go home. Hence, the vehicle movements would be concentrated in the early morning and late afternoon. Some vehicle movements would occur at intervals through the day.

An estimated 20 vehicles would access the bridge site per day through the Lonergan Drive access point (resulting in approximately 40 to 50 light vehicle traffic movements per day). From the Kings Highway, vehicles would utilise Atkinson Street, Severne Street, and Lonergan Drive. Figure 1 shows the proposed access route from the Kings Highway to the project off Lonergan Drive. There would be no heavy vehicle access or deliveries to the construction site via this access point.

All vehicles accessing the site from Lonergan Drive would be required to drive into the construction site to park. There would be no vehicles parking on Lonergan Drive or impeding access to the construction site or to private property driveways on Lonergan Drive.

The primary objectives of the proposed modification are to:

- Provide a safer access route to the bridge launching site for the bridge construction workers, easing on the congestion within an already confined and high risk construction site; and
- Improve the effective and efficient delivery of the Ellerton Drive Extension project.

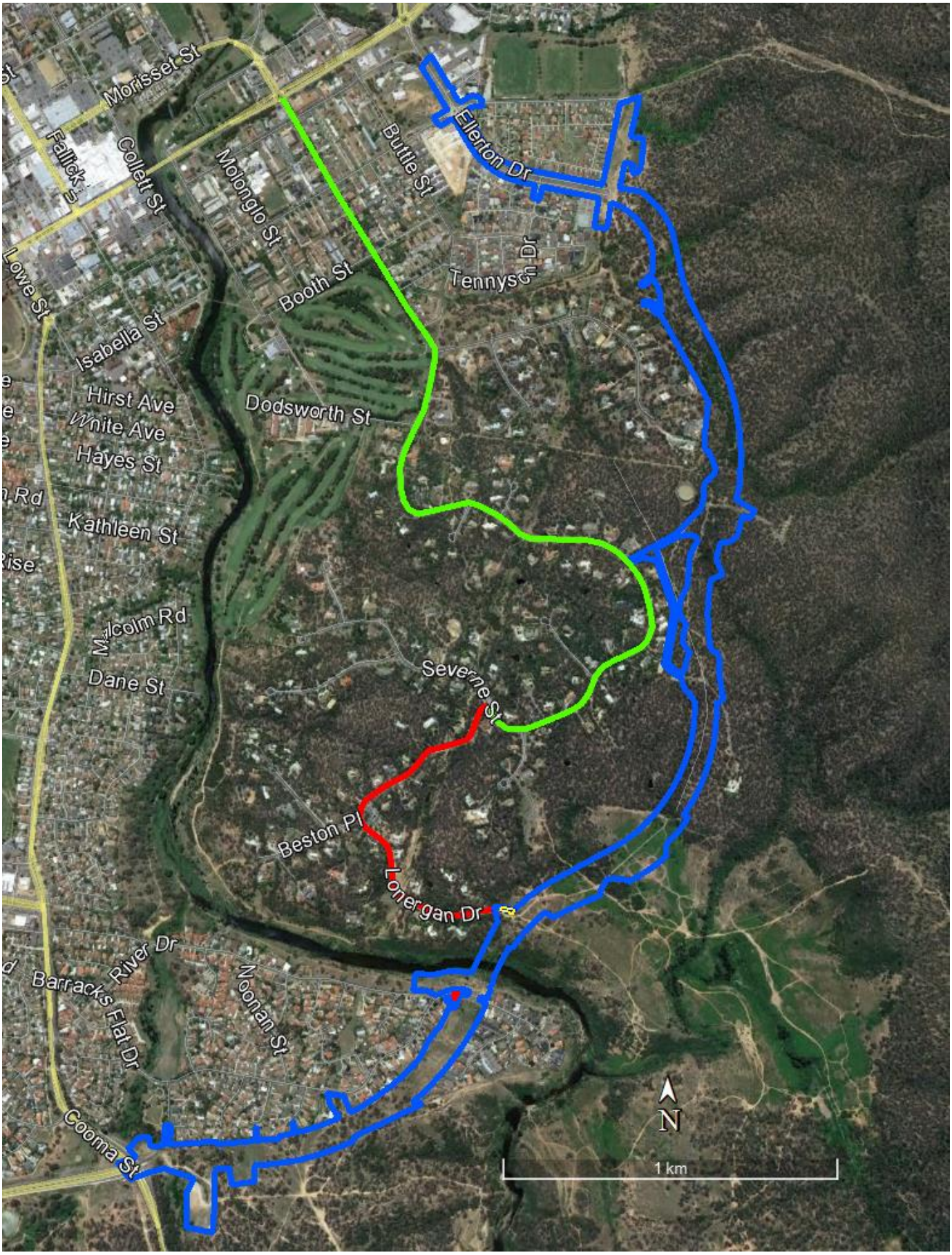

Figure 1 Project area (blue), proposed access via Atkinson/Severne Street (green) and Lonergan Drive (red)

Figure 2 Existing gate at the end of Lonergan Drive.

1.3 Purpose of the report

This addendum REF is to be read in conjunction with the determined REF and submissions report. The purpose of this addendum REF is to describe the proposed modification, to document and assess the likely impacts of the proposed modification on the environment, and to detail mitigation and management measures to be implemented.

For the purposes of these works, QPRC is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The description of the proposed work and assessment of associated environmental impacts has been undertaken in context of clause 228 of the Environmental Planning and Assessment Regulation 2000, *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (*Is an EIS Required?* guidelines) (DUAP, 1995/1996), *Roads and Road Related Facilities EIS Guideline* (DUAP, 1996), the *Biodiversity Conservation Act 2016* (BC 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 addendum REF helps to fulfil the requirements of:

- Section 5.5 of the EP&A Act, including that QPRC 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 addendum REF would be considered when assessing:

- Whether the proposed modification is likely to result in 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 Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the Biodiversity Conservation Act and/or Fisheries Management Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured.
- The potential for the proposed modification to significantly impact any other matters of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Australian Government Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. Need and options considered

2.1 Strategic need for the proposed modification

Chapter 2 of the determined REF addresses the strategic need for the project, the project objectives and the options that were considered. The proposed modification described and assessed in this addendum REF is consistent with the strategic need for the project.

At present, the only approved point of access to the northern section of the project is via Ellerton Drive. The Ellerton Drive project access point is located approximately 2.8 km from the bridge launching site. Active construction work is occurring along this 2.8 km length of the project, including bulk earthworks, culvert and drainage construction, and service relocations. The project site is narrow in many locations, and there are limited opportunities to provide light and heavy vehicle separation. There is a significant amount of heavy plant operating within the project site, often resulting in traffic congestion.

Under the current arrangements, bridge construction crews must travel the entire length of the northern portion of the project (2.8 km), through heavily congested work areas containing heavy plant and equipment, to reach the bridge launching site. The workers that require access to and from the bridge launching site on a daily basis experience significant safety risks due to the amount of time that they must spend interacting with large plant and navigating through high risk work areas. Additionally, these traffic movements have the potential to contribute to dust emissions from the project impacting on worker safety and residential amenity.

The purpose of the current proposal is to provide a more efficient and safer access route to the bridge launching site for the bridge construction workers, easing on the congestion within an already confined construction site. WBHO have identified that the interaction of light and heavy vehicles onsite is a significant high safety risk. Bridge site access from Lonergan Drive will eliminate the need for the majority of the bridge workers to travel the 2.8 km length of the construction site, to and from Ellerton Drive. This will significantly reduce the number of light vehicles travelling through active work areas, thereby reducing the risks associated with light and heavy vehicle interaction on site.

Additionally, the proposal would facilitate an improvement to the effective and efficient delivery of the project.

2.2 Options considered

2.2.1 Do nothing

Under this option, access to the bridge site for bridge construction workers would continue to be via the Ellerton Drive access gate. The bridge crew would be required to travel to and from the bridge site through 2.8 kilometres of active construction works. The workers that require access to and from the bridge launching site on a daily basis would experience significant safety risks due to the amount of time that they must spend interacting with large plant and navigating through high risk work areas. There would also be significant time loss due to the time that workers must spend travelling to and from the bridge site.

2.2.2 Provide access to the bridge site via Lonergan Drive

Under this option, access to the bridge construction site would be provided via an existing gate at the end of Lonergan Drive, Greenleigh. Bridge site access from Lonergan Drive will eliminate the need for the majority of the bridge workers to travel the 2.8 km length of the construction site, to and from Ellerton Drive. This will significantly reduce the number of light vehicles travelling through active work areas, thereby reducing the risks associated with light and heavy vehicle interaction on site.

This option would provide a more efficient and safe access route to the bridge construction site for the bridge construction workers, easing on the congestion within an already confined construction site. Additionally, this option would facilitate an improvement to the effective and efficient delivery of the project.

2.3 Preferred option

The preferred option is to provide access to the bridge site via Lonergan Drive. This option would provide a safer route of transport for workers accessing the bridge site and it would facilitate an improvement to the effective and efficient delivery of the project.

3. Statutory and planning framework

3.1 Environmental Planning and Assessment Act 1979

3.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

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

Certain developments such as the construction of roads by a public authority do not require development consent via the development application process (as per clause 94 of the ISEPP) but instead are assessed under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Proposal is for a public road and is to be carried out on behalf of QPRC. It is appropriately assessed for determination by QPRC under Part 5 of the EPA Act.

3.1.2 NSW Environmental Planning and Assessment Regulation 2000

Clause 228 of the NSW *Environmental Planning and Assessment Regulation 2000* identifies factors to be taken into account concerning impact of an activity on the environment. The proponent (QPRC) is obliged to consider clause 228 of the Regulation with regard to identification of environmental impacts of proposals. The factors specified under this regulation (What factors must be taken into account concerning the impact of an activity on the environment?) form the scope of this Addendum REF.

3.1.3 Local Environmental Plans

Queanbeyan Local Environmental Plan 2012

The proposed modification site is entirely within the Queanbeyan LEP area. Council has been, and will continue to be consulted on the proposal throughout the development and construction phases.

3.2 Commonwealth legislation

3.2.1 Environment Protection and Biodiversity Conservation Act 1999

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance (MNES) and impacts on Commonwealth land are required to be considered for the proposed modification.

Appendix B contains an analysis of the proposed modification against the EPBC Act factors.

3.3 Licences, permits and approvals

A range of licences, permits and approvals have already been obtained for the Project. These are outlined in the table below. No additional licences or permits would be required for the proposed modification.

Table 1 Licences, permits and approvals relevant to the determined Project

Existing requirement for the determined project	Identification of additional requirements or any change to the existing requirements as a result of the proposed modification
EPBC 2014/7304 Approval Decision 10 January 2017 EPBC 2014/7304 Approval Variation, 22 December 2017.	There are no additional requirements or changes to the existing requirements.
OEH concurrence, letter dated 10 June 2016	There are no additional requirements or changes to the existing requirements.
EPA Environmental Protection License (EPL 20852), 22 November 2016. Variation of Licence 20852, dated 28 February 2018	There are no additional requirements or changes to the existing requirements.
Aboriginal Heritage Impact Permit (AHIP) No: C0002305 and variation No: C0002441.	There are no additional requirements or changes to the existing requirements.
NSW DPI fisheries permit	There are no additional requirements or changes to the existing requirements.

4. Consultation

4.1 Consultation strategy

4.1.1 Queanbeyan-Palerang Regional Council

QPRC are the proponent and the determining authority for the project and this proposed modification. A community consultation strategy report was presented to QPRC a Planning and Strategy Committee meeting held at Council Chambers on 8 August 2018. The report was adopted by QPRC without change.

4.1.2 Office of Environment and Heritage

The Office of Environment and Heritage issued Conditions of Concurrence for the determined project. Each of these Conditions would still me met under the proposed modification, and no changes to the conditions would be required. However, notification of the proposed modification would be provided to the OEH.

4.1.3 Department of the Environment and Energy

The Department of the Environment and Energy (DoEE) have provided an Approval Decision for the determined project with Conditions. The Conditions of the Approval would still be met under the proposed modification, and no changes to the Conditions would be required. However, notification of the proposed modification would be provided to the DoEE.

4.1.4 Environment Protection Authority

The Environment Protection Authority (EPA) have issued an Environment Protection Licence (EPL) for the determined Project. The Conditions of the EPL would still be met under the proposed modification, and no changed to the Conditions would be required. However, notification of the proposed modification would be provided to the EPA.

4.1.5 Community consultation

A community consultation strategy report was presented to QPRC a Planning and Strategy Committee meeting held at Council Chambers on 8 August 2018. The report was made publicly available on QPRC's website and members of the public were able to register to make a short presentation to QPRC on the agenda item. No presentations were registered.

A notification letter regarding the proposed new access arrangements will be distributed to the residents of Lonergan Drive, Severne Street and Atkinson Street.

This Addendum REF will be placed on QPRC's Your Voice website for 14 days. Feedback from the consultation period will be summarised and included in an updated Addendum REF for Council's assessment and determination.

Following determination of this Addendum REF, and prior to the use of the Lonergan Drive access point, a second letter notification would be provided to the same group of residents to inform them of the outcomes of the QPRC determination. Should a determination be made to proceed, the notification will include an approximate date from which use of the access point would commence.

A Community Liaison Plan (CLP) has been prepared for this Project. Following the distribution of any notifications regarding this modification, comments or questions received by the Project Community Liaison team be managed and responded to in accordance with the requirements of the CLP. Should this modification be approved, all relevant community consultation aspects of the modification would be included in the CLP.

5. Environmental assessment

5.1 Traffic and transport

5.1.1 Existing environment

Lonergan Drive and Severne Street in Greenleigh are both sealed public roads with posted speed limits of 50 km/h.
There are no pedestrian footpaths along either of these roads.

The Annual Average Daily Traffic Counts (AADTs) for these roads are presented in Table 2 below. Although some of this data was collected as early as 2009, the population of Greenleigh has only increased slightly in this time and so the current traffic counts would be very similar.

There is an existing school bus route with multiple stops along Severne Street.

Table 2 Average daily traffic volumes for streets in Greenleigh

Street (location)	Average Daily Traffic Volume	Year measured
Severne Street (Considine Close to Woodman Place)	753	2009
Severne Street (Morris Close to Considine Close)	1021	2015
Lonergan Drive (Severne Street to Beston Place)	345	2015
Lonergan Drive (Beston Place to end)	100	2012

5.1.2 Potential impacts

An estimated 20 light vehicles are likely to enter the Project site via the Lonergan Drive access per day. This would result in approximately 40 to 50 additional light vehicle movements per day along Lonergan Drive and Severne Street, assuming that several of the vehicles also leave and re-enter the site during the day. The vehicle movements would be concentrated in the early morning (prior to 7am) and late afternoon (generally after 6pm) as workers arrive for work and go home at the end of the day. However, some vehicle movements would occur throughout the daytime. There would be no heavy vehicle access or deliveries to the construction site via this access point.

The use of the Lonergan Drive access point would increase the volume of light vehicle traffic along Severne Street and Lonergan Drive. On Severne Street, between Considine Close and Morris Close, the additional project-related traffic would represent a 4% increase in traffic volume. On Severne Street, between Considine Close and Woodman Place, there would be approximately a 7% increase. Residents living on Severne Street are unlikely to notice the increased traffic associated with the project.

Near the end of Lonergan Drive, where the existing traffic is up to 100 vehicles per day, the additional traffic would represent a 50% increase which could potentially be noticeable to residents. However, even with the additional Project-related traffic, Lonergan Drive would remain a low traffic area. Further, the vehicle movements would be concentrated in the early morning when there are few local vehicles using the road, and evening when the majority of traffic would be travelling in the opposite direction. The vast majority of project-related traffic movements will not coincide with any school bus traffic through Greenleigh.

The additional vehicle traffic associated with the modification would be consistent with the type of traffic that currently uses these local roads (ie. light vehicles). These roads are designed for light vehicles and the proposed modification is unlikely to exceed the existing traffic volume capacity of these two local roads.

There would be no project related vehicles parking on Lonergan Drive or restricting access to any nearby private properties. All project related vehicles using the Lonergan Drive access point would be required to park inside the Ellerton Drive Extension project at designated parking areas.

In line with the determined REF, additional access points to the project site have been investigated to facilitate effective and efficient delivery of the project. The use of the Lonergan Drive access point by a limited number of project-related light vehicles would likely result in low traffic, transportation and access impacts.

The extent and magnitude of impacts associated with the proposal are considered to be minor in comparison to the determined Project.

5.1.3 Safeguards and management measures

To ensure that potential traffic and transportation impacts are minimised and avoided, the following mitigation measures would be implemented by WBHO:

1. Within the first month of the operation of this access, WBHO will contact and consult with residents along Lonergan Drive regarding the use of this access route to ensure the potential impacts of using this road are well mitigated and managed.
2. The use of the Lonergan Drive access route will be limited to light vehicles only. No heavy vehicles are to use Lonergan Drive to access the project site.
3. Access will only be provided to selected staff involved in bridge construction.
4. A permit system will be implemented whereby WBHO will provide individual inductions, site instruction and management tools to staff using this access point.
5. The use of the Lonergan Drive access point will be restricted to the following hours:
    - 6:30am to 6:30pm, Monday to Friday.
    - 7:30am to 1:30pm, Saturdays.
6. No access via Lonergan Drive will be permitted on Sundays or Public Holidays.
7. WBHO will provide a secure and stabilised site access point. A lockable gate is already installed at the end of Lonergan Drive. WBHO will ensure that access can be controlled at all times.
8. Adequate signage will be provided on the gate/fence at the site entry point to ensure that people can identify the site as a construction site and that relevant project contact phone numbers are available.
9. Environmental controls will be implemented to minimise mud/dirt tracking from the project onto Lonergan Drive and other public roads.
10. WBHO will develop a Traffic Control Plan for this access point. The TCP will identify additional traffic controls on Lonergan Drive to ensure that pedestrian traffic can be safely separated from vehicle traffic, safe speeds are maintained, and that no road users park at the gate outside of nominated hours.

The relevant project management plans would be updated with the above mitigation measures to ensure their ongoing implementation and monitoring.

5.2 Noise and vibration

5.2.1 Existing environment

Current sources of noise along Severne Street and Lonergan Drive primarily includes local traffic, and construction and maintenance activities carried out by landowners on private property. Construction activities associated with the determined project can also be heard from several locations and properties on Severne Street and Lonergan Drive.

5.2.2 Potential impacts

The proposed site access off Lonergan Drive would result in the movement of additional light vehicle traffic through Greenleigh, along Severne Street and Lonergan Drive. These traffic movements would be concentrated in the early morning and late afternoon/evening as workers arrive for work and then go home at the end of the day. Some vehicle movements would occur throughout the daytime. There will be some traffic noise associated with the movement of these vehicles along the proposed access route. Given the small number of vehicle movements per day, and the restricted use of the route to light vehicles only, it is anticipated that Lonergan Drive would remain a low traffic and low noise environment.

The use of Lonergan Drive would not result in an overall increase to the noise impacts generated by the project, as it would not generate additional traffic movements. It would result in a portion of the construction-related traffic entering the project site via Lonergan Drive instead of via Ellerton Drive. The extent and magnitude of noise impacts associated with the modification are considered to be minor in comparison to the determined Project. There would be no additional vibration impacts as a result of the proposed modification.

5.2.3 Safeguards and management measures

The recommended noise and vibration mitigation measures of the determined REF, which includes the implementation of the Construction Noise and Vibration Management Plan, are still applicable. The mitigation measures outlined in the Traffic, transportation and access section above will assist with avoiding and minimising any potential traffic noise impacts. No additional noise or vibration mitigation measures are proposed.

5.3 Other environmental factors

5.3.1 Existing environment, potential impacts and mitigation measures

Table 3 Assessment of other environmental factors

Environmental factor	Existing environment and potential impacts	Mitigation measures
Biodiversity	The proposal will not require any additional land clearing to be undertaken. There is an existing unsealed road from the end of Lonergan Drive into the construction site (refer to Figure 1). The determined project includes sealing of this access road, and the potential impacts have already been assessed in the determined REF. There would be no additional impacts on any vegetation, waterways or other habitats as a result of the current proposal.	There is no change in biodiversity impacts from the determined REF, and no changes or additional measures are required.
Socio-economic issues	The project boundaries would not be changed as a result of the proposal. As such, no change in the assessment of impacts on land use and property is identified. The use of Lonergan Drive as a point of access for the bridge construction workers will improve the effective and efficient delivery of the project. There will be significant time savings for workers, who would reach their work site more efficiently compared to travelling 2.8 km through the active construction site to and from Ellerton Drive entrance.	There is no change in socio-economic impacts (other than noise and traffic, discussed separately in Sections 5.1 and 5.2) from the determined REF, and no changes or additional measures are needed.

Environmental factor	Existing environment and potential impacts	Mitigation measures
Geology, soils and water	The proposed access point off Lonergan Drive would not change the project footprint. Risks to soils and water would be managed through standard environmental controls which are implemented elsewhere on the project. This would include a stabilised access and suitable erosion and sediment control measures to prevent offsite pollution.	There is no change in geology, soil and water impacts from the determined REF, and no changes or additional measures are required.
Air quality	The proposal will not change the overall volume of vehicles that access the project site. However, there would be a minor decrease in the volume of bridge construction related traffic movements along the unsealed access roads through the project site north of the river. Instead, this traffic would be travelling to the bridge site along Severne Street and Lonergan Drive which are sealed public roads. This would reduce the potential for dust emissions to result from the traffic movements along the unsealed site roads. There would be an overall reduction in negative air quality impacts as a result of the proposal.	The recommended air quality mitigation measures of the determined REF are still applicable, and no changes or additional measures are needed.
Aboriginal and non-Aboriginal heritage	The construction footprint, alignment, and location of the roadwork footprint does not change as a result of the modification. The Lonergan Drive access point uses already disturbed areas. The works will remain entirely within the approved project boundary.	There is no change in Aboriginal and non-Aboriginal heritage impacts from the determined REF, and no changes or additional measures are required.

Environmental factor	Existing environment and potential impacts	Mitigation measures
Landscape character and visual impacts	There would be some very minor changes in short term visual impact due to the additional traffic movements through Lonergan Drive and Severne Street in Greenleigh. The traffic would comprise light vehicles, predominantly private vehicles of the bridge construction crew. Severne Street and Lonergan Drive are public roads, and the additional traffic would generally not be discernible from the local traffic that already uses these roads. This impact is not expected to be significant given that the traffic movements would be concentrated in the early morning (between approximately 6:30am and 7:00am) and evening (5:30pm to 6:30pm).	There is no significant change in the landscape character and visual impacts from the determined REF, and no changes or additional measures are required.
Lighting	The additional access point off Lonergan Drive may require the use of lighting at the entrance point, outside of daylight savings. Any lighting implemented at the gate would not be orientated to affect any of the nearby residences, which are either located uphill from the entrance point or are shielded by vegetation along their property boundary. During daylight savings, there would be no requirement for lighting at the site entry. The assessment of significance of temporary and short term negative impacts from light spill, in the determined REF does not change as a result of the proposal.	The recommended mitigation measures identified in the determined REF are still applicable, and no changes or additional measures are needed. A Light Pollution Management Plan exists for this project and this plan would be implemented for any lighting that may be associated with the Lonergan Drive access point.
Waste	The proposed modification will not alter the waste and resource management streams. There would be no additional waste impacts associated with the proposed modification. The assessment of significance of temporary and short term negative impacts on waste and resource use, in the determined REF are not changed.	The recommended waste mitigation measures identified in the determined REF are still applicable, and no changes or additional measures are needed.

Environmental factor	Existing environment and potential impacts	Mitigation measures
Climate change	The proposed modification will not result in an increase to emissions resulting from the Project. Overall there will be no changes in the assessment of significance of negative impacts on climate change as a result of the construction of the alternative bridge.	The recommended mitigation measures identified in the determined REF are still applicable, and no changes or additional measures are needed.
Cumulative impacts	There will potentially be some minor and short term cumulative noise impacts to residents of Lonergan Drive, who are already experiencing some noise impacts from the active construction works. The potential additional noise impacts from the project-related traffic movements would be minor and short term.	The recommended mitigation measures identified in the determined REF are still applicable and no changes or additional measures are needed.

6. Environmental management

6.1 Environmental management plans

A number of additional safeguards and management measures have been identified to minimise adverse environmental impacts which could potentially arise as a result of the proposed modification. Should the proposed modification proceed, these management measures would be incorporated into the existing Construction Environmental Management Plan (CEMP) and relevant Sub-plans and applied during the operation of the proposed modification.

The CEMP contains the following environmental management sub-plans:

1. Flora and Fauna Management Plan
2. Weed Management Plan
3. Soil and Water Management Plan
4. Clearing and Grubbing Plan
5. Flood Management Plan
6. Contaminated Land and Water Management Plan
7. Pollution Incident Response Management Plan
8. Asbestos Management Plan
9. Aboriginal Cultural Heritage Management Plan
10. Community Liaison Sub-plan
11. Noise and Vibration Management Plan
12. Air Quality Management Plan
13. Waste Management Plan
14. Resource Management Plan
15. Bushfire Management Plan
16. Light Pollution Management Plan

7. Conclusion

7.1 Justification

Environmental impacts associated with the proposed modification have been avoided, minimised, or mitigated wherever possible, through safeguards and management measures. The proposed modification does not alter in any way the project, which is to construct and operate an extension of Ellerton Drive. It would not result in a substantive change to the objectives and functions of the determined project. This proposal would facilitate the effective and efficient delivery of the project, and would not change the objectives of the determined project as a whole.

7.2 Objects of the EP&A Act

Objects of the EP&A Act have been reviewed and updated where required to reflect changes in impacts due to the proposed modification. Table explains how the proposed modification performs against the objects of the Act and references earlier sections of this addendum REF where greater detail is provided.

Table 4 Objects of the EP&A Act

Object	Comment
a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The proposed modification supports the construction of the Ellerton Drive Extension project, improving safety and travel efficiency which will benefit the local community.
b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	The application of the principles of ecologically sustainable development to the proposed modification are consistent with the determined project REF.
c) to promote the orderly and economic use and development of land.	Not relevant to this proposal.
d) to promote the delivery and maintenance of affordable housing.	Not relevant to this proposal.
e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The proposed modification would have no impact on threatened species of native animals and plants, ecological communities or their habitats.
f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The proposed modification will have no impact on built and cultural heritage.
g) to promote good design and amenity of the built environment.	Not relevant to this proposal.
h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to this proposal.

Object	Comment
i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Both Roads and Maritime Services and QPRC have been involved in the environmental planning and assessment for this proposed modification.
j) to provide increased opportunity for community participation in environmental planning and assessment.	The proposed modification has been notified to potentially affected residents, who have had the opportunity to provide comments.

7.3 Conclusion

Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies to the proposed modification. The proposed modification has been reviewed in the context of the Ellerton Drive Extension REF and considered against the requirements of sections 5.5 and 5.7 of the (EP&A Act).

In considering the proposed modification this assessment has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity as addressed in this Addendum REF, and associated information. This assessment is considered to be in accordance with the factors specified in the guidelines, *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (DUAP 1996) and *Roads and Related Facilities* (DUAP 1996) and the factors under clause 228 of the *Environmental Planning and Assessment Regulation 2000*.

The Ellerton Drive Extension, including the proposed modification described in this Addendum REF, will have some environmental impacts which can be ameliorated satisfactorily. Having regard to the safeguards and management measures proposed, this assessment has considered that these impacts are unlikely to be significant and therefore an environmental impact statement does not need to be prepared and approval for the proposal does not need to be sought under Division 5.2 of the EP&A Act.

The assessment has considered the potential impacts of the activity on the biodiversity values listed under the *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 1994*.

The proposed modification described in this Addendum REF will not have any additional impact on biodiversity values listed under the *Biodiversity Conservation Act 2016*. Therefore, the concurrence of the Chief Executive of the Office of Environment and Heritage (OEH) and a species impact statement or a Biodiversity Development Assessment Report (BDAR) is not required.

The assessment has also addressed the potential impacts of the activity on matters of national environmental significance and any impacts on the environment of Commonwealth land and concluded that there will be no significant impacts. Therefore, there is no need for any referral or variation to the current DoEE Approval.

While there would be some environmental impacts from the proposed modification, they have been avoided or minimised where possible through site-specific safeguards. The benefits of the proposal are considered to outweigh the adverse impacts that may be generated by the proposal, which are mostly temporary and local in nature.

8. Certification

This addendum review of environmental factors provides a true and fair review of the proposed modification 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 proposed modification.

Alana Gordijn
Environmental Site Representative
WBHO Infrastructure
Date: 14/08/2018

Section below would be completed after assessment determination by Council.

I have examined this addendum review of environmental factors and accept it on behalf of Queanbeyan-Palerang Regional Council.

[Insert name]

[Position title]

Date:

Appendix A

Ellerton Drive Extension REF (SMEC, 2016)

SMEC

Local People. Global Experience.

Ellerton Drive Extension

Review of Environmental Factors

April 2016

For: Queanbeyan City Council

DOCUMENT/REPORT CONTROL FORM

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Revision Number:	4

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Executive Summary

Queanbeyan City Council (QCC) proposes to construct a four kilometre (km) extension of Ellerton Drive, Queanbeyan, from the existing Ellerton Drive at East Queanbeyan to Old Cooma Road and Edwin Land Parkway at Karabar, in Queanbeyan, New South Wales. A total project length of 4.69 km includes upgrade works to a portion of existing Ellerton Drive.

The 4.69 km Ellerton Drive Extension (the Proposal / EDE) provides an alternative route around the Central Business District and connects east and west Queanbeyan to the new southern population growth areas.

The Proposal would cater for future growth mainly arising from increase residential development within Queanbeyan. It has been identified in the strategic business case (Roads and Maritime Services, 2014b) that the project would improve travel times, travel experience and the liveability of the city. It supports regional development through improved connectivity to jobs and services, and it improves road safety and sustainability through reduced road congestion. It allows connectivity across the Queanbeyan River when in flood, protecting against greater than the 1 in 100 year event.

The Proposal would involve the construction of a two lane road (i.e. one travel lane in each direction) with climbing lanes in areas with steep grades, a bridge over the Queanbeyan River and supporting infrastructure including shared paths, lighting, stormwater drains and fauna under-passes. The new road construction would be approximately 4 km with 700 m of existing Ellerton Drive to be upgraded.

Key features of the Proposal include:

- 2 lane single carriageway design with climbing lanes
- Bridge crossing over Queanbeyan River and Barracks Flat Drive
- Shared cyclist and pedestrian pathway
- Provision for on-road cyclists
- Additional access points for Fairlane Estate
- Emergency egress for Greenleigh Estate at Lonergan Drive and the East Queanbeyan reservoir
- Stormwater drainage system, including pavement surface drainage and culverts
- Two fauna under-passes
- Potential for pedestrian under-passes at Jumping Creek Estate
- Noise mitigation measures
- Edwin Land Parkway Intersection upgrade

The original Review of Environmental Factors (REF) was placed on public exhibition in December 2014, based on the concept design current at that time. The design has subsequently developed as the detailed design has been progressed. As a result the REF has been revised to reflect the changes in design and temporary works as currently reflected in the detailed design, and the environmental impact assessments (refer ngh Environmental 2016, Species Impact Statement Addendum).

This updated REF is a revised version of the December 2014 REF with amendments integrated throughout the document. The REF is divided into eight sections. Each section provides a detailed account of the Proposal. Section one provides an overview of the Proposal.

Section two highlights the needs and the options considered for the Proposal. The Proposal is required to cater for the increase in residential development and to provide greater accessibility and connectivity for freight, business and private travel. Alternate options, in addition to the Ellerton Drive Extension Proposal, were considered during the development of the Proposal; however, these alternate options were not adopted as they did not improve the level of service, or they resulted in greater environmental harm, or they had higher cost estimates.

Section three provides a detailed description of the Proposal. This includes the design development and the construction methods for the project.

Section four provides the statutory and planning framework for the Proposal. As the Proposal is for a road and is to be developed by a public authority, QCC, the Proposal is assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Section five discusses community and stakeholder consultation. A significant level of consultation has been undertaken with the local community, Aboriginal community and government agencies. This REF would be on display for community input.

Section six provides the environmental impacts. Short and long term, positive and negative, environmental impacts associated with the Proposal during the project's construction and operational phases are addressed in this section. A species impact statement was undertaken and an offset strategy is being developed to offset adverse impacts on native species protected under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and the NSW Threatened Species Conservation Act 1997. Noise, visual, heritage, aquatic and wildlife connectivity assessments have been undertaken. These assessments are described and mitigation measures proposed for adverse impacts.

Section seven provides the environmental safeguards that would be applied during construction and operation of the proposed road. Potential adverse environmental impacts from the Proposal have been avoided or reduced during the preliminary design and options assessment phases; some impacts are likely to occur with regard to construction and operational noise, visual impacts, threatened species, native vegetation and water quality. A series of environmental safeguards addressing the main environmental issues has been proposed and would be incorporated into the Construction Environmental Management Plan at the construction phase.

Section nine provides the Proposal justification and the concluding statements. This REF highlights that the Proposal is needed to improve safety and traffic flows in the Queanbeyan CBD and wider area, provides a greater than 100 year flood connection across the Queanbeyan River and services Queanbeyan's economic development.

In summary, the REF determines that the negative impacts are outweighed by the long term positive impacts of the Proposal. This Proposal would reduce travel time for road users, improve the Queanbeyan CBD environs and cater for the region's anticipated economic growth. It is the key component in the program of works required to maintain the required Level of Service D for the road network. The adverse ecological impacts of the Proposal are being offset. Other adverse impacts have been or are being mitigated to as low a level as is practical.

On balance the project is justified and should be approved under the EPA Act.

1. Introduction

1.1 Proposal identification

1.1.1 Proposal summary

The Proposal is for the construction and operation of a two lane, single carriageway, sealed road as an extension to Ellerton Drive at East Queanbeyan to Old Cooma Road and Edwin Land Parkway at Karabar, in Queanbeyan, New South Wales.

The 4.69 km Proposal provides an alternative route around the Central Business District and connects east and west Queanbeyan to the new southern population growth areas.

As identified in the strategic business case (Roads and Maritime Services, 2014b), the project would improve travel times, travel experience and the liveability of the city. It supports regional development through improved connectivity to jobs and services, and improves road safety and sustainability through reduced road congestion.

The Proposal provides an eastern, alternative route around the Queanbeyan CBD and is designed to accommodate B-Double movements. The objective of the Proposal is to retain a minimum Level of Service (LOS) D to Queanbeyan's road network, and reduce heavy vehicle movements and traffic congestion in the Queanbeyan city centre by providing an alternative route for traffic travelling on the north/south route through Queanbeyan. It would provide relief to Cooma St, Monaro St, Queens Bridge and various CBD roads from the increase in traffic passing through the entire Queanbeyan area due to the growth in development throughout Queanbeyan.

A bridge across the Queanbeyan River is included in the Proposal to provide in excess of 1:100 year flood free accessibility and connectivity for Queanbeyan. The new bridge would be built out of concrete and would be approximately 184 m long and 22 m above the river.

Once the Proposal is in operation, Kings Highway, which extends through the Queanbeyan CBD, would become an increasingly pedestrian friendly environment enabling further civic and inner city improvements.

The Proposal broadly consists of a two lane road; one travel lane in each direction with climbing lanes in areas with steep grades, and a bridge over the Queanbeyan River. The terrain is undulating and there would be a general balance of cut and fill batters on the road. The overall length is 4.69 km and the total development footprint is approximately 49.6 ha. Of the overall length, approx. 4 km is new construction in greenfield sites and the balance of the length consists of upgrades to the existing Ellerton Drive.

Figure 1 shows the road's location in the context of the city and its existing arterial roads. Figure 2 shows the concept and present Proposal's construction footprint, the primary subject of this report.

Figure 10 - Figure 13 show proposed compound and stockpile sites. Extensions to stock pile areas and compound sites have been carefully selected in areas that are already disturbed and have no identified Aboriginal sites. QCC would continue to investigate opportunities for suitable access points, stockpile sites and compound areas to facilitate effective and efficient delivery of the project. Should additional sites be identified for use (e.g. Jumping Creek Estate or other cleared areas), all appropriate approvals would be obtained, and the construction footprint adjusted when necessary, but only in areas where only exotic vegetation or disturbed lands would be affected.

The project development phase was funded and formed part of the NSW Government commitment to providing $4 million over four years for the project development of Ellerton Drive Extension, Dunns Creek Road, Old Cooma Road and the design of 13 intersection improvements throughout Queanbeyan.

The project construction cost estimates, based on the preliminary design, are between $75 million and $90 million but these may change due to the final design.

In June 2014, the State and Commonwealth Governments announced a joint funding agreement of $50 million for the project: 50% Federal Government, 25% Re-Start NSW and 25% Transport for NSW. Agreements with land developers are anticipated to provide an additional level of funding. This arrangement is subject to further ongoing analysis.

1.1.2 Proposed works

The works would consist of earthworks, the construction of a two lane, single carriageway road (i.e. one travel lane in each direction) with climbing lanes in areas with steep grades, the construction of a two lane bridge and supporting infrastructure including shared paths, lighting, stormwater drains and fauna under-passes.

1.1.3 Key design changes since Concept Design

Key changes to the proposal since publication of the SIS and the original REF (Dec. 2014) are detailed below, shown in outline in Figure 2:

- The centreline and vertical alignment of the approximately 4 km extension of Ellerton Drive has shifted marginally in some locations, so that some areas previously not impacted would now be impacted and vice versa. The centreline has been adjusted in different directions and the vertical alignment improved to minimise earthworks and optimise the vertical profile. The subject site is therefore narrower in some locations and slightly wider at several points mostly due to changes in required cut and fill batters.
- Erosion and sediment control elements have been added to the design, some of which are slightly outside the originally SIS assessed areas.
- The proposed northern construction compound area has increased substantially in size, and now also includes a section of the existing Ellerton Drive. The proposed bridge compound area on the south bank of the Queanbeyan River has increased in size.
- Minor adjustments to the footprint have been made to accommodate the shared path connections to various neighbourhoods.
- One bridge would be constructed over Queanbeyan River, rather than two, as the roadway is no longer a dual carriageway. This reduces the project footprint over the river.
- Several new potential stockpile sites have been identified and included in the updated assessment.
- Noise walls are being installed at various locations along the alignment. The area required for the wall along the properties on Severne Street has been added to the footprint. The remainder of the walls are within the original footprint.
- The entire intersection at Edwin Land Parkway and Old Cooma Road is now included within the total project footprint.

- The footprint is slightly wider at one location adjacent to Severne Street to accommodate an access driveway to a residential property.
- Stone Mastic Asphalt is being installed on the main alignment for noise attenuation.
- Public utility relocation is proposed at various locations.

These changes are a result of progressing the detail design towards its final phase.

1.1.4 Setting

The Proposal alignment runs between southern Queanbeyan and northeast Queanbeyan along the eastern urban fringe and in an alignment predominately set aside and zoned for this development. The landscape incorporates dry forest and woodland some of which is listed under State and Federal law for conservation and protection. The land also falls within the fringe of the Local Environment Plan's 'biodiversity overlay' as part of a regional bio-link. The local vegetation also contains threatened species habitats and listed endangered ecological communities. The Queanbeyan River would be bridged in an area where some local riparian, aquatic and recreational values have been identified.

1.1.5 Timing

The project is proposed to be constructed between 2017 and 2019. The anticipated duration of major construction is approximately 30 months. The road extension is required to be operational by 2019.

1.2 Purpose of the report

This Review of Environmental Factors has been prepared by SMEC Australia Pty Ltd on behalf of Queanbeyan City Council (QCC). For the purposes of these works, QCC is the proponent and a 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 impacts of the Proposal on the environment and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts has been undertaken in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000,* the *Threatened Species Conservation Act 1995* (TSC Act) and the *Fisheries Management Act 1994* (FM Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act, i.e. that QCC examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by the Proposal.

A Species Impact Statement has been produced under the TSC Act, which addresses OEH's Director Generals Requirements (DGRs). A Referral to the Commonwealth Department of Environment has resulted in the Proposal being determined as a controlled action with preliminary documentation under the *Environment Protection and Biodiversity Conservation Act 1999*. QCC has determined that an REF would serve the purposes of the EP&A Act and that an EIS is not required.

1.3 REF revision

The REF (8 December 2014), based on the project concept design and released for public exhibition and comment, has been revised in response to public comments and

with respect to the revised project detailed design and the Species Impact Statement Addendum (ngh Environmental 2016).

This REF document (April 2016) addresses public comment and incorporates the revised project designs.

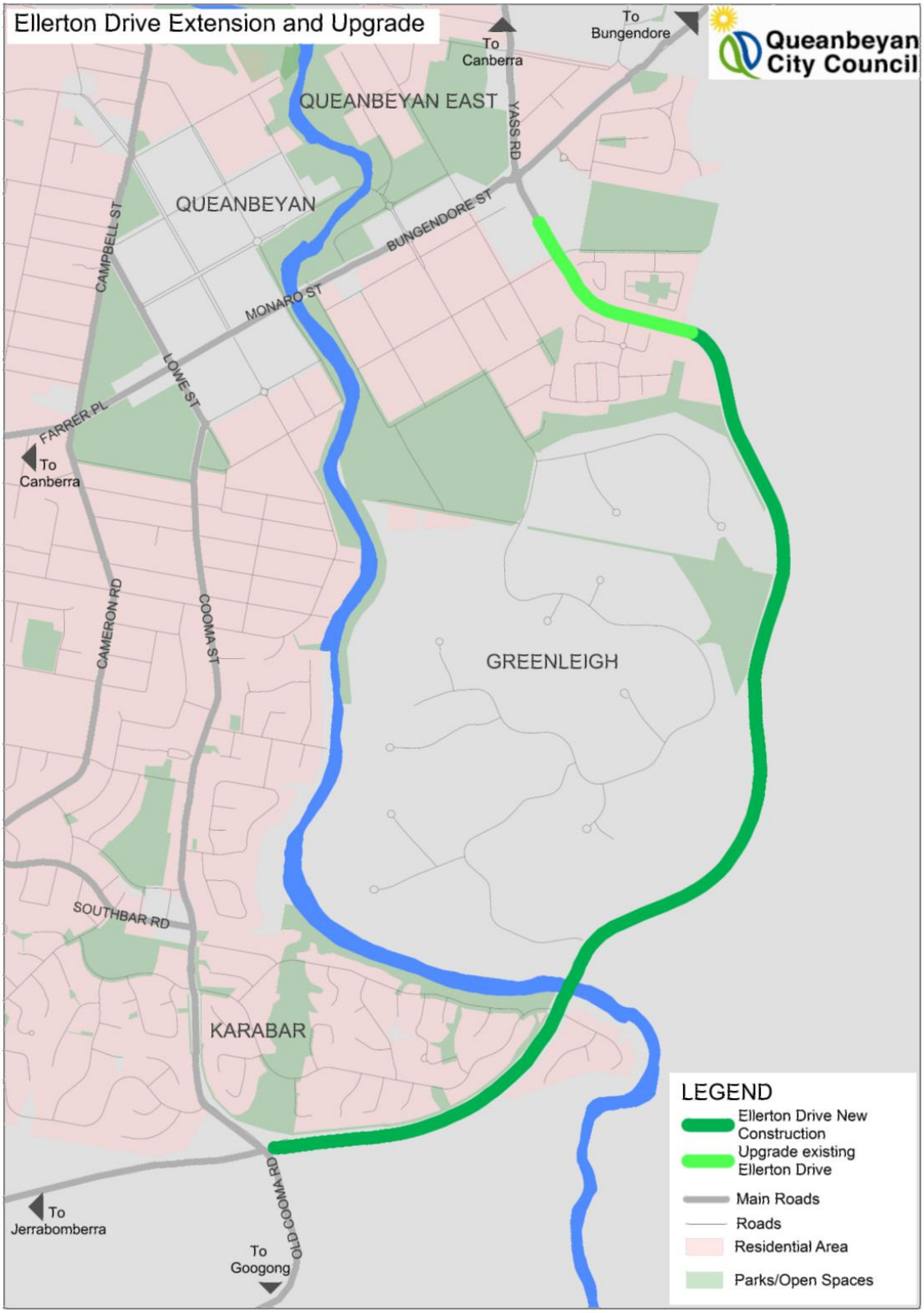

Figure 1. Location of Ellerton Drive Extension.

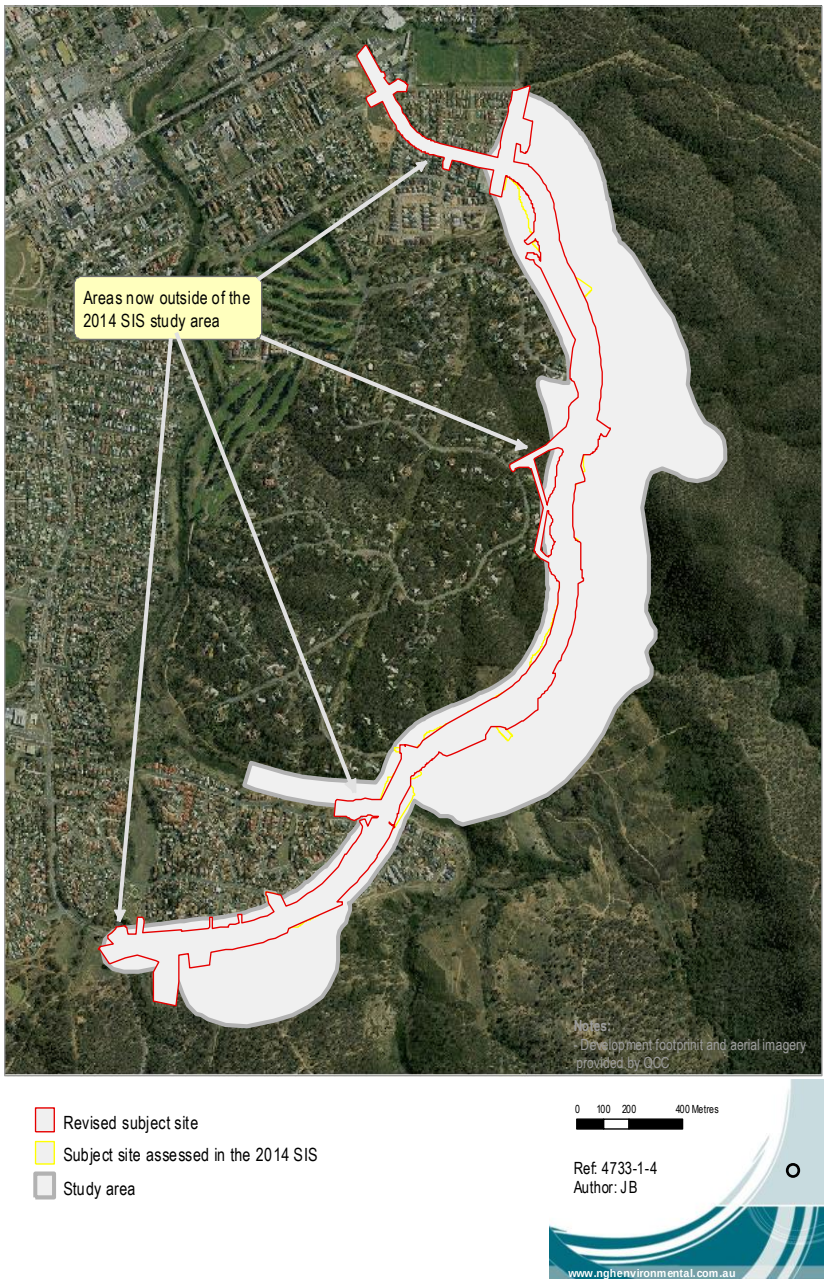

Figure 2. The Ellerton Drive Extension construction footprint (red outline).

2. Needs and options considered

2.1 Strategic need for the Proposal

The strategic need for the Proposal is drawn from the Strategic Business Case (Roads and Maritime Services, 2014b) which is discussed in section 2.2, the Googong and Tralee Traffic Study (2031) which is discussed in section 2.1.8 and other wider plans for transport and road infrastructure in the Queanbeyan area discussed below.

2.1.1 Proposal objectives

The following project objectives are outlined as context for the analysis of options and strategies:

- Maintain the required Level of Service D for the road network (the key component in the program of works);
- Provide an eastern alternate route around the Queanbeyan CBD;
- Reduce heavy vehicle (including B-Double) movement in the Queanbeyan CBD;
- Reduce traffic congestion in the Queanbeyan CBD;
- Create a pedestrian friendly environment in the Queanbeyan CBD;
- Provide a safer environment in the Queanbeyan CBD for both vehicles and pedestrians;
- Provide an alternative access across the Queanbeyan River in case of a greater than 1:100 year flood event (up to a 1:2000 year flood);
- Include fauna friendly design to reduce road kill and population fragmentation.

The primary drivers of this project are:

- The need to provide greater accessibility and connectivity (measured in terms of travel times and reliability) for both freight, business and private travel; and
- To ensure that the road environment is as safe as possible for all users.

The main customer benefits this project provides are:

- The maintenance of the required Level of Service D along Cooma Street, Queens Bridge and the Queanbeyan CBD.
- Maintaining transport assets through improving the quality of the road network.
- Improving transport services and operations through improved customer satisfaction, improving freight efficiency, improving journey travel times, reducing crash rates, and providing additional infrastructure for walking and cycling.
- Growing the transport system by potentially increasing the capacity for public transport services through additional routes and increasing the capacity of the freight network.

Figure 3 shows the traffic issues, which, with the EDE implemented, would significantly reduce the need for commuting traffic to enter the CBD.

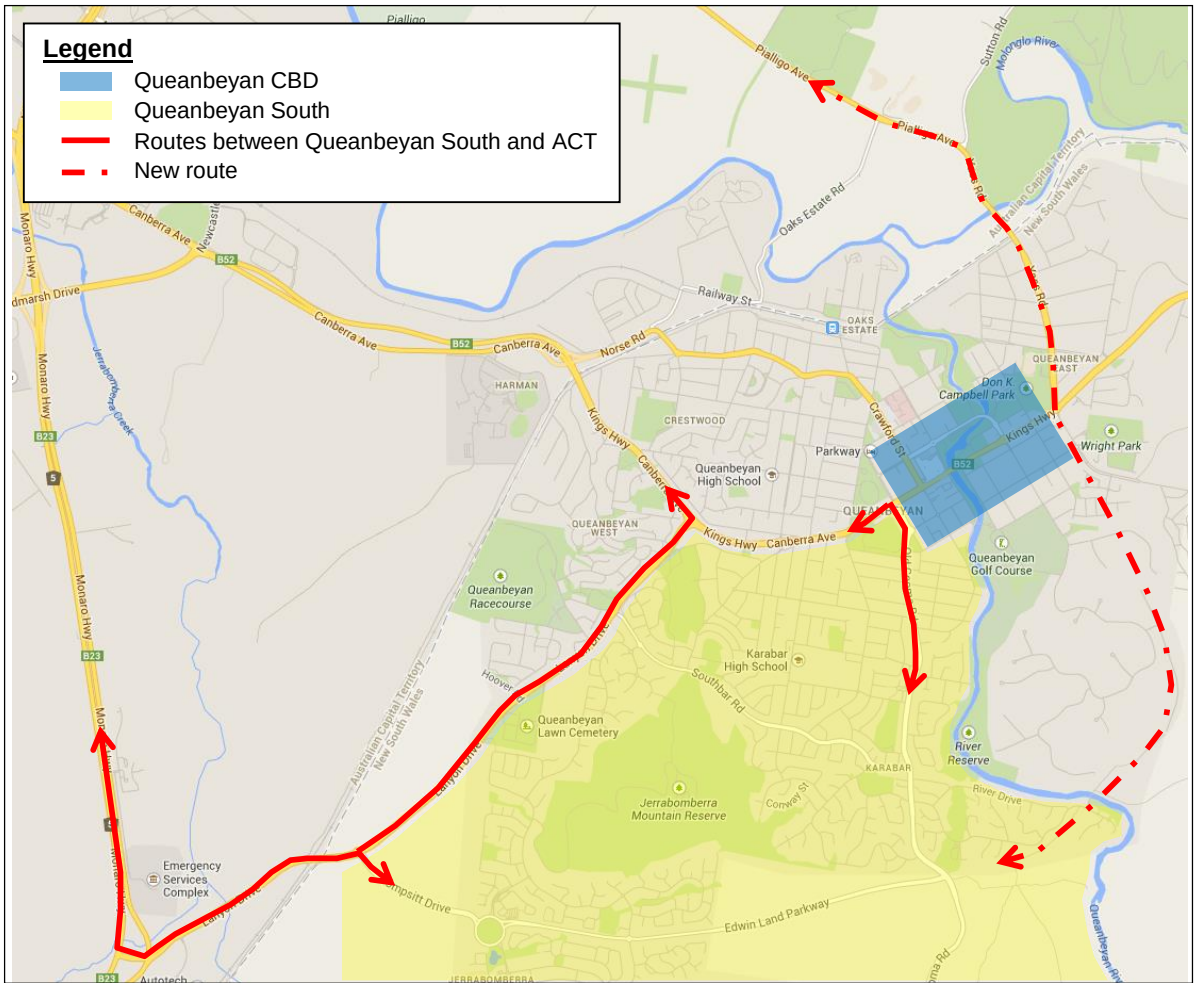

Figure 3. Future travel routes between Queanbeyan and the ACT, with the Ellerton Drive Extension.

2.1.2 NSW 2021: A plan to make NSW number one

NSW 2021: A plan to make NSW number one (NSW Government, 2011) is the NSW Government strategic business plan, and aims to set priorities and guide resource allocation. It is a 10 year plan to rebuild the economy, return quality services, renovate infrastructure, restore government accountability, and strengthen local environments and communities. These five core strategies are supported by 32 goals. Goals under 'return quality services' are directly relevant to the Proposal, specifically Goal 7: Reduce travel time, and Goal 10: Improve road safety.

Travel times would be reduced by diverting traffic from Cooma Street away from the CBD, reducing congestion. Travel times would improve both within the CBD, and for through traffic, from ACT and NSW. Whilst the NSW 2021 report specifies this goal for Sydney, it is relevant to all NSW cities.

Improved road safety would be achieved by reducing congestion, particularly heavy vehicles, in the Queanbeyan CBD. This would create a safer environment for pedestrians, cyclists and vehicles by reducing potential conflict between these varying modes of transport and heavy vehicles. Cyclist safety would also be increased with the inclusion of a cycle path with numerous connections to the Proposal. The Proposal would be designed and constructed to appropriate safe design standards, with appropriate clear zones, speed zone signposting and, as it is a distributor road, minimal accesses to reduce conflicts.

2.1.3 NSW State Infrastructure Strategy 2012–2032

The *NSW State Infrastructure Strategy 2012–2032* (Infrastructure New South Wales, 2012) builds on the NSW Government's existing public commitments and outlines a forward program of more than 70 urban and regional projects, and reforms across transport, freight, aviation, energy, water, health, education and social infrastructure that should take priority over the next five, 10 and 20 years.

The *NSW State Infrastructure Strategy* recognises that improvements to local transport are necessary for regional communities, to reduce congestion and improve safety. The benefits of alternate routes are also addressed, including improved amenity and reduction in trucks in town centres. The construction of the Proposal is in line with recommendations of the Master Plan by reducing congestion and truck use of the CBD and improving safety.

2.1.4 NSW Long Term Transport Master Plan

The *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) sets the direction for transport planning for the next 20 years, providing a framework for transport policy and investment decisions that respond to key transport challenges. The Plan has identified eight objectives for the NSW transport system, including improving liveability, supporting regional development and improving sustainability. Construction of the Ellerton Drive Extension is in line with these objectives.

2.1.5 Southern Regional Transport Plan

The *Southern Regional Transport Plan* ((Transport for NSW, 2014) provides more detail on the *NSW Long Term Transport Master Plan*. It identifies transport challenges unique to the southern NSW region, and the future actions required to resolve these. The plan aims to deliver a transport system that is reliable, comprehensive, safe and efficient.

Challenges relevant to the Queanbeyan region include delivering better transport links within and to regional cities, and making cycling easier. The Proposal supports these

goals by improving travel efficiency through Queanbeyan, removing congestion in the CBD and providing cycling access.

2.1.6 Sydney – Canberra Corridor Regional Strategy 2006 – 31

The Sydney – Canberra Corridor Regional Strategy (NSW Government Department of Planning, 2008) sets a framework for the Sydney – Canberra region's long term growth and environmental diversity. It recognises the need to commute efficiently across the region, whilst maintaining connectivity for centres within the region. Transport related actions include protection of the regional transport network, encourage the development of passenger interchanges in major centres, improve road, rail and bus services to cater for population growth, and control development adjacent to the major highway network and rail network.

The Proposal caters for predicted population growth in the Queanbeyan region, and improves connections to the ACT and the Kings Highway.

2.1.7 QCC Residential and Economic Strategy 2006 - 2031

The *QCC Residential and Economic Strategy 2006 - 2031* (QCC, 2006) provides a plan for residential and employment lands to accommodate expected growth to 2031.

In relation to the proposed EDE, the plan recognises traffic issues in the CBD, heavy vehicle impacts and alternate traffic route issues. The report recommends investigations into solutions that would alleviate traffic issues and support future growth.

2.1.8 Googong and Tralee Traffic Study 2031 and other updates

The QCC commissioned the *Googong and Tralee Traffic Study (2031)* (Traffic Design Group - formerly Gabites Porter, 2010) to identify when and where traffic network improvements should occur in Queanbeyan to ensure a suitable level of road network performance.

A working party consisting of QCC, Roads and Maritime (RMS), developers and Gabites Porter (now Traffic Design Group) developed the report, which was finalised after a peer review by a senior transport planner and senior transportation engineer. The method includes analysis against a computer model developed for Queanbeyan and testing was undertaken for each option as part of the analysis. Level of Service (LOS) measures (Table 1) were used to determine the average performance of roads and intersections in peak periods. The current Queanbeyan road network was identified to be operating at LOS D or better. To maintain this level of service, the future network, also allowing for additional development, must also operate at LOS D or better. Modelling of all options resulted in LOS E or LOS F conditions along Cooma Street and the Queens Bridge, unless Ellerton Drive was included. The addition of Ellerton Drive resulted in LOS D or better. The Ellerton Drive Extension was recognised as a key solution to traffic congestion on Cooma Street and the CBD.

Table 1. Level of service summary table.

LOS	Austroads Description	Road Section (vehicles per lane per hour)
LOS F	Forced flow. The amount of traffic approaching a point exceeds that which can pass it. Flow break-downs occur, and queuing and delays occur.	900 - 1700

LOS	Austroads Description	Road Section (vehicles per lane per hour)
LOS E	Traffic volumes are at or close to *capacity and there is virtually no freedom* to select desired speed and to manoeuvre within the traffic stream. Flow is unstable and *minor disturbances within the traffic stream would cause breakdowns in operation*.	720 - 1360
LOS D	Approaching unstable flow where *all drivers are severely restricted* in their freedom to select desired speed and to manoeuvre within the traffic stream. The general level of *comfort and convenience is poor* and small increases in traffic flow would cause operational problems.	585 - 1105
LOS C	Stable flow but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience has declined noticeably.	450 - 850
LOS B	Stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is less than LOS A.	Not applicable
LOS A	Free flow in which drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high and the general level of comfort and convenience is excellent.	

Note additional studies for elements of the network have been undertaken and these are summarised in the Strategic Business case and section 2.2.

The *Googong and Tralee Traffic Study (2031)* (Traffic Design Group, 2014) recommended a program of improvements to the Queanbeyan road network up until 2031. Results from modelling showed that Option 05B provided the best combination of traffic improvements to the long term strategic transport plan for all of Queanbeyan. Option 05B includes the EDE, the future four-lane expansion of Old Cooma Road and various intersection improvements to maintain the road network at a minimum Level of Service D.

The *Googong and Tralee Traffic Study (2031)* was updated in December 2014, and is referred to as the South Jerrabomberra and Queanbeyan Traffic Analysis 2014. Part 3 of this study identifies the recommended program of road and intersection improvements required by 2031.

This latest study used current census, land release information, infrastructure programs and traffic counts for both Queanbeyan and Canberra. This study supports the findings of the previous study in 2010.

Without the EDE, LOS E or worse (gridlock) is predicted along Cooma Street and across the Queen's Bridge in the AM peak by 2018. The Proposal is expected to carry about 7,600 vehicles per day by 2031. Drivers would enjoy an almost 40% travel time saving to 2031 – around 35% in the morning peak and 38% in the afternoon peak 1. This 2014 study has confirmed the need for the road but has also established that traffic levels in 2031 would not require construction of the second carriageway. For this reason the road design provides for a two lane road (one travel lane in each direction) with climbing lanes in areas with steep grades.

QCC had also conducted the North Crestwood Traffic Study which recommended intersection improvements in the North Crestwood area.

All other improvements recommended in the traffic studies are required regardless of whether the Proposal is built or not.

Table 2 provides a status update current at October 2015 on all recommended improvements.

Table 2. Status update on all recommended improvements.

Improvement	Status
Lanyon Drive / Canberra Ave - Signals	RMS is undertaking design work. Construction is to be paid by various developer contributions when RMS is ready.
Lanyon Drive / Gilmore Road - Right Turn Ban	Minor change and will be completed when required.
Kings Hwy / Yass Road / Bungendore Road - Signals	RMS is undertaking design work. Majority of construction is to be paid by various developer contributions.
Old Cooma Road / Googong Road - Signals	Will be undertaken by Googong developers. Construction is to be paid by Googong.
Tompsitt Drive / South Jerrabomberra Road - Signals	Will be undertaken by South Jerrabomberra developers. Construction is to be paid by South Jerrabomberra developers.
Canberra Ave / Cameron Road – Signals	Design completed. Construction funds are to be split between QCC and various developers.
Lanyon Drive / Tompsitt Drive - Signals	RMS is undertaking design work. Construction funds are to be split between QCC and various developers.
Yass Road / Hincksman Street - Signals	Design completed. Majority of construction is to be paid by various developer contributions.
Jerra Circle - Signals	Preliminary designs and reports completed. Preparing for community consultation.
Uriarra Road / Frederick Street / McKeahnie Street - Signals	Design completed.
Uriarra Road / Ross Road - Signals	Design completed.
4L Old Cooma Road (Googong to ELP)	Design will need updating for new 80 km/h speed zone. REF completed. OEH concurrence received.
2L Ellerton Drive Extension	Design ongoing. Construction funds to be split by federal government, state government and developer contributions. REF addenda to come shortly. OEH concurrence will be sought.
4L Cooma St (ELP to Southbar)	Design completed. REF completed.
4L Sth Jerrabomberra Northern Access Rd	Will be undertaken by and paid for by future South Jerrabomberra developers

2.1.9 Queanbeyan Council Cycle Plan

In May 2010, Geoplan and Cardno Eppell Olsen developed the Queanbeyan Bicycle Plan in conjunction with a Pedestrian Access Mobility Plan. Figure 4 came from the bike plan and shows the important contribution the off-road and on-road paths on EDE (R1 to S4) would make to the wider and longer distance regional cycling network connecting the Queanbeyan suburbs and beyond.

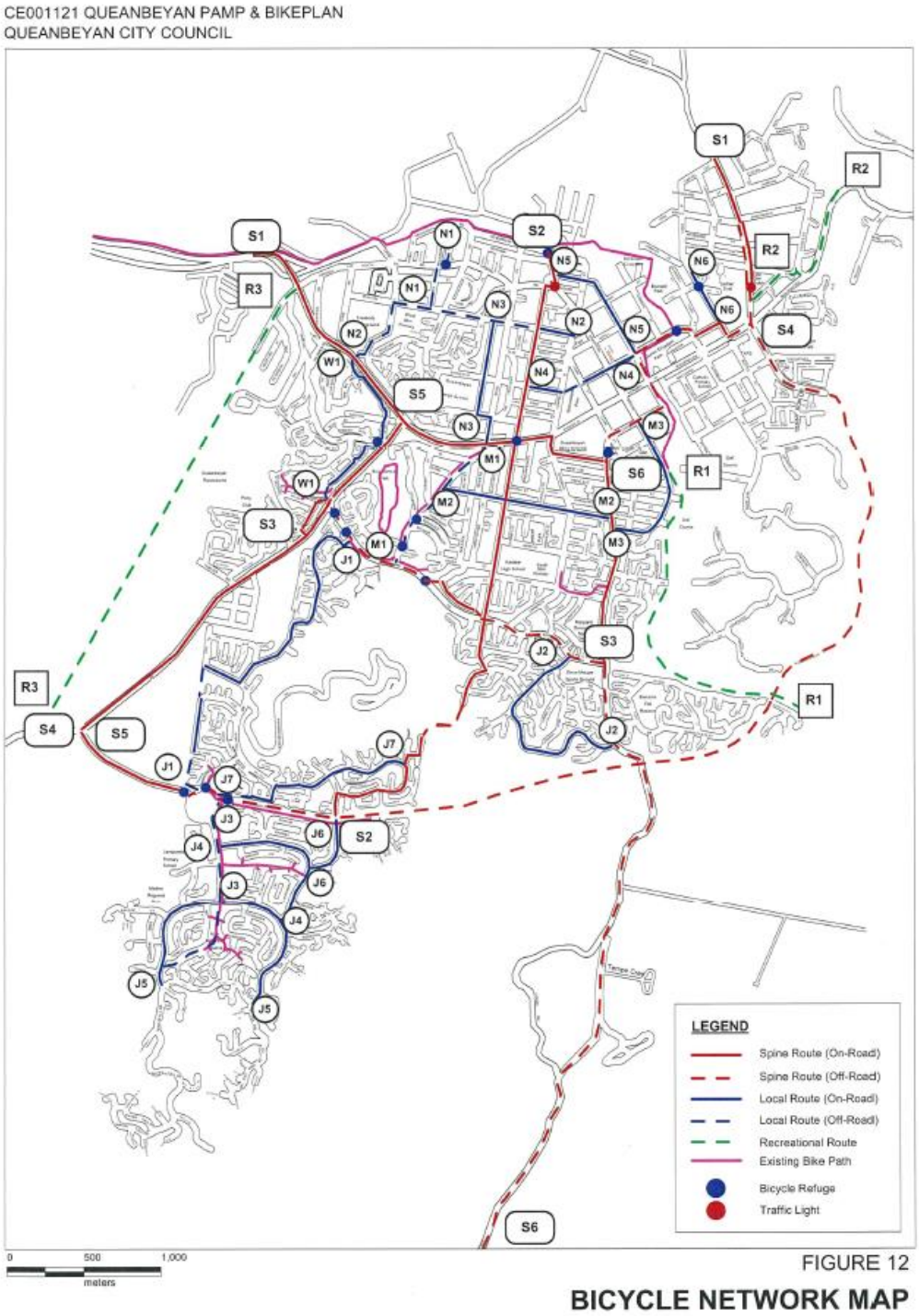

Figure 4. Bicycle network map for Queanbeyan.

2.1.10 Queanbeyan Council Public Transport Plan

The Proposal would increase traffic efficiency in the Queanbeyan CBD, which would assist in improved efficiency, travel capability and service reliability for local and regional bus services. The increase in network efficiency due to the road would also improve the public transport efficiency, including vehicles not travelling on the Proposal.

Reducing the congestion in the CBD would enable the bus interchange within the CBD to operate more efficiently, as the on time running of buses and bus accessibility through the CBD would be improved.

2.2 Ellerton Drive Strategic Business Case

2.2.1 Current situation and the Proposal

Queanbeyan is a major regional centre for the Southern region (as defined in the Southern Regional Transport Plan, 2014). It forms part of the Canberra-Queanbeyan Metropolitan area as it is a regional focal point providing services, employment and housing. QCC projections indicate an increase in population of approximately 15,000 by 2031.

Goulburn, Queanbeyan and Moss Vale-Bowral-Mittagong are the main centres for employment, education and health services in the Southern region. Improving transport outcomes for travel within the Southern region relies on the transport network being planned and managed in an integrated fashion. A major challenge for travel within the Southern region is a high demand for urban growth and rural lifestyle housing in those areas closest to the city of Canberra, such as Queanbeyan.

The Strategic Business Case provides the primary economic argument for the new road. QCC aims to service growth projections within Queanbeyan and the region equitably mitigating the potential social and economic impacts of this growth. The predicted increase in population of around 15,000 is expected to mostly occur in the Googong and Tralee development area. The Googong and Tralee development areas would eventually provide housing and services for an additional 28,000 people by 2031.

The traffic modelling conducted by QCC (as discussed in 2.1.8) has identified that, by 2017, the Kings Highway (Bungendore Road) route through the Queanbeyan CBD and at Queens Bridge would be performing at Level of Service F, and would experience forced flow stop-start conditions, with traffic volumes exceeding capacity during the am peak hour, without the Proposal. The traffic modelling has identified that to maintain a Level of Service D or better on the Queanbeyan Road network, the EDE is required by 2017. The updated study in 2014 has extended the date by which the Proposal is required to 2018.

The construction of the Proposal is projected to reduce the 2019 traffic volumes on Bungendore Road, the state road through the Queanbeyan CBD, by at least 15% including heavy vehicles.

The identified risks associated with the current road network remain unchanged (i.e., not constructing the Proposal) and land use predictions being realised are:

- Lack of connectivity between the land releases, the CBD and the ACT leading to network congestion and a lack of access to employment areas;
- The development potential of the Jumping Creek Estate would be adversely impacted and would cause additional cost in upgrading Severne Street and

Lonergan Drive and supporting road networks through Greenleigh to accommodate local construction and long term residential traffic;

- Increased traffic congestion and road safety risks through the Queanbeyan main street precinct (especially for pedestrians);
- Need for junction upgrades on Kings Highway (Queanbeyan main street) and Old Cooma Road;
- Reduced amenity for residents and road users in and around the CBD, and new development areas;
- Reduction of land release potential;
- Increased traffic congestion and loss of amenity for residents along Cooma Street; and
- Increased traffic congestion and road safety risks adjacent to three schools in the CBD area.

In comparison to current route options (i.e. Old Cooma Road and Lanyon Drive), the Proposal could reduce travel times to and through Queanbeyan significantly for many residents. In comparison to the Cooma Street route, residents would only need to cross through four intersections and one set of traffic lights, at a speed limit of 80 km/h using the EDE compared with 22 intersections and two sets of traffic lights, at a speed limit to 50 – 60 km/h if using Cooma Street.

The EDE could also significantly reduce the travel times in comparison to the Lanyon Drive route option. Residents would only need to pass through six intersections and one set of traffic lights along the EDE compared to 13 intersections and four sets of traffic lights using the Lanyon Drive route.

Other primary drivers of this project are the need to provide greater accessibility and connectivity, measured in terms of travel times and reliability, for freight, business and private travel, and to ensure that the road environment is as safe as possible for all users.

The project is aligned with other town planning strategic objectives by:

- Improving the quality of service through improved travel times, improved customer travel experience and improved customer options;
- Improving liveability through facilitating ease of movement to activity centres;
- Supporting regional development through improved connectivity to jobs and services;
- Improving safety and security through improved road safety; and
- Improving social sustainability through reduced road congestion.

2.2.2 Traffic options considered

The *Googong and Tralee Traffic Study (2031)* (Traffic Design Group [formerly Gabites Porter], 2010) modelled many combinations of a series of both new and upgraded road links and intersections to provide a broad understanding of how different combinations of road infrastructure upgrades and additions may affect major links in the Queanbeyan road network. The scenarios were developed by a working group comprising of QCC, RMS, a traffic consultant and local developers. The traffic study looked at the following options in various combinations:

- Dunns Creek Road – the option of connecting Old Cooma Road with the Monaro Highway was seen as useful to include by the working group but

could not be justified as it did not reduce congestion elsewhere in the Local Government Area within the current planning horizon. It is currently estimated to cost more than twice as much as EDE and would require proportionally greater environmental offsets which would add to the project cost.

- The Northern Bypass (i.e. the connection of the Kings Highway from the Ridgeway area to the ACT with connections to Pialligo Avenue and Canberra Avenue) - this option was originally investigated prior to the major expansion of Queanbeyan's residential lands to the south at Googong and Tralee.
  - The Northern Bypass has been shown to provide only limited relief of traffic volumes along Monaro Street and the Queens Bridge, as it is primarily a bypass for non-Queanbeyan traffic to avoid using the Canberra Avenue - Monaro Street route through the centre of town.
  - It also does not relieve local traffic travelling on the north-south route along Old Cooma Road and Cooma Street wanting to access Queanbeyan and the northern routes out of Queanbeyan.

  In summary, the Northern Bypass is not a preferred solution as it:

  - Does not solve gridlock on Cooma Street and on Queens Bridge or in the CBD.
  - Crosses difficult terrain, has large environmental impacts and requires multiple bridges.
  - The majority of the alignment occurs in the ACT.
- Duplication of Southbar Rd – did not improve the level of service along Cooma Street.
- Duplication of Old Cooma Road – improved the level of service coming into Queanbeyan but did not improve the level of service on both Cooma Street and the Queens Bridge.
- Widening Cooma Street (i.e. Southbar Rd to Rutledge St) – the introduction of clearways to provide four lanes on Cooma Street improved the level of service on Cooma Street but did not improve the level of service on Queens Bridge and reduced amenity to Cooma St residents.
- Ellerton Drive Extension – improved the level of service on both Cooma Street and the Queens Bridge.
- Duplication of Ellerton Drive Extension – was not justified within the current planning horizon.
- Duplication of the Bungendore Road in the approach to the Queens Bridge in Queanbeyan – was not justified within the current planning horizon.

The original traffic study (Traffic Design Group [formerly Gabites Porter], 2010), which underwent a public exhibition and consultation period in 2009, found that the options modelled other than the EDE did not fulfil the role intended, did not adequately improve the future network deficiencies or were too expensive. The updated report (Trffic Design Group, 2014) reached the same basic conclusions.

Regardless of what scenario was analysed, the level of service on both Cooma Street and the Queens Bridge did not improve significantly without the inclusion of the Ellerton Drive Extension.

The QCC considered three options for the EDE when analysing the land use improvements and road network needs.

(I) The base case of 'do nothing' which would result in maintaining and managing the current road network and not constructing the Ellerton Drive extension.

As discussed earlier, this option is very problematic as the approved and potential land use development changes would increase travel demand and traffic volumes, with additional traffic travelling along Bungendore Road through the main street of Queanbeyan CBD. This would lead to increased congestion, increased crash risks and reduced amenity.

It was concluded the 'do nothing' approach (i.e. not constructing new roads or road duplications, or improving intersections), would not provide the necessary transport infrastructure to accommodate the future transport demands of Queanbeyan and the region. Pressures on existing roads would continue to increase, eventually exceeding the current road network capacity. This would cause substantial further traffic congestion and delays in the regional transport corridor and ultimately restrict the growth potential of the Queanbeyan area. To do nothing would also take away the only planned east west connection in Queanbeyan during a 1 in 100 year flood event. Currently the Queanbeyan River crossing at the CBD, and the Oaks Estate and Yass Road crossings are well underwater during both a 1 in 100 year flood event, and during a 1 in 10 year flood.

(Note: This base case included upgrading Old Cooma Road south of Edwin Land Parkway and minor junction improvements along Yass Road).

(II) Construction of a 4 lane divided carriageway between the existing Ellerton Drive and Edwin Land Parkway, providing an alternative route around the CBD.

Construction of a 4 lane divided carriageway was not warranted within the current planning horizon of 2031.

(III) Construction of a 2 lane single carriageway between the existing Ellerton Drive and Edwin Land Parkway, providing an alternative route around the CBD.

The traffic modelling shows that a 2 lane road would perform at an acceptable level from 2018 to 2031 and beyond. As discussed earlier, it also serves the required safety, development and social sustainability objectives. In particular it would be a heavy vehicle route allowing B-Doubles. Overtaking / slow vehicle climbing lanes are included in this Proposal to allow for passing opportunities in areas with steep grades.

This option is clearly the most economic and is presented as 'the Proposal' in this REF.

2.3 Existing road and infrastructure

The EDE is proposed as the construction of a new two way, single lane road from 10 Ellerton Drive to the Old Cooma Road / Edwin Land Parkway intersection. Existing infrastructure within the proposed road corridor is as follows:

- Existing street lighting can be found on the existing Ellerton Drive at chainages 0 – 700; however it does not comply with the required lighting levels (Category V3), therefore upgrades of the existing lighting are proposed to comply with standards and maintain consistency.
- Existing intersection, including traffic signals and turning lanes, at Old Cooma Road and Edwin Land Parkway. Minor modifications to the left turning lane and traffic signals will be required.

- The remaining sections of the road are mostly within woodland and do not contain existing pavement or lighting infrastructure.
- The QCC water main crosses or runs parallel to the proposed alignment at several locations, and would require relocation in places.
- An Icon Water Ltd (IWL) water main also crosses and runs parallel with the proposed alignment, but is not expected to require relocation.
- A QCC sewer main occurs at ch95, and from ch3420-ch3510.
- Stormwater pipes would require relocation or replacement at various sites.
- Gas pipes occur within the alignment and are to be protected during works.
- Overhead electricity linescross the alignment. None of these are expected to require raising or relocation.

2.4 Flood proofing

The EDE includes a new bridge connecting east and west Queanbeyan. The new bridge, which is an integral part of this major road project, would maintain a connection between the east and west of Queanbeyan in excess of a 1 in 100 year flood event that would otherwise see the CBD underwater.

The design would also ensure pedestrian and cycle access across the bridge.

The bridge would be built out of concrete and would be approximately 184 m long and 22 m above the existing river level of 570 m AMSL.

One of the primary drivers for the EDE is the need to provide increased flood protection for transport through and within Queanbeyan, which is currently only protected up to an approximate 1 in 10 year flood event.

During major flood events, Queanbeyan and the major link between Canberra and coastal NSW via the Kings Highway is cut. The bridge crossings and approaches have on several previous occasions been flooded for up to 20 hours during major rain events.

During major flood events, the entire Queanbeyan CBD is under water and improvements to the various approaches to the CBD would not alleviate the problem.

There are several river crossings and approaches currently used in the Queanbeyan area. They are all affected by heavy rain.

- The Queens Bridge on Bungendore Road is currently the main crossing from east to west Queanbeyan and provides direct access to the CBD.
- The low level crossing along Morisset Street is easily flooded.

Queanbeyan has flooded nine times in since 1974 with severe disruption to business and the community.

The Queanbeyan Floodplain Risk Management Study and Plan investigated alternative options for providing flood access in Queanbeyan (Lyall & Associates Consulting Water Engineers, 2008). These are summarised as follows:

2.4.1 The big dip on Bungendore Road

During a 1 in 100 year flood, the western approach to Queens Bridge is underwater. Consequently, raising the road level at the dip in Bungendore Road on the eastern approach would not by itself provide flood security along this route. Providing a 1 in 50

ARI flood free access along Bungendore Road would require a bridge structure in lieu of a culvert arrangement to minimise flow-on affects to surrounding residential properties; however the western approach would still be underwater. Raising the dip in Bungendore Road so that it remains trafficable in a 1 in 20 year flood could be undertaken but would cost at least $8 million (2008 costs), but does not allow the route to become trafficable due to Monaro Street on the western approach being underwater. Updating the current major east west route linking two sides of Queanbeyan as well as the Canberra and NSW coast route along Bungendore Road and Monaro Street (Kings Hwy) would require high financial output with little being achieved.

2.4.2 The Morisset Street low level crossing

The first significant effect, as a flood develops in Queanbeyan, occurs when the river overtops the low level bridge at Morisset Street. The overtopping of this crossing is an inconvenience to commuters. The peak depth of overtopping is 3.6 m during a 1 in 5 year flood and 6.1 m for a 1 in 20 year ARI river flood. The options for upgrading the Morisset Street bridge to allow it to remain open during a medium flood are extremely costly. To achieve protection for a 1 in 10 year ARI flood, a standard bridge costing $13.2 million (2008 costs) would be required and would require a deck that is 5 m above the existing crossing. It is not feasible to raise this crossing.

2.5 Sustainability

Table 3 summarises the sustainability aspects of the project, and the measures to avoid, reduce, minimise and mitigate the adverse impacts from the Strategic Business Case (Roads and Maritime Services, 2014b).

Table 3. Project sustainability and adverse impact management measures.

Energy management *To use transport energy sources more efficiently and reduce its greenhouse gas emissions.* • Reduced energy consumption has been identified as a potential benefit of the project at a strategic level however this has yet to be quantified. • Reduced greenhouse gas emissions have been identified as a potential benefit of the project primarily based on reduced fuel consumption; however this has yet to be quantified.
Pollution control *To minimise air, noise, water and pollution from transport operations and construction.* • Improved efficiency in both corridors leading to a decrease in pollution.
Climate change resilience *To plan and deliver transport infrastructure and operations that are resilient to the effects of climate change.* • Transport infrastructure and operation that is resilient to the effects of climate change. • Flood immunity. • Secure transport links.
Resource management *To reduce water consumption in transport operations, maintenance, construction and management.*

- Water saving measures would be undertaken during construction as part of the sustainability and waste management sub plan within the Construction Environmental Management Plan.
- Landscaping to fit into current environment and locally appropriate.

Biodiversity

To mitigate transport impacts on biodiversity.

- The Proposal has been assessed as having a significant impact on four threatened species; however, these adverse impacts are being offset under Federal and State biodiversity conservation legislation, which would implements protection and management measures over offset lands and would maintain or improve biodiversity values.

Heritage

To mitigate transport impacts on heritage.

- Adverse impacts on Aboriginal heritage have been assessed, and a salvage and protection program is being implemented over sites that are in or near the alignment under an Aboriginal Heritage I Program.
- The Proposal does not significantly or adversely impact European heritage matters.

Liveable communities

To improve community experience through the delivery of transport, which is integrated with surrounding land use activities. The Proposal is anticipated to:

- Improve freight and light vehicle traffic movements and safety.
- Improved community experience with transport
- Improve cycle access.
- Reduce local travel times.
- Reduce CBD congestion.

Corporate sustainability

To establish governance arrangements for transport, which support resources efficiency and continuous improvement in environment and sustainability performance.

3. Description of the Proposal

3.1 The Proposal

The QCC proposes to construct a two lane, single carriageway, sealed road as an extension to Ellerton Drive at East Queanbeyan to Old Cooma Road and Edwin Land Parkway at Karabar, in Queanbeyan, New South Wales.

The Proposal involves the construction of a sealed, two-lane, single carriageway with climbing lanes and a new bridge crossing over the Queanbeyan River. The new section of road would form an important link in the regional transport corridor and is considered an essential element of the recommendations in The *Googong and Tralee Traffic Study 2031* (Traffic Design Group [formerly Gabites Porter, 2010).

Construction is proposed to begin in early 2017.

The benefits of the route and alignment include provision of:

- A free flow controlled access road for local residents and traffic travelling through Queanbeyan.
- The only connection between the east and west of Queanbeyan during in excess of a 1 in 100 year flood event, which sees much of the CBD underwater.
- Additional connections to Fairlane Estate and Greenleigh Estate (emergency access only) for properties which currently have only one access.

The works to be constructed between 2017 and 2019 would consist of earth works, the construction of a two-lane, single carriageway with necessary climbing lanes and shared pathways, and the construction of a two lane bridge with provisions for road cyclists. The development footprint is defined as the final formed extent of the clearing and earthworks required for the Proposal, including all cut and fill batters, drainage and boundary fences. The ‘subject site’ is defined as the development footprint plus a 5 m buffer to allow for additional construction impacts (e.g. establishment of sediment and erosion controls and machinery movements). It also includes additional areas proposed for construction compounds and material stockpiles. The ‘subject site’ covers approximately 49.6 ha, is approximately 4.69 km long and is approximately 35 - 220 m wide. The development footprint is less than the ‘subject area’ that was assessed for the ecological impact assessment.
The Proposal includes:

- Two lane single carriageways with climbing lanes.
- Heavy vehicle traffic route suitable for B-double vehicles from 10 Ellerton Drive to Edwin Land Parkway.
- Bulk earthworks to accommodate the carriageway, climbing lanes, drainage and shared pathways for Ellerton Drive extension.
- Construction of road pavement on the Ellerton Drive extension.
- Provision of a 2.5 m wide shared pathway from the Old Sydney Road Roundabout to the Edwin Land Parkway intersection.
- Shared path connections at:
    - Existing Ellerton Drive starting from the south west corner of the roundabout at Mowatt Street and Old Sydney Road

  - Near the water reservoirs along the western side of EDE and Severne Street
  - Lonergan Drive
  - Barracks Flat Drive connection on southern side of Queanbeyan River
  - Barracks Flat Drive connection between Webber Place and Emery Crescent
  - Webber Place
  - Fitzgibbon Place
  - Alfred Place
  - Old Cooma Road connection with existing shared path
- 60 km/hr posted speed limit from ch0 - ch1200.
- 80 km/hr posted speed from ch1200 to the Edwin Land Parkway intersection.
- Bridge crossing the Queanbeyan River and Barracks Flat Drive to accommodate in excess of a 1:100 year ARI storm event:
  - The bridge would be 184 m long, consist of six spans, and would carry two lanes of traffic, provision for on-road cyclists and a shared-use path
  - Columns would be located on the river banks on the edge of the flow level, limiting direct river bank damage and waterway contamination
- Street Lighting:
  - Upgrade of existing street lighting along Ellerton Drive from ch0 - ch700 to required lighting regulations
  - Upgrade of street lighting at the intersection of Ellerton Drive Extension and Old Cooma Road
  - New street lighting at the intersections at 74 Barracks Flat Road and future Jumping Creek Estates
- Known utilities locations and relocation or removal:
  - The QCC water main crosses the proposed alignment at several locations and runs parallel to the alignment from approximately ch1700 to the intersection at Edwin Land Parkway. The QCC main would require relocation at several locations
  - The IWL water main crosses the proposed alignment at approximately ch4270 and runs parallel with the proposed alignment to the intersection at Edwin Land Parkway. The IWL main is not expected to require relocation
  - The QCC sewer main occurs at ch95 and from ch3420 - ch3510
  - Stormwater pipes would require relocation or replacement at various locations
  - Domestic gas services occur within the existing Ellerton Drive alignment and in the vicinity of Barracks Flat Drive. There is a gas main in the vicinity of the Old Cooma Road intersection. All gas lines and services are to be protected during works

  - Overhead electricity lines cross the alignment at several locations. None of these are expected to require raising or relocation.

- Landscaping the new road corridor using predominantly native grasses, creating an interface between the existing vegetation and the new road.
- Intersections:
  - 10 Ellerton Dr: Provision for left in, left out, right in and right out turning movements. Right turning bay provided within Ellerton Drive
  - Old Sydney Road – Ellerton Dr: Single carriageway with climb lanes designed for provision of a B Double vehicle
  - Tennyson Dr.: Provision for left in, left out, right in and right out turning movements. Right turning bay provided within Ellerton Drive
  - Church Access: Provision for left in, left out, right in turning movements. Right turning bay provided within Ellerton Drive
  - Greenleigh Reservoir Access: Gated access to the Greenleigh reservoirs. Also used as emergency egress for Greenleigh. Left in and out turning provision provided
  - 40A Severn Street, Eastern Property Access: Left in and out, right in and right out turning movements provided to the eastern side of the EDE alignment at 40A Severn Street. Right turning bay provided within Ellerton Drive
  - Jumping Creek Estate Connection: Provision for left in, left out, right in and right out turning movements. Seagull intersection to Ellerton Drive at ch3030
  - Lonergan Drive Emergency Access: Gated access to the Lonergan Drive emergency access
  - Barracks Flat Dr On-ramp: Left in and right in turning provision for south bound vehicles to enter the EDE from Barracks Flat Drive. The on-ramp runs from ch3510 to approximately ch3950
  - Connection to 74 Barracks Flat Dr: Provision for left in, left out and right in turning movements
  - Edwin Land Parkway, Old Cooma Road Signalised Intersection: Provision for B-double to navigate onto Edwin Land Parkway. Left in to Old Cooma Road and provision for right in and left in from Old Cooma Road for “truck and dogs”
- Storm Drainage:
  - A stormwater drainage system, including pavement surface drainage and culverts is proposed. These include reinforced concrete pipes and box culverts. Pavement drainage, including subsurface drains, surface gutters, pits, catch drains and pipes would direct water into cross drains and connect into tributaries across the catchment. Pavement run off would be collected in gutters or along the roadway verge, median drains and catch drains. The main carriageways would be drained by means of a pit and pipe drainage network.
  - Open catch drains are provided along the top of road cut batters, along the toe of the fill batters, at the culvert inlets and outlets, and from the water quality basins to the drainage outlet points. Open

drains and culverts would be protected from scour by concrete lining, rock riprap or grass lining as required.

- Fauna crossings - two of the box culverts would be sized and located to meet appropriate fauna passage requirements. These culverts would meet RMS biodiversity requirements and be located at appropriate topographic locations and where they would provide best service to wildlife movement between habitat patches adjoining the road. In addition, natural areas under the bridge would be enhanced for wildlife passage.
- Figure 8 shows the extent of the proposed clearing, and potential locations of stockpiles and construction compounds. Stockpiles would be sited in areas that would be cleared within the development footprint or in immediately adjacent areas that had been previously disturbed.
- Potential construction compounds are proposed in existing cleared, highly disturbed areas (Figure 8). Satellite compounds would be required on each side of the river. All access on the northern section would be off Ellerton Drive. All access for the southern section would be from Old Cooma Road.
- QQC would continue to investigate opportunities for suitable access points, stockpile sites and compound areas to facilitate effective and efficient delivery of the project. Should additional sites be identified for use (e.g. within Jumping Creek Estate or other cleared areas), all appropriate approvals would be obtained, and the construction footprint adjusted when necessary, but only in areas where only exotic vegetation or disturbed lands would be affected.

3.2 Early work

To avoid the primary native fauna breeding season, the SIS (ngh Environmental, 2014) and the Addendum to the SIS (ngh Environmental, 2016) have identified that clearing for construction needs to commence before spring. Any work requiring or involving vegetation clearing would need to be completed in the period suitable for removal of potential habitat for species that may begin to nest over winter.

- The SIS provides a clearing window from the end of February to September.
- To avoid adverse impacts on native fauna, certain habitat trees would be removed prior to the native fauna breeding and nesting season.
- Pre clearance surveys of termite mounds would be required.
- Early autumn clearing (e.g. early March) of areas with a high density of termite mounds is recommended to help discourage use of the site for breeding and minimise impact to the Rosenberg's Goanna.

The early installation of noise walls, where feasible, would mitigate construction noise.

Relocation of archaeological heritage artefacts would be required under the AHIP permit conditions prior to commencement of clearing operations.

3.3 Design

The Preliminary Sketch Plan (PSP) report and design (OPUS, 2014) are available for review from QCC at the contacts provided.

The Final Sketch Plan (FSP) report and layout design (OPUS 2016) will be made available once the updated documents have been made available to Councillors for

consideration under Part 5 of *Environmental Planning and Assessment Act 1979* (EP&A Act).

3.3.1 Design criteria

The concept and detailed design for the Proposal were prepared in accordance with accepted road design standards and guidelines, including those published by RMS and Austroad. Table 4. Design criteria. Table 4 outlines design features. Figures 7-11 provide typical cross sections. Bridge drawings are provided in Figure 8 and Figure 9.

Table 4. Design criteria.

Design item	Requirement
Design speed	• 60 km/hr posted speed limit from ch0 - ch1200. • 80 km/hr posted speed from ch1200 to the Edwin Land Parkway intersection.
Lane widths	• Traffic lane widths would, as a rule, be 3.5 m except where local lane widening is required on horizontal curves.

Shoulder width	• Shoulders have generally been designed to 2.5 m wide.
	  ○ A 2.5 m shoulder width accommodates a 2 m wide on road cycle lane and 0.5 m gutter width.
	  ○ A 2.5 m wide shoulder enables discretional stopping of cars clear of the traffic lanes.
	  ○ 2.5 m shoulders would be provided on the steep portions of road where broken down heavy vehicles are unlikely to stop.

Pavement type	• Stone mastic asphalt (SMA) has been specified as the wearing surface across the main alignment of Ellerton Drive. • Deep lift asphalt laid over heavy bound base material. • EDE would be designed to have a road pavement life of 40 years.
Divided Median and Climbing lanes	• Divided median between CH200 and 960, CH2900 to 3250, and CH3640 to 4690, which provides separation between lanes, where climbing lanes are required. • South bound climbing lane and two lane approach to Edwin Land Parkway – Old Cooma Road Intersection from CH3660 to 4690. • Northbound climbing lane from CH3710 to 4640.
Grade	• The maximum vertical grade on the main carriageways is 8.5% and the minimum is grade is 1%. • The steep grade is within the recommended 7-9% in AustRoads Road Design Guide for mountainous terrain.
Bridge	• The bridge would be approximately 184 m long, consist of six spans, and would carry two lanes of traffic, provision for on-road cyclists and a shared-use path.
Safety barriers	• Safety barriers would be provided in locations where there is a risk of a vehicle leaving the roadway going down a slope. • On the eastern side of the alignment with fill batters with slopes with a height greater than 2 m - a safety barrier is to be installed at the top of the batter slope (except where there is a 5 m clear zone at the base of these embankments). • Where there is the shared pathway on the western side of the alignment a kerb and gutter is provided. No safety barrier is required at the top of batter slopes outside the 5 m clear zone.

Design item	Requirement
	• A safety barrier would be provided between the traffic lane and the shared pathway on the bridge.
Barriers and fencing	• The proposal would have a boundary fence around the perimeter of the works. • Fauna exclusion fencing would be used 100 m either side of the fauna under passes.
Noise mitigation	• Noise mitigation measures will be provided in accordance with the NSW Road Noise Policy.

Cyclist and pedestrian provisions	• A dedicated 2.5 m wide shared pedestrian/cycle pathway would be provided along the western side of the northbound carriageway along the whole length of the Proposal.
	• Shared path connections are shown at the following locations:
	  ○ Existing Ellerton Drive starting from the south west corner of the roundabout at Mowatt Street and Old Sydney Road.
	  ○ Water reservoirs along the western side of EDE and Severne Street.
	  ○ Lonergan Drive.
	  ○ Barracks Flat Drive connection from southern side of Queanbeyan River approximate chainage 3685.
	  ○ Barracks Flat Drive connection along no. 74 Barracks Flat Drive.
	  ○ Webber Place.
	  ○ Fitzgibbon Place.
	  ○ Alfred Place.
	  ○ Old Cooma Road connection with existing shared path.

Bus provisions	• Intersection designs accommodate medium two axle truck or bus usage.
Turnout Areas	• RBT police stopping area required in an appropriate location near the end of the existing section of Ellerton Drive. (Bay length = 15 m approx. x 3.5 m wide). • 2-3 Emergency vehicle stopping bays are required between the existing section of Ellerton Drive and the bridge crossing. (Bays 3.5 m wide. Length to accommodate a rigid vehicle.)
Batter slopes	• Unprotected permanent cut and engineered fill batter slopes would generally be constructed no steeper than 2H: 1V for stability except in localised areas where steeper slopes would be considered during detailed design. Drainage measures would be implemented to intercept and divert water runoff from the toes and crests of batters. • Generally for batters higher than 10 m, a 4.5 m wide bench would be included with a 2:1 batter above the bench. • Batter slopes would be evaluated during construction for stability. Where the batters are required to be vegetated to stabilize the slopes, placement of geofabric would be used where appropriate to prevent erosion of placed topsoil while vegetation matures.
Landscaping	• Landscaping would be installed on the embankments and verges. • Existing topsoil would be stockpiled for use within the landscape works. • Cleared native vegetation, as required, would be mulched, recycled and used within the project landscape works. • Tree logs would be placed in appropriate revegetation areas as ground habitat.

Design item	Requirement
	• Habitat / significant trees have been identified for retention. Tree protection measures would be detailed in the clearing and landscape specifications, and would be implemented prior to clearing / construction taking place. • Landscaping would predominantly comprise grassing with native grass species. • Grass seed would be sourced either from a local nursery or native seed supplier. • A mix of locally-sourced shrubs and hydro seed would be used at various locations along Ellerton Drive. • Depending on the timing of the planting or hydro seeding, and the heat / rainfall experienced in that season, it may be necessary to water the shrubs during / following installation to improve the success rate for establishment. Hand watering via a water cart is the most appropriate option. • Soil stabilisation and erosion control measures would be required for steep embankments and for any areas that are subject to rapid overland flows. Erosion controls would be installed along any embankments where runoff flowed towards the Queanbeyan River and any other waterways / tributaries on site. Methods would include the placement of jute mats, coir logs, hydro seeding and grassing where appropriate. The final locations for stabilisation would be determined during the detailed design phase in coordination with QCC. Construction ERSED measures will be designed and implemented by the Contractor in accordance with their approved Erosion and Sedimentation Management Plan.

Access	• The EDE would provide:
	  ○ A free flow, controlled access at 60 km/hr from ch0 - ch1200 and 80 km/h from ch1200 – ELPW from Ellerton Drive or Edwin Land Parkway intersection.
	  ○ Flood free access to and from the Queanbeyan CBD during at least a 1 in 100 year flood event that would see the CBD underwater.
	  ○ Connection point at Tennyson Drive
	  ○ Additional connection points for Fairlane Estate and Greenleigh Estate (emergency only) and North and Southbound access from Barracks Flat Drive.

Construction traffic	• Barracks Flat Drive would be affected during construction of the southern end span of the Queanbeyan River Bridge. • Construction access would be from the northern end of the project via Ellerton Drive or from the southern end of the project from Edwin Land Parkway intersection.

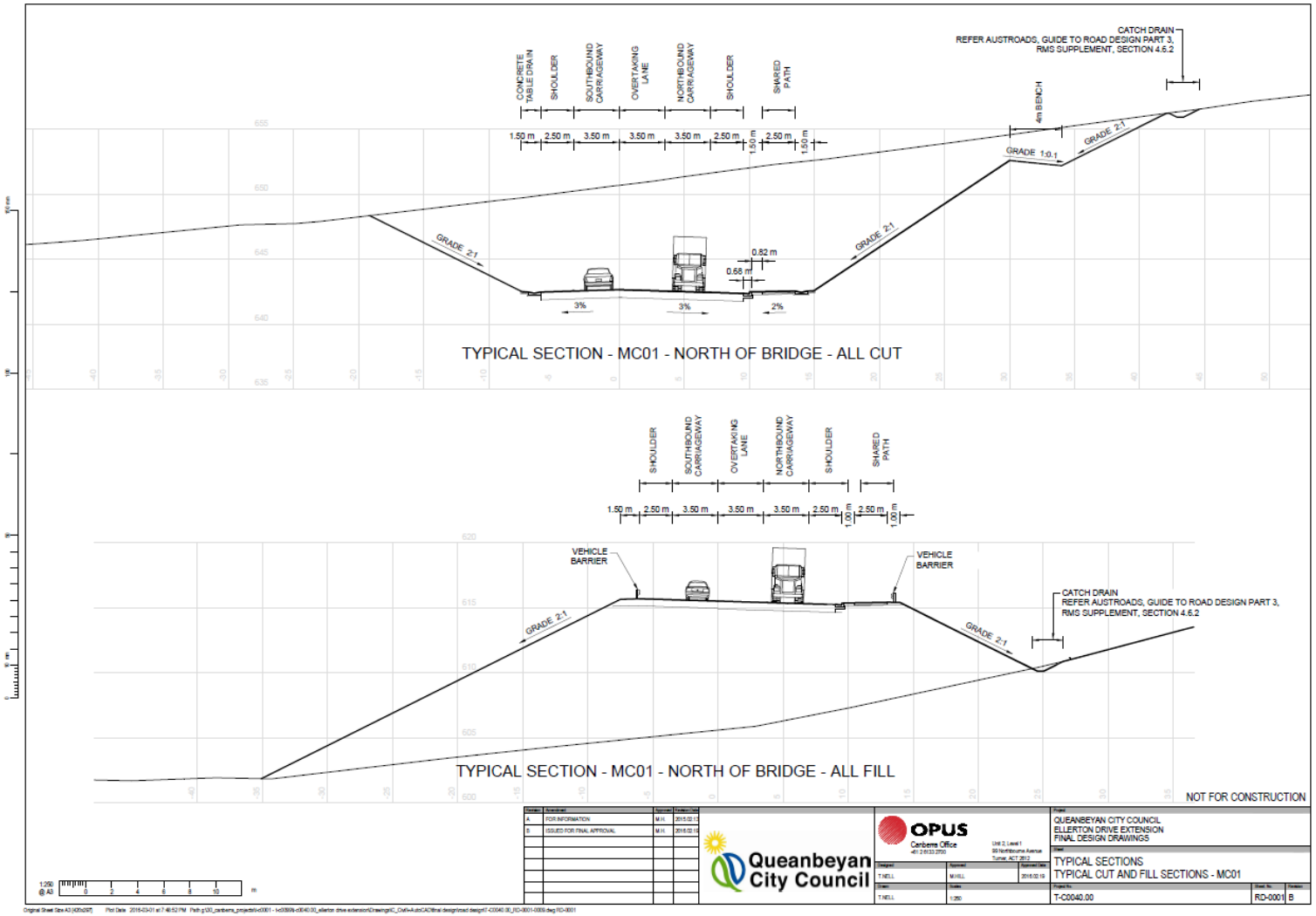

Figure 5. Typical Cut and Fill Cross Sections Ellerton Drive (Opus, 2016).

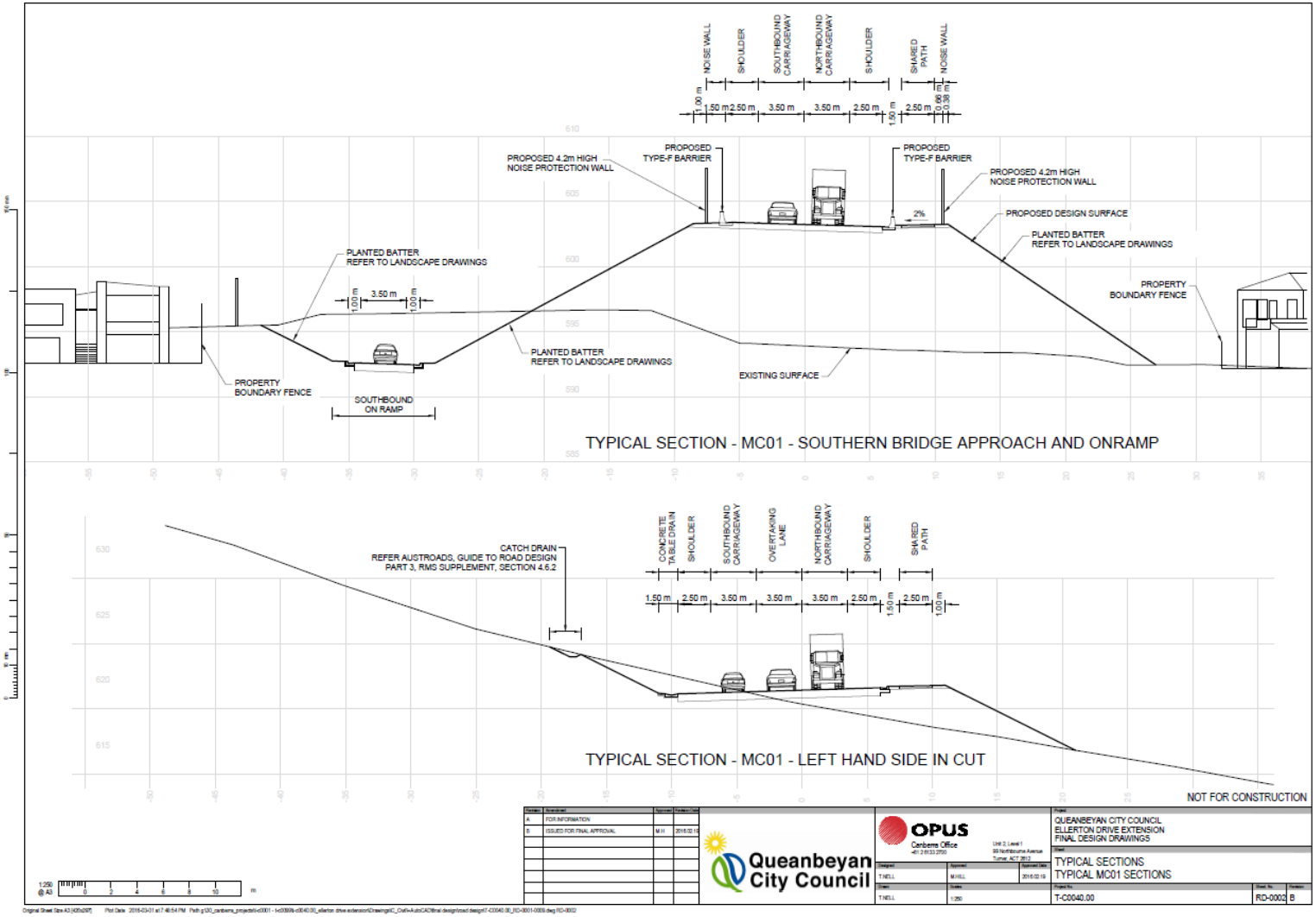

Figure 6. Typical Cross Sections Ellerton Drive (Opus, 2016).

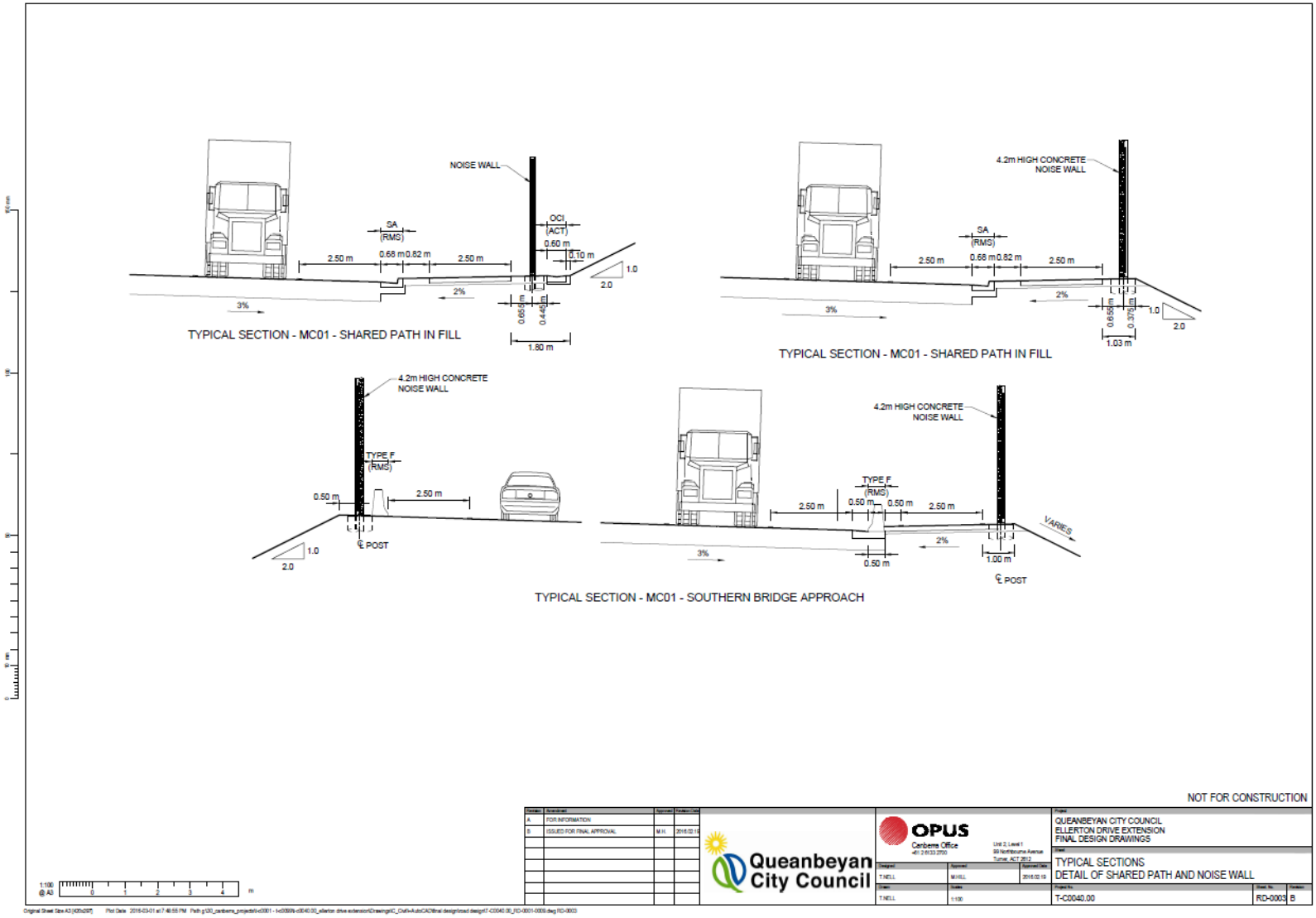

Figure 7. Typical Cross Sections Shared Path and Noise Wall Ellerton Drive (Opus, 2016).

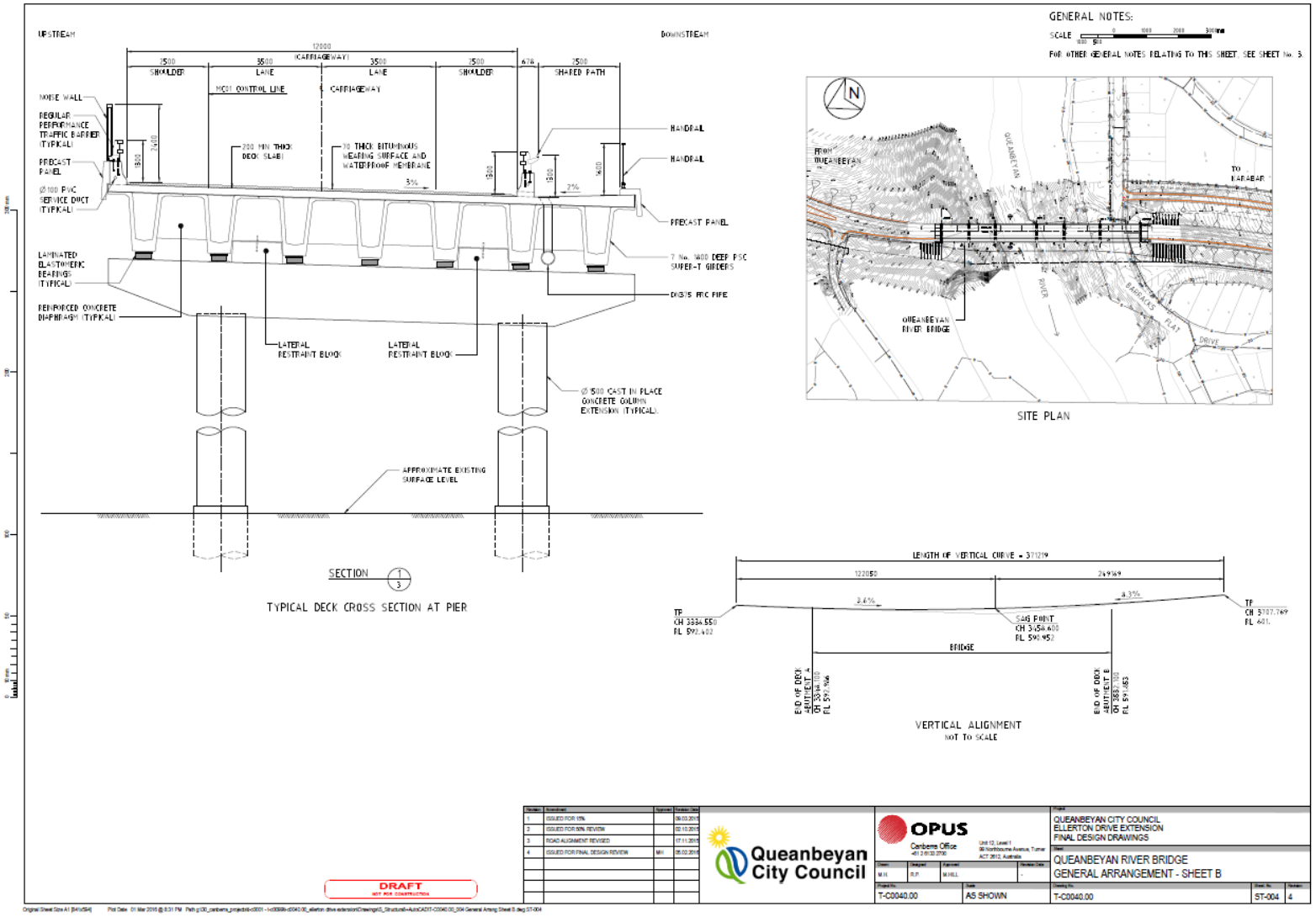

Figure 8. Cross section EDE bridge over the Queanbeyan River (Opus, 2016).

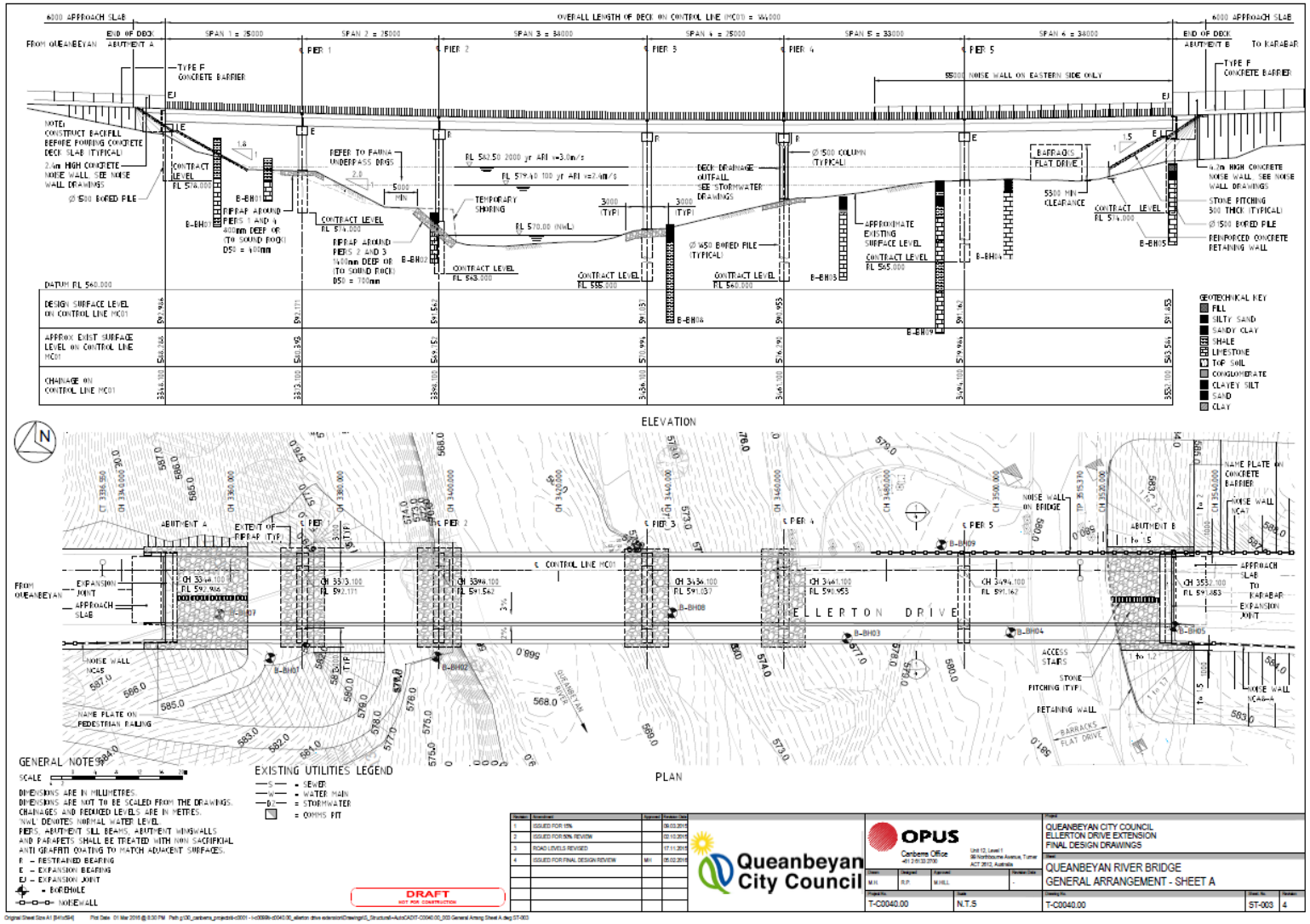

Figure 9. Overall length of the EDE bridge over the Queanbeyan River (Opus, 2016).

3.3.2 Engineering constraints

Engineering constraints relevant to the Proposal include:

- The proposed EDE alignment is situated to the east of Queanbeyan's CBD. The northern section of the proposed alignment is situated in the suburb of Greenleigh and the southern section is situated within Karabar.
- Undulating to steep topography with large cuts and fills required to create safe and easily navigable alignment. The land to the west of the alignment is populated with low density properties surrounded by bush. The land to the east of the alignment is mountainous bush connecting to the Cuumbuen Nature Reserve, and between CH2700 to 3348.1, is open rural grassland. This grassland is identified for future land development known as Jumping Creek Estate.
- The northern section of the scheme involves existing pavement replacement and the addition of a shared path and noise walls to the existing section of Ellerton Drive, in an urban area with a posted speed limit of 60 km/hr.
- The southern section of the alignment from the Queanbeyan River to the Edwin Land Parkway intersection has urban development either side of the road corridor boundary. The road boundary to the north is adjacent to an urban area while to the south from Ch 3850 is adjacent to sparsely populated bush land.
- Overfland flow paths crossing the proposed alignment requiring extensive cross drainage to prevent localised flooding.
- Crossing of the Queanbeyan River, which must be serviceable in a 1:100 year rain event.
- Relocation of QCC water mains.
- Avoidance / protection of IWL water main.
- Avoidance of QCC sewer mains.
- Relocation of stormwater pipes.
- Protection of gas pipes.
- Avoidance of and protection from low voltage overhead power lines.

The preferred EDE alignment is on the western edge of the regional biolink and on the lower slopes of the eastern escarpment. Although the EDE would reduce the size of the regional biolink, sufficient habitat exists to the east of the preferred alignment for the regional biolink to function without impediment. Maintaining an alignment on the lower slopes of the eastern escarpment reduces the required cut and fill of the Proposal which reduces the road footprint.

The road alignment cannot be shifted to the west as existing residential properties prevent this option. Shifting the alignment to the east would cause the road to be further up the escarpment where the natural topography is significantly steeper, resulting in greater cut and fill, a larger footprint, and more habitat to be removed. Shifting the alignment to the east would also reduce the size and connectivity of the regional biolink as the road would relocate from the edge of the biolink to somewhere in the middle of the regional biolink. Shifting the road further east would also result in a road that is longer and require more habitat to be removed. The Cuumbean Nature Reserve prevents the alignment of the EDE moving too far to the east.

The preferred alignment is designed to minimise the adverse impact on the regional biolink and minimise the road footprint.

The site does not pose any major construction constraints.

The Proposal passes through a W1 Natural Waterway land zone. The consent arrangements under the EP&A Act for the proposed road are set out in Clause 94(1) of State Environmental Planning Policy (Infrastructure) 2007 which allows roads and road related infrastructure to be constructed without consent on any land when undertaken by (or on behalf of) a public authority. State Environmental Planning Policy (Infrastructure) 2007 overrides any provisions of the Queanbeyan Local Environmental Plan 2012 that otherwise restrict the road from being constructed, including any prohibitions set out in the land use table for the W1 Natural Waterway zone. Accordingly the zoning of the Queanbeyan River is not a restriction on the road or any road related infrastructure being constructed.

Bridge piers would be located to avoid interference with the alignment of the flow channel. The deck would be approximately 22 m above the normal water level. The piers would be built so as not to alter river flow and would be stabilised with rock revetment, reinforced concrete and suitable revegetation. The details will be shown in the final design, landscape plans and contractor's Construction Environmental Management Plan (CEMP).

Consent will not be required for a pier in the Queanbeyan River.

Existing utilities would be protected or removed prior to any construction activities which may adversely impact on them.

Barracks Flat Drive would be occasionally affected during construction of the southern end span.

3.3.3 Major design features

Major design features of Ellerton Drive Extension include:

- Two lane, single carriageway design with climbing lanes
- Bridge Crossing over Queanbeyan River and Barracks Flat Drive
- Shared pathway
- Provision for on road cyclists
- Additional access points for Fairlane Estate
- Emergency egress for Greenleigh Estate at Lonergan Drive and the East Queanbeyan reservoir
- Stormwater drainage system, including subsurface drains, pavement surface drainage and culverts
- Fauna crossings
    - Two underpasses suitable for multiple species such as goannas, kangaroos and koalas
    - Glider poles with box rope ladder crossings, suitable for gliders and koalas
- Potential for pedestrian under pass at Jumping Creek Estate
- Intersections:

  - 10 Ellerton Drive
  - Old Sydney Road – Ellerton Drive
  - Tennyson Drive
  - Church Access at 91 Ellerton Drive
  - Greenleigh Reservoir Access
  - 40A Severn Street, Eastern Property Access
  - Jumping Creek Estate Connection
  - Lonergan Drive Emergency Access
  - Barracks Flat Drive On-ramp
  - Connection to 74 Barracks Flat Drive
  - Edwin Land Parkway, Old Cooma Road Signalised Intersection
- Noise mitigation measures
- Edwin Land Parkway Intersection upgrade

3.4 Construction

3.4.1 Construction activities and methods

The proposed construction works would involve the following general activities and overall sequence:

- Potential for early works:
  - Early works could be initiated to meet seasonal clearing constraints, and would depend on the date of contract award to the main civil contractors and potential major construction commencement dates
  - Selective felling of hollow bearing habitat trees. Affected trees would be bumped, lowered by a special machine, then inspected by ecologists for fauna which would be processed as per agreed protocols
  - Limited clearing for related early works, so that the soil remains protected and the waterways including the Queanbeyan River are less exposed to sedimentation risks during autumn and winter
  - Utility relocation
  - Noise wall construction where feasible
- Establishment of construction compounds and facilities
- Establishment of boundary fencing
- Clearing of remaining portions of 26 ha of native vegetation
- Stripping and stockpiling of topsoil for landscape use
- Implementation of erosion and sedimentation control measures
- Installation of river embankment protection works (platypus), preparation for and construction of bridge concrete footing foundations, piers and stocks
- Excavation for and installation of drainage ditches, pipes, culverts, headwalls, revetments, and fauna and pedestrian crossings
- Earthworks, including excavation, filling and compaction along the alignment
- Importation, stockpiling and placement of materials

- Installation of bridge girders and reinforced concrete decking
- Road pavement construction and paving
- Intersection improvements, traffic signals at Edwin Land Parkway intersection
- Street lighting
- Landscaping
- The use of various vehicles, plant and machinery
- Site clean-up and disposal of all surplus waste materials and decommissioning of the compound site

3.4.2 Construction duration and working hours

The duration of the major road and bridge works would be approximately 30 months.

Construction activities would be generally undertaken during standard working hours.

Standard working hours would be as follows:

Monday to Friday:	7:00 am to 6:00 pm
Saturday:	8:00 am to 1:00 pm

In general, the project does not propose to undertake consistent works outside of standard working hours.

Works outside of standard working hours would be undertaken in accordance with the *RMS Environmental Noise Management Manual Practice Note vii* (Roads and Traffic Authority, 2001) and *RMS Noise Management and Night Works Fact Sheet 02* (Roads and Maritime Services, 2011), or in accordance with any Environment Protection Licence.

Evening and night time works would be based on prevailing circumstances on a case by case basis and may include deliveries, late running works where continuity is required for safety or engineering reasons, or similar activities.

Potentially affected members of the community would receive prior notification and be notified before the start of any works outside of standard hours.

3.4.3 Plant and equipment

Construction of the Proposal would require a range of plant and equipment and potentially include the following:

- Excavators
- Scrapers
- Bulldozers
- Graders
- Rollers
- Loaders
- Hand tools
- Asphalt pavers
- Concrete truck / pumps
- Cranes
- Generators
- Compressors
- Compactors
- Water carts
- Chainsaws and wood chippers
- Line-marking / lane painting equipment
- Trucks
- Small plant
- Kerb laying equipment
- Light vehicles (pickups)

- Crushing plant
- Concrete batch plant

3.4.4 Earthworks

The Queanbeyan River divides the EDE project into two sections. Earthwork volumes for each section north and south of Queanbeyan River are considered as isolated earthwork packages, and the achievement of a cut / fill balance in each section in the design would be attempted.

Any excess material would be hauled to approved stockpile areas along Old Cooma Road in preparation for another approved project that has a material shortage, or alternative approved sites. An approximate volume of 20,000 m^3 would be removed from site.

Hauling material between the north and south sections would require navigation through the Queanbeyan CBD and should be minimised as much as possible.

Temporary haul roads across the Queanbeyan River are not proposed.

Approximate preliminary design earthwork quantities:

- Cut volume north of Queanbeyan river = 177,000 m^3
- Fill volume north of Queanbeyan river = 143,000 m^3

There is a net excess of 34,000 m^3 north of Queanbeyan River.

- Cut volume south of Queanbeyan river = 30,000 m^3
- Fill volume south of Queanbeyan river = 59,000 m^3
- Cut volume from Barracks Flat Drive onramp = 17,000 m^3

There is a net shortfall of 12,000 m^3 south of Queanbeyan River.

These preliminary cut and fill estimates have been extracted from the preliminary model of the EDE. These volumes are subject to change with the detail design and will be minimised wherever possible.

Site won material from onsite excavation, residual soil and, extremely to highly weathered bedrock, should be suitable for re-use as engineered fill from a geotechnical perspective, provided unsuitable materials such as organics, waste or oversized particles are not present or can be removed.

It is expected that excavated, moderately to freshly weathered bedrock, would require crushing and screening to meet the nominated engineered fill criteria.

Further geotechnical assessment, sampling and testing would be required during construction to assess the suitability of particular soils for re-use.

3.4.5 Source and quantity of materials

The construction of road works would require various materials. The main construction materials and approximate quantities are provided in Table 5. Materials would be sourced from local suppliers where practicable.

Table 5. Construction material quantity estimates.

Material	Approximate quantity	Likely Source
	13,000 m^3	All material would be sourced from local suppliers and within the local region where

Material	Approximate quantity	Likely Source
		possible
	To be confirmed in detailed design	All material would be sourced from local suppliers and within the local region where possible
Select fill	76,000 m^2	All material would be sourced from local suppliers and within the local region where possible
Concrete	76,000 m^2	All material would be sourced from local suppliers and within the local region where possible
Dense grade road base	76,000 m^2	All material would be sourced from local suppliers and within the local region where possible
Precast concrete pipes and culverts	4,400 m	All material would be sourced from local suppliers and within the local region where possible
Trench backfill (sand)	To be confirmed in detailed design	All material would be sourced from local suppliers and within the local region where possible
Precast concrete wall elements	7,550 m^2	All material would be sourced from local suppliers and within the local region where possible
Geofabrics	To be confirmed in detailed design	All material would be sourced from local suppliers and within the local region where possible

Note: Quantities are based on preliminary designs only and are subject to revision during detailed design.

3.4.6 Temporary traffic management and access

The Contractor would be required to prepare a detailed Traffic Management Plan in accordance with the relevant Australian Standards and the RMS Traffic Control at Worksites Manual.

Construction access and material haul routes to the southern section of the project would be restricted to the site entrance from the Edwin Land Parkway / Old Cooma Road intersection entrance.

Construction access and material haul routes to the northern section of the project would be restricted from the Ellerton Drive entrance.

In exceptional circumstances, where temporary access is required through alternate routes to the project, potentially affected members of the community would receive reasonable prior notification.

The Contractor would prepare traffic management plans where work would interact with local traffic. Affected residents would be provided with a minimum of 48 hours notification of any traffic interruptions.

Materials from local suppliers for both sections of the project would be hauled along the existing public haul routes, and would be subject to Council and State regulations.

3.5 Ancillary facilities

Site compounds and onsite stockpile locations were identified in the SIS (NHG Environmental, 2014). Three potential site compound sites were identified (Figure 10):

- Along the northern end of Ellerton Drive at the junction with the existing section of Ellerton Drive.
- The southern (south of Queanbeyan River) compound site would be located in existing cleared, highly disturbed areas north-east of the Old Cooma Road / Edwin Land Parkway intersection.
- On disturbed property within the road reserve to the north of Barracks Flat Drive adjacent to the river.

The Contractor would be required to provide a main compound site, plus satellite compounds to minimise excessive construction related traffic having to regularly travel through the Queanbeyan CBD to access the two construction sites. The Contractor would also likely require a separate site compound for the bridge construction.

Onsite stockpile areas would be restricted to areas within the cleared boundaries or the roadway formation and ancillary works, or approved previously disturbed areas.

The Jumping Creek area has naturally occurring metal oxides in the soil; however, these occur outside the Proposal footprint. In the vicinity of the Jumping Creek ex-mining area, stockpiles, runoff and drainage features would be monitored during construction for elevated levels of metal oxides; however, onsite stockpile sites are not expected to contain naturally elevated levels of metal oxide containing materials.

The Proposal would require site compounds for the duration of construction (i.e. around 30 months). The compound sites would be used for site offices, lunch and ablution facilities, vehicle parking, temporary stockpiling of construction materials, fill material, plant and equipment.

Residential properties are located in close proximity to the proposed site compounds. Facilities and activities at the site compounds would be located and oriented to minimise adverse impacts on adjacent residential properties.

Onsite stockpile and compound sites should not be located in or immediately adjoining the box-gum woodland to protect these areas from inadvertent access, dust, weed spread and other potential indirect impacts.

QCC would continue to investigate opportunities for suitable access points, stockpile sites and compound areas to facilitate effective and efficient delivery of the project. Should additional sites be identified for use (e.g. Jumping Creek Estate or other cleared areas), all appropriate approvals would be obtained.

Figure 10 to Figure 13 illustrate the proposed compound and stockpile sites.

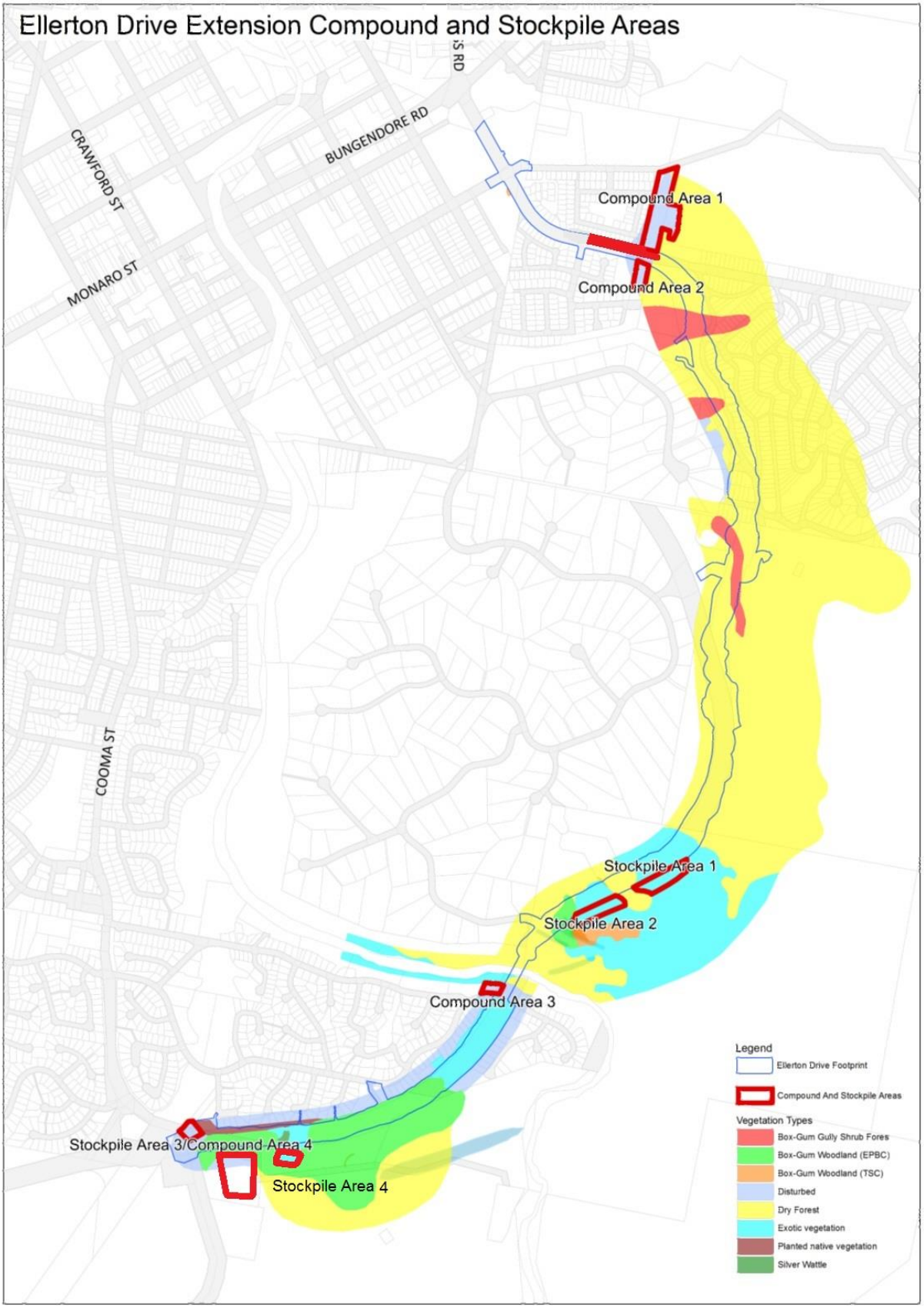

Figure 10. Ellerton Drive Extension updated compound and stockpile areas.

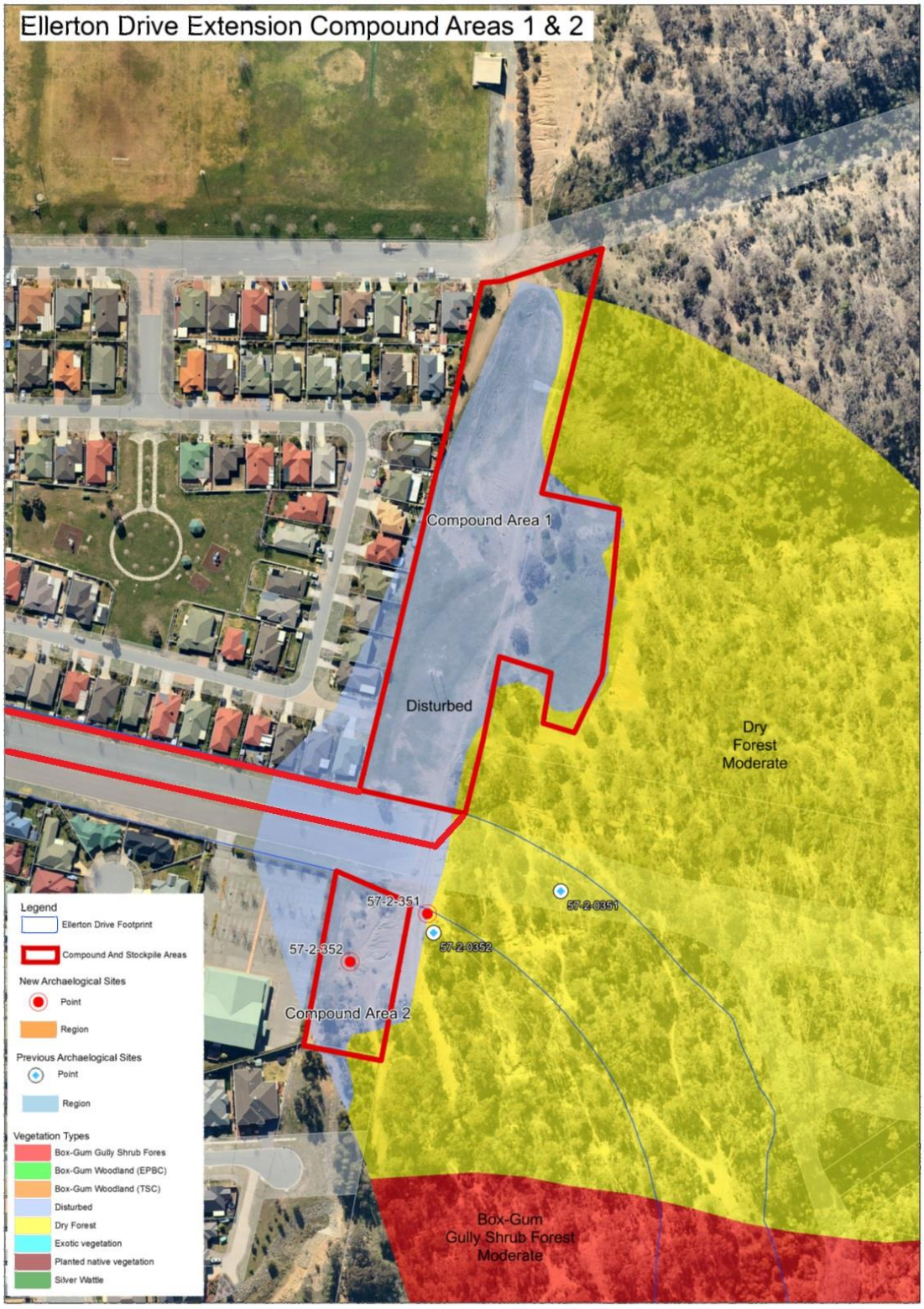

Figure 11. Ellerton Drive Extension compound areas 1 and 2.

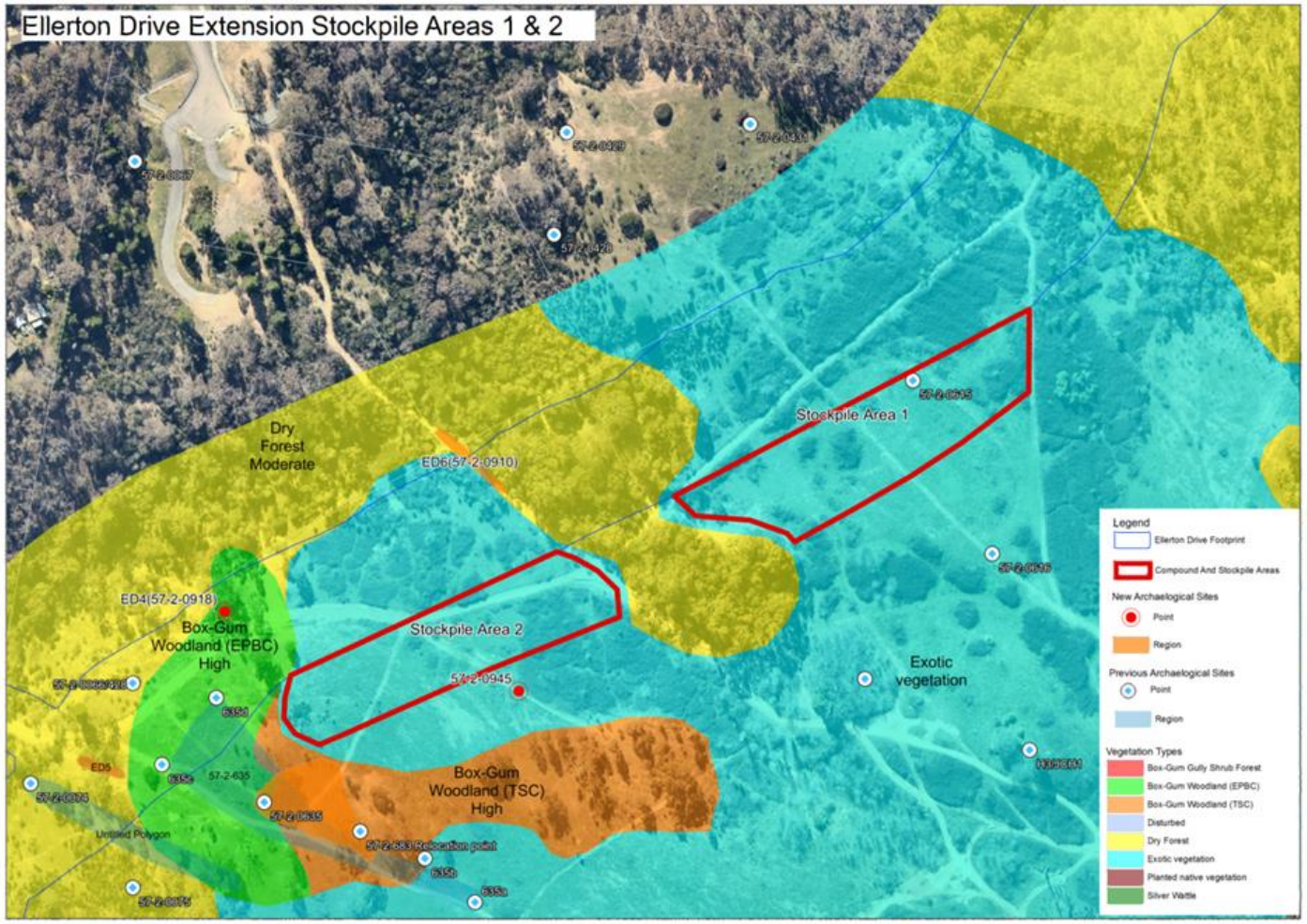

Figure 12. Ellerton Drive Extension stockpile areas 1 and 2.

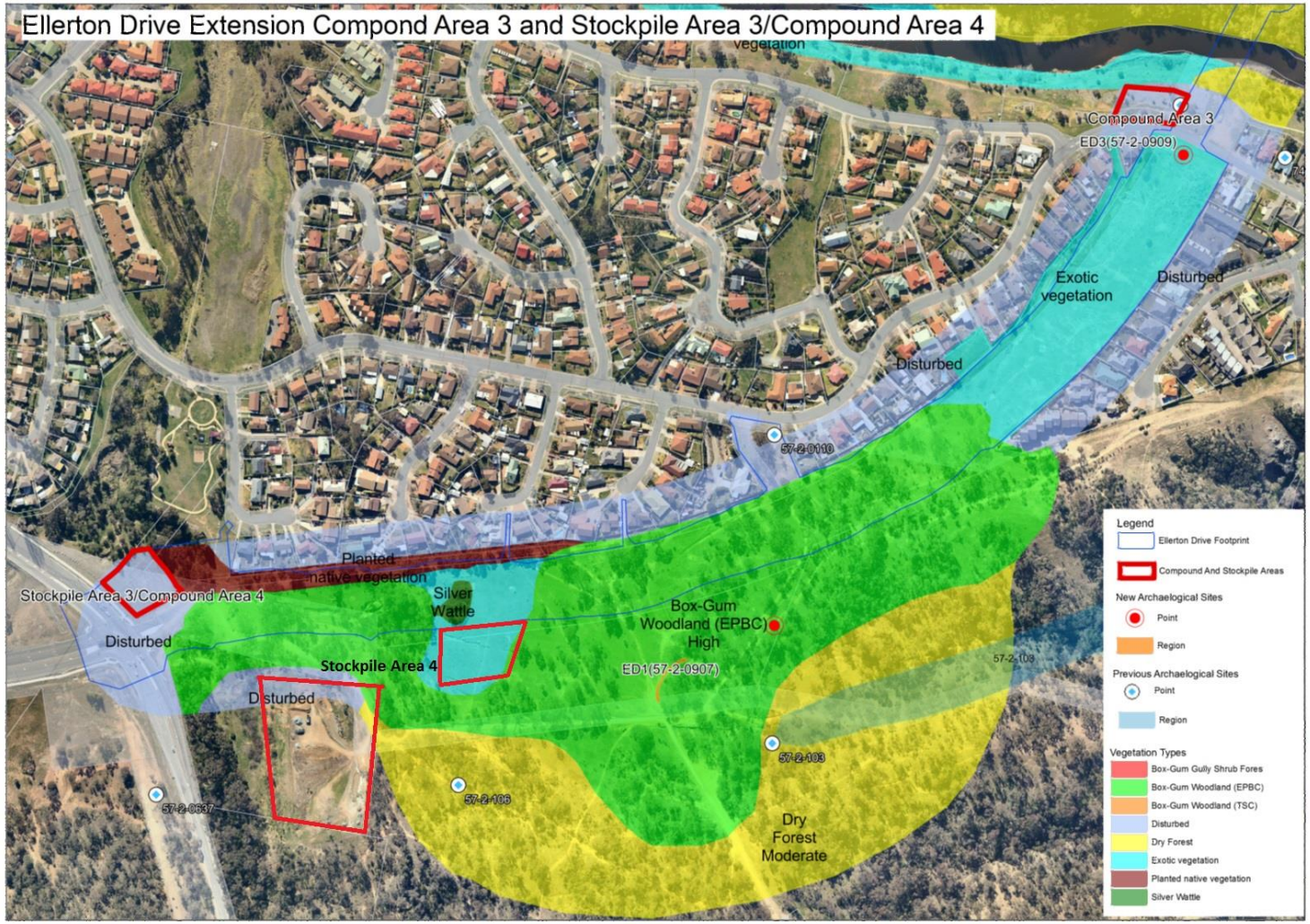

Figure 13. Ellerton Drive Extension compound area 3 and 4, stockpile area 3 and 4.

3.6 Public utility adjustments

3.6.1 Water mains

- The QCC water mains crossing the proposed alignment at ch1720 are expected to require lowering to clear the proposed alignment and adjacent road to the water tank. Potholing of these water mains was undertaken to confirm pipe levels and allow relocation design to be conducted. QCC will undertake tie-ins to existing water mains, and provide connection points for contractors prior to start of construction contract.
- The QCC water main running parallel to the proposed alignment from ch1860 - ch3280 would require potholing to confirm pipe locations. It is unclear if pipe relocation is required until the pipe location is confirmed on site.
- The QCC water main at ch3500 would require potholing to confirm its location and ensure it clears the proposed bridge piers.
- The QCC water main crossing the proposed 74 Barracks Flat Drive connection between ch4040 and ch4060 was potholed to confirm its location and verify that pipe relocation is required. QCC will undertake the relocation of the water main prior to start of construction contract.
- The QCC water main crossing the alignment between ch4180 and ch4220 would require lowering to clear the proposed alignment. Potholing of these water mains would be required to confirm pipe levels and allow relocation design to be conducted.
- The IWL 1800 mm diameter water main crossing the alignment between ch4260 and ch4290, and running parallel to the alignment between ch4290 and ch4660, has been potholed to confirm its location. This pipe would not require relocation works.

3.6.2 Sewer mains

- The QCC sewer main at ch95 would require potholing to confirm the site location and avoid clashes with the cross drain relocation to the southern QCC depot access way.
- The QCC sewer mains between ch3480 and ch3515 would require potholing to confirm it is located between the bridge priers at pier location 4.

3.6.3 Stormwater pipes

- The stormwater pipes between ch3420 and ch3510 would require relocation during bridge construction.
- The QCC stormwater pipe crossing the alignment at ch4625 would require replacement.
- The QCC stormwater pipe and outlet structure would require relocation at ch4650.

3.6.4 Gas

- The gas service pipes at ch180, in the vicinity of Barracks Flat Drive and in the vicinity of the Old Cooma Road intersection, would be located and protected during construction.

3.6.5 Electricity

- The overhead power lines crossing the Proposal alignment at ch710 and ch4170 have adequate clearance over the proposed alignment based on the survey information.
- Low voltage overhead power lines crossing the Proposal alignment at ch1745 has adequate clearance over the proposed alignment based on the survey information.

3.6.6 Lighting

- Two light poles at the north eastern and south-eastern corners of the Old Sydney Road, Ellerton Drive intersection (roundabout) would require relocation.
- The light pole at ch690 requires relocation to avoid the shared pathway.

Consultation would be undertaken with the relevant utility owners as detailed design progresses. The relocation designs would be provided to the relevant utility owner for approval prior to construction.

3.7 Property acquisition

The QCC has recently acquired Lots 69-88, Lots 184 and 197, and Lots 225-229 inclusive of DP15764 through the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) for securing part of the road corridor. The purchase of the road corridor through Lot 1 DP711905 has commenced through a mutual agreement with the land owner. The QCC has been the owner of over half of the remaining road corridor since the 1990s.

Specifically, the land owned by the QCC includes:

- Lot 49 DP754907
- Lot 3 DP 1097427
- Lot 2 and Lot 3 DP 869386
- Lot 52 and Lot 53 DP 835313
- Lot 205 DP 771021
- Lot 141 DP 718941
- Lot 67 DP 264406
- Road corridor between Lot 2 DP 8669386 and the Queanbeyan River
- Lot 1, 2, 3 DP 872684
- Lot 4 DP 800542
- Roads within DP 15222 and DP15764

Identification of offset sites and the acquisition of these sites are ongoing. This will be conducted through mutual agreement with the landowners.

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.

Certain developments such as the construction of roads or electricity infrastructure by a public authority do not require development consent via the development application process (as per clause 94 of the ISEPP) but instead are assessed under Part 5 of the *Environmental Planning and Assessmen*t *Act 1979* (EPA Act). The Proposal is for a public road and is to be carried out on behalf of QCC. It is appropriately assessed and determined for approval by QCC Part 5 of the EPA Act.

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 prior to commencing 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 No. 44 Koala Habitat Protection*

This *SEPP Koala Habitat Protection* aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas, to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. SEPP 44 applies to land within the former Yarrowlumla LGA but does not apply to land within the Queanbeyan LGA, so this policy does not apply, even though incidental Koala observations do occur in the shire.

4.1.3 *State Environmental Planning Policy (Rural Lands) 2008*

The *SEPP Rural Lands 2008* policy is in place to ensure significant agricultural land is identified and maintained, and that rural land is protected to promote social, economic and environmental welfare.

Much of the EDE is zoned as an environmental protection zone (E2: Environmental Conservation). Proposed development within rural and environment protection zones must be consistent with Clause 7: Rural Planning Principles, as follows:

a) The promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,

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,

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,

d) In planning for rural lands, to balance the social, economic and environmental interests of the community,

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,

f) The provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,

g) The consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,

h) Ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The EDE does not adversely impact on productive agricultural areas, thus only Clause 7e applies, due to adverse impact on native vegetation, biodiversity and water resources. This is further discussed in section 6. It is also accepted that the land may ultimately rezoned as SP2 Infrastructure (Roads) to avoid any potential conflicting landuse issues.

4.1.4 *State Environmental Planning Policy No. 55 – Remediation of Land*

The Proposal passes over the Jumping Creek contamination study area, identified as lands potentially containing naturally occurring raised levels of metal oxides, which in previous times attracted mining to the site. Old mine sites and a sheep dip are being remediated in the vicinity of the road, but no Areas of Environmental Concern are within the footprint of the Proposal and SEPP 55 is not triggered. Further, any risk of activating the metals in the sub surface layers is assessed by QCC as minimal, since the road formation over the Jumping Creek contamination study area would be formed on fill.

An unexpected finds protocol (UFP), as part of the CEMP for the project, would include a response to the possibility that earth works disturb contaminants of concern, including hydrocarbons and metal oxides that may be mobilised and moved into waterways. The UFP would provide information on how to identify and manage risk associated with such contaminants and, if required, result in remediation of the contamination. Observations made onsite may include visual and olfactory signs of contamination.

Waterways and sediment basins would be monitored during construction for abiotic contaminants to ensure road construction does not adversely affect the downstream catchment. A treatment plan would be made available in the CEMP's water management sub plan.

4.2 Local Environmental Plans

Queanbeyan Local Environmental Plan 2012

Queanbeyan Local Environmental Plan 2012 (LEP) applies to the study area. The impact area is predominantly located within land zoned E4 Environmental Living, E2 Environmental Conservation and SP2 Infrastructure (Roads). Small sections of the impact area are located in land zoned R2 Low Density Residential, W1 Natural Waterways and RE1 Public Recreation. The development of roads is permitted with consent within zones E2 and E4.

As the Queanbeyan population grows within the Queanbeyan LGA, the QCC is conscious of their role in improving traffic and transport (including active transport)

infrastructure within the region. Much of the route for the EDE has been zoned SP2 Infrastructure in the current *Queanbeyan Local Environmental Plan 2012* with provisions within the remaining land zones for the inclusion of the road. The EDE is specifically mentioned in Part 6 Clause 6.6 'Access to Jumping Creek' in the Queanbeyan LEP. This regulation prevents the development consent for development at Jumping Creek land unless vehicular access to and from the development would be provided by the EDE.

Clause 5.12 of the Queanbeyan LEP states:

(1) This Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under *State Environmental Planning Policy (Infrastructure) 2007*.

4.2.1 *Queanbeyan Tomorrow Community Vision 2021*

In 2006 QCC consulted widely with the Queanbeyan community to develop a long term community vision for the city. The vision gives direction and focus for QCC's future activities. The EDE has been included in the document, as an alternative route around the CBD (People, Place and Partnership & The Regional Development Company, 2012). The EDE is proposed to take heavy vehicles out of the CBD, allow traffic to flow easily between suburbs and the CBD, and assist traffic flow through Queanbeyan from the ACT to the coast.

4.2.2 *QCC Residential and Economic Strategy 2031*

The *QCC Residential and Economic Strategy 2031* (QCC, 2006) acknowledges a need for further work on transportation modelling and studies to highlight the likely impacts and measures required to respond to future demands from residential developments. The report outlines the need to eventually connect Edwin Land Parkway to the Kings Highway as a means to support future growth in Queanbeyan.

4.2.3 *QCC Biodiversity Study Findings Report*

The *QCC Biodiversity Study Findings Report* (Bushfire and Environmental Services, 2008) was prepared in 2008 to inform the Queanbeyan LEP 2012 on appropriate zoning, environmentally sensitive areas and biodiversity values.

Vegetation of conservation value, containing important ecological features, includes vegetation communities that:

- Are over-cleared, poorly conserved or otherwise threatened
- Are located within over-cleared Mitchell landscapes
- Are in moderate to good condition
- Provide other important ecological functions such as buffering high conservation vegetation, linking habitats, stabilising creek banks and protecting riparian zones.

The EDE contains high conservation vegetation in that it has an endangered ecological community (Box-Gum Woodland) and a riparian corridor (Queanbeyan River). The area is also identified as a local biolink.

Many of the values identified in the biodiversity study for the Proposal area have been confirmed and/or elaborated on in the SIS, which discusses the adverse impacts of the Proposal and outlines the manner in which adverse impacts have either been avoided, reduced or offset. These are discussed in section 6.

4.2.4 *Queanbeyan River Riparian Corridor Strategy Incorporating the Platypus Awareness and Conservation Strategy*

The Queanbeyan River Riparian Corridor Strategy (Eco Logical Australia, 2012) aims to improve environmental quality, amenity and recreational opportunities by reducing threats, and rehabilitating the river corridor and its tributaries. High priority actions recommended in the strategy include to increase riparian habitat and amenity of the river and its tributaries, improve public access along the corridor, ensure future development does not adversely affect the river corridor, improved coordination of rehabilitation activities within the corridor and increased community education and involvement.

The Queanbeyan River is important for water supply, amenity and recreation. Sections of the river are degraded, which is typical of rivers located in urban areas. Despite this, the river corridor provides important habitat for native species such as the platypus, water rat and wombat. The occupation by platypus in this urban setting is reasonably unique and the local Queanbeyan community is concerned and committed to ensuring the species, while not threatened, is not lost to this section of the river, as expressed in the Platypus Awareness and Conservation Strategy. The health of the river also plays a vital role for communities and ecosystems further downstream.

The Proposal aims not to compromise the actions of the riparian and platypus strategies. Avoidance and mitigation strategies are discussed in section 6.

4.3 Other legislation potentially applying

4.3.1 *Environmental Planning and Assessment Act 1979*

The EP&A Act is the principal legislation guiding land use development in NSW. Key parts of the Act include:

- Section 5A provides a seven-part test in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats.
- Section 111 outlines duty of a determining authority to consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of an activity.
- Section 112 outlines that an Environmental Impact Statement is required when an activity is prescribed or may have a significant impact on the environment.

The Proposal requires approval under Part 5 of the EP&A Act via a Review of Environmental Factors. The QCC is the determining authorities for the REF. OEH have a concurrence role for biodiversity, pollution and Aboriginal heritage aspects. Consultation with other agencies is required including Office of Water, Department of Planning, NSW Rural Fire Service and Department of Primary Industries (Fisheries). The Environmental Protection Authority (EPA) has the enforcement responsibilities and functions as the regulatory authority under NSW environmental legislation.

4.3.2 *NSW Environmental Planning and Assessment Regulation 2000*

Clause 228 of the *NSW Environmental Planning and Assessment Regulation 2000* identifies factors to be taken into account concerning impact of an activity on the environment. QCC are obliged to consider clause 228 of the Regulation with regard to identification of environmental impacts of proposals. The factors specified under this regulation (*What factors must be taken into account concerning the impact of an activity on the environment?)* form the scope of this REF.

4.3.3 *Threatened Species Conservation Act 1995*

The *Threatened Species Conservation Act 1995* is in place to conserve biological diversity, promote sustainable development, protect species habitat and prevent species extinctions. The Act determines the requirements for assessment and mitigation or avoidance of listed threatened species, communities and populations and initiates the production of recovery plans where required.

The Proposal has been assessed under the TSC Act. Any protected species, populations and communities likely to occur in the area and in the habitat type affected by the Proposal have been assessed under the 7-part test provided in the Act. Under sections 109 and 110 of the TSC Act, a Species Impact Statement has been completed for the Proposal. Seven Part tests are included in the Species Impact Statement (ngh Environmental, 2014) and are summarised in section 6.

4.3.4 *Protection of the Environment Operations Act 1997*

The *Protection of the Environment Operations Act 1997* (POEO Act) provides an integrated system of licensing for polluting activities within the objective of protecting the environment. The Environment Protection Authority (EPA) must be notified when a 'pollution incident' occurs that causes or threatens 'material harm' to the environment. Section 120 of the *Protection of the Environment Operations Act 1997* (POEO Act) prohibits the pollution of waters. Section 7 identifies measures to mitigate the risk of water pollution.

Part 3.2 of the POEO Act requires an Environmental Protection Licence (EPL) for scheduled development work and the carrying out of scheduled activities. The Proposal does not meet the definition of 'Road Construction' in Clause 35 because it is less than 5 km long. The Proposal does not warrant an EPL based on the prescribed scheduled activities; however, a license may still be requested to provide certainty to the timeline for the project.

4.3.5 *Heritage Act 1977*

The *NSW Heritage Act 1977* (Heritage Act) is a statutory tool developed to conserve the cultural heritage of NSW. It is used to regulate development impacts on the State's heritage assets. Administered by the NSW Heritage Office, the Act details the statutory requirements for protecting historic buildings and places and includes any place, building, work, relic, movable object or precinct, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value.

A heritage assessment has been undertaken for the Proposal and potential archaeological deposits have been investigated and salvaged. An Aboriginal Heritage Impact Permit under the *National Parks & Wildlife Act 1974* is required for this project. Aboriginal and European heritage is addressed further in section 6 and 7.

4.3.6 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* governs the care, control and management of national parks, nature reserves, Aboriginal areas and historic sites including areas vested with the Environment Minister. The objectives of the Act include the conservation of nature, objects, places or features such as habitats, biological diversity, landforms and places of Aboriginal, social or historical value. These objectives are achieved by applying principles of ecologically sustainable development. The management principles for national parks includes promoting public awareness, making provisions for sustainable visitor use and the conservation of biodiversity, ecosystem function, natural landscape and cultural value.

Several Indigenous heritage items were discovered in and adjacent to the EDE alignment. An Aboriginal Heritage Impact Permit (AHIP) is required under Section 90 to prevent harm to Aboriginal objects or places over the entire impact area in consultation with registered Aboriginal parties.

An assessment of potential impacts is included in Section 6 and a summary of the consultation undertaken with Aboriginal stakeholders is provided in Section 5.3.

4.3.7 *Noxious Weeds Act 1993*

This *Noxious Weeds Act 1993* aims to prevent the establishment, reduce the risk of spread and minimise the extent of noxious weeds. The Act guides the management of declared noxious weeds within LGAs.

This Proposal does not require a permit or approval under this Act, but it is QCC's responsibility to remove and appropriately dispose of any listed weeds found within the Proposal site and to prevent the establishment of noxious weeds in the disturbed areas of the site during and following construction. Noxious weeds are discussed and management measures proposed in Section 7.

4.3.8 *Rural Fires Act 1997*

The *Rural Fires Act 1997* ensures protection of life, property and the environment from fires. Under Section 63, public authorities must take all practicable steps to prevent the occurrence and spread of bushfires on or from land vested in or under its control or management.

Based on consultation with the Rural Fire Service (RFS), the following features would be required:

- Right turn out of the driveway north of the 10 Ellerton Drive driveway;
- Emergency u-turn gaps in the median approximately every 500 m;
- Fire truck access at reasonable intervals to adjacent bushland from reasonably flat grades off the side of the EDE.

4.3.9 *Fisheries Management Act 1994*

The *Fisheries Management Act 1994* (FM Act) is in place to conserve fish stocks, habitats and threatened species, populations and communities, so to preserve fishery resources for future generations.

Several approvals would be required for the Proposal under the Act. Section 200 requires a permit from the Minister for Primary Industries for the QCC to carry out dredging or reclamation work. Section 219 requires a permit from the Minister for Primary Industries or approval under this or another Act to create an obstruction that would block fish passage. Under Section 220ZZ the Determining Authority must consider whether the Proposal would cause significant adverse impact on threatened species, populations or ecological communities, or their habitats.

SMEC has established in section 6 via consultation with DPI that the likelihood of adverse impact on threatened fish is low; however, a license to undertake works in waterway would be required.

4.3.10 *Water Management Act 2000*

The objects of the *Water Management Act 2000* are to provide for the sustainable and integrated management of the State's water sources for the benefit of both present and future generations. A water use approval may be required to dewater footings and trenches during construction (Section 89). Taking groundwater that is not managed by

a water sharing plan requires a groundwater license under Section 113 of the *Water Act 1912* however the water table is generally deep and is unlikely to be used. Works within 40 m of a waterway generally requires a Controlled Activity Approval (Section 91). Consultation is required with the NSW Office of Water prior to road construction.

4.3.11 *Native Vegetation Act 2003*

The *Native Vegetation Act 2003* aims to prevent broad scale clearing, protect native vegetation of high conservation value and improve conditions of existing native vegetation. Tree clearing would be required for EDE works, however under Clause 25 (h) of the Act, any clearing carried out as part of an activity assessed under Part 5 of the *EP&A Act* is excluded from the application of the Act, if the Determining Authority has complied with that Part.

4.3.12 *Crown Lands Act 1989*

The *Crown Lands Act 1989* provides for management of Crown land including occupation, use, sale, lease, license, dedication or reservation. Currently the only crown land within the EDE alignment is adjacent to the southern crest. The QCC would confirm in the detailed design that no batter encroachment occurs across the entire road boundary and the Proposal can be retained in its current footprint where no crown land acquisition is required.

4.3.13 *Soil Conservation Act 1938*

The *Soil Conservation Act 1938* allows for conservation of soil resources and erosion management. Notices can be issued under Section 15A to control erosion or degradation. The construction would be required to follow best practice and a CEMP would be in place to avoid soil loss from the construction site and sedimentation of downstream waterways.

4.3.14 *Contaminated Land Management Act 1977*

The *Contaminated Land Management Act 1977* establishes a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3. Furthermore, under Section 60 a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify the EPA when they become aware of the contamination. A phase 1 contamination assessment of the alignment is being undertaken and, at this stage, it appears unlikely that this legislation would be triggered.

4.3.15 *Dangerous Good (Road and Rail Transport Act) 2008*

Under the *Dangerous Good (Road and Rail Transport) Act 2008,* the EPA regulates on-road transport of dangerous goods while WorkCover regulates activities prior to transport, including correct classification, packaging and labelling. If dangerous goods are used during construction then a license may be required.

4.3.16 *Environmentally Hazardous Chemicals Act 1985*

The *Environmentally Hazardous Chemicals Act 1985* regulates the use and storage of environmentally hazardous chemicals or declared chemical waste. It provides the OEH with assessment and control mechanisms for chemicals and chemical wastes. This Act would only apply if environmentally hazardous chemicals are used during construction of the Proposal and there is potential for a significant adverse impact on the environment.

4.4 Commonwealth legislation

4.4.1 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a referral to the Australian Government is required for proposed actions that have the potential to significantly and adversely impact on matters of national environmental significance or on Commonwealth land.

The QCC submitted a referral to the Australian Government Department of the Environment on 11th August 2014 (2014/7304) for a determination on whether or not the Proposal constitutes a controlled action due to potential adverse impacts on listed threatened species and communities, including Box-Gum Woodland and the Hoary Sunray. The Commonwealth has determined the Proposal to be a controlled action with preliminary documentation. The determination is included in Appendix 2.

4.4.2 *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the ATSIHP Act) assists in the preservation and protection of places, areas and objects of particular significance to indigenous Australians. The ATSIHP Act does not apply to all indigenous heritage, but only to areas and objects that are of particular significance to indigenous Australians in accordance with their indigenous traditions. Unlike NSW legislation, the ATSIHP Act is not designed to protect areas and objects of scientific and historical interest. The ATSIHP Act can override NSW planning approvals, as the Commonwealth Minister may prevent an activity from occurring by making a declaration to protect an area or object.

This Act would not be triggered by this Proposal. All of the Aboriginal sites and value matters have been considered and agreement with OEH on the treatment on low value adversely impacted sites has been obtained.

4.5 Confirmation of statutory position

The Proposal is not a state significant development nor is it state significant infrastructure. The Proposal has been assessed as permissible without consent under the relevant environmental planning instruments. That position is established by reference to clause 94 of the ISEPP.

The Proposal is an ‘activity’ as set by Section 110 of the EP&A Act. As it is being proposed by a public authority, namely the QCC, assessment and approval under Part 5 of the EP&A Act is required.

The matters prescribed by clause 228 of the Environmental Planning and Assessment Regulation 2000, for consideration by assessments under Part 5, are addressed in Section 6.

A referral under the EPBC Act (2014/7304) resulted in the EDE being determined as a controlled action, requiring assessment and approval under the EPBC Act by preliminary documentation. A biodiversity offset strategy is being developed and would be implemented as part of this Proposal.

5. Stakeholder and community consultation

5.1 Public consultation

5.1.1 Proposal background

Queanbeyan has been experiencing a boom in growth with the addition of new townships, subdivisions and infill development. As part of the Queanbeyan's ongoing design and development and the long term planning undertaken by the QCC, the EDE has been planned since the 1970s, and has been on the Queanbeyan Structure Plans since 1974 and the Local Environmental Plan mapping since 1991.

A review of the Queanbeyan Residential and Economic Strategy 2031 (addendum Dec. 2008) by the NSW Department of Planning required QCC's Transport Strategy to specifically address the need, timing and funding (including the preparation of contributions plans) for required transport infrastructure works to address forecasted growth for the region.

As a result of this review, QCC engaged Gabites Porter (now Traffic Design Group) to conduct a fully functioning integrated land use/transport model to analyse Queanbeyan's traffic network. This work was reported in the Draft Queanbeyan Strategic Traffic Plan (2031) and was completed in 2009.

The study used land use data and traffic flows in the Queanbeyan / Canberra area to analyse, test and optimise various 2031 future land use and infrastructure scenarios.

The traffic study investigated the possible network deficiencies due to Queanbeyan's forecasted growth between 2006 and 2031.

The Traffic Study looked at over 34 combinations of road and intersection improvements to address the network deficiencies that are likely to be experienced due to the expected development growth in the Canberra-Queanbeyan region. The Traffic Study did not focus on reducing flows in any particular areas of the network but rather looked at the Canberra-Queanbeyan network as a whole.

Proposed road and intersection improvements were identified on the basis of their ability to improve the level of service (LOS) at each location and for the overall road network to LOS "D" or better. Several new routes were proposed as a means of creating additional capacity thereby relieving various areas of congestion, and analysed in detail in the modelling.

The study also took into account the strong correlation between Queanbeyan and ACT traffic travelling over the border for employment and school opportunities.

Results from modelling for the Draft Queanbeyan Strategic Traffic Plan (2031) showed that Option 05B provided the best combination of traffic improvements for the long term strategic transport plan for all of Queanbeyan. Option 05B includes the EDE, the future four-laning of Old Cooma Road and various intersection improvements. Thus the proposed extension to Ellerton Drive was identified as a key component of the preferred option.

The Traffic Study also found that traffic congestion on Cooma Street and the Queens Bridge only improved with the inclusion of the proposed EDE, as it would provide an alternative route around the CBD. The new link would also provide better access over the Queanbeyan River in major flood events.

In its resolution 274/09 of 26 August 2009, the QCC adopted the Draft Queanbeyan Strategic Traffic Plan (2031) and resolved to rename it the Googong and Tralee Traffic Study (2031).

5.1.2 Current consultation and REF exhibition

Consultation with community and stakeholders forms an important part of the project development process. To provide information to the public and to receive feedback and information regarding the project, QCC has undertaken a range of consultation during the exhibition period for the review of environmental factors.

The REF was exhibited for a 60 day period from 12 December 2014, ending 9 February 2015.

The REF public exhibition allowed members of the community opportunity to comment on the elements of the project, the environmental impact of the project and the proposed protective measures. The exhibition period was extended from 30 days to 60 days to accommodate the Christmas holiday period.

The following documents were made available:

- Review of Environmental Factors (SMEC, 11 December 2014)
- EPBC Referral under EPBC Act (ngh Environmental, August 2014)
- Draft Species Impact Statement (SIS) (ngh Environmental, June 2014)
- Preliminary Sketch Plan Design Report (OPUS, December 2014)
- Aboriginal Cultural Heritage Archaeological Report (ACHAR) (CHMA, 1 December 2014)
- Artist impressions of the Proposal
- Noise Impact Assessment – Operation and Construction (SLR, 18 December 2014)
- Preliminary Sketch Plan Drawings (OPUS).
- Fact sheets (including general overview, finance, environment and heritage, review of the environmental factors, traffic, and flooding).

Advertisements for the REF exhibition period were placed in the Queanbeyan Age, The Chronicle and the Canberra Times, and on QCC's website, Facebook page and Twitter. Emails were sent to those registered on the EDE mailing list and letters sent to directly affected residents. A5 postcards were posted to 21,000 Queanbeyan properties.

In addition to the above consultation, an invitation to comment on the REF was sent directly to the various stakeholders, as detailed in Section 5.1.2.1.

Physical exhibition of the documents occurred at two locations:

- QCC's Customer Service Centre, 257 Crawford Street Queanbeyan (8am - 4.30pm Monday-Friday), excluding the Christmas closedown period of 25 December 2014 - 4 January 2015
- Queanbeyan Library at 6 Rutledge Street, Queanbeyan.

The QCC hosted the following community information sessions, which were attended by up to 120 people, some of whom attended multiple sessions. The sessions were held at:

- Harry Hesse Room of the RB Smith Community Centre at 262 Crawford Street.

  – Tuesday 16 December 2014 (4.30-7.30pm)

  – Tuesday 20 January 2015 (4.30-7.30pm)

  – Tuesday 3 February 2015 (5.30-7.30pm)

- Jerrabomberra Community Centre:

  – Thursday 18 December 2014 (4-6pm)

  – Wednesday 21 January 2015 (3-4.30pm)

  – Thursday 29 January 2015 (5-6.30pm).

During the consultation period, the QCC, together with Roads and Maritime Services (RMS), undertook pop-up sessions at Riverside Plaza, Karabar Shopping Centre and Jerrabomberra Shopping Centre during various periods on selected days. Approximately 1,000 people were spoken to at these shopping centres over more than 20 sessions.

The REF and all associated documents were also placed on QCC's website:

www.qcc.nsw.gov.au

All submissions that were provided during the REF exhibition process have been reviewed to determine if there are any outstanding issues not adequately addressed in the REF.

5.1.2.1 Additional stakeholder comments

In addition to the above consultation, an invitation to comment on the REF was sent directly to the following stakeholders:

- NSW Office of Water
- NSW Office of Environment and Heritage (OEH)
- NSW Department of Primary Industries
- NSW Department of Planning and Environment
- NSW Public Works
- Roads and Maritime Services
- NSW Rural Fire Service
- NSW State Emergency Services
- Transport for NSW
- Queanbeyan Police Department
- Commonwealth Department of the Environment
- Australian Platypus Conservancy.

Responses from the NSW Office of Water, the Environmental Protection Authority and NSW Department of Primary Industries generally referred to mitigation measures to be included in a CEMP. These responses will be incorporated into the construction documentation where appropriate.

The NSW Office of Environment and Heritage identified outstanding issues with respect to the SIS, including platypus, fauna underpass (location and design), fauna fencing, risk of wildlife getting caught in noise barriers, indirect impacts on flora and fauna, habitat rehabilitation, soil erosion, weed control and protection of the LandCare restoration project at Jumping Creek.

Biodiversity issues were discussed in the REF.

- The NSW Department of Primary Industries has been consulted on fisheries management. They have indicated the adverse impacts on native fish are likely to be minimal as long as sediment, pollution and temporary obstructions are managed according to best practice. The Murray Cod and Golden Perch restocking history has been provided. DPI has advised that stormwater treatments, pollutant and sediment traps and stormwater treatment ponds are required to protect Queanbeyan River riparian and aquatic values.
- NSW Rural Fire Service comments consisted of a request for access to adjacent forest land for fire-fighting equipment.
- Queanbeyan Police Department comments consisted of a request for a Random Breath Test location plus emergency turnaround areas along the route.
- The Australian Platypus Conservancy (APC) commented on the impact of the bridge foundation construction on platypus habitat and breeding.
- Icon Water Ltd, the Department of Trade and Investment, NSW Public Works, and Roads and Maritime Services provided general advice regarding infrastructure

All feedback received is further discussed in Section 5.4 and will be incorporated into the detailed design and construction documentation where appropriate.

No formal submissions were received from the following:

- NSW Department of Planning and Environment
- NSW State Emergency Services
- Transport for NSW
- Commonwealth Department of the Environment

5.1.3 QCC Past Consultation

QCC has undertaken a range of consultation events in relation to the development of the EDE which has informed the development of the project, including modifications to the design.

While no statutory consultation is required, comprehensive consultation has been undertaken in various stages throughout the early concept planning and development of the Proposal up to the commencement of detailed design.

In particular, the following consultation has been undertaken to date:

- Urban Release Area Process, discussed in Section 5.1.3 A
- Traffic plan consultation, discussed in Section 5.1.3 B
- Public transport forum, discussed in Section 5.1.3 C
- Pre-REF consultation, discussed in Section 5.1.3 D

- Questions on Notice, discussed in Section 5.1.3 E

5.1.3 A Urban Release Area Process

QCC published the Queanbeyan Residential Economic Strategy (2031) in November 2006.

This strategy identified both Googong and Tralee as future growth areas. When these identified future growth areas were officially rezoned in 2009, the rezoning process was publically exhibited for comment prior to gazettal. This public exhibition included the Local Environmental Study which looked at, amongst many other things, the development of Googong and its impact on the Queanbeyan traffic network.

The Queanbeyan Local Environmental Plan 2012 (LEP) process was publically exhibited for comment in 2011 and Googong was subsequently incorporated into the LEP.

5.1.3 B Traffic Plan Consultation (2009)

QCC's meeting on 24 June 2009 resolved to place the Draft Queanbeyan Strategic Traffic Plan (2031) on public exhibition for 28 days.

The Draft Queanbeyan Strategic Traffic Plan (2031) was exhibited for nine weeks in July and August 2009. Public meetings were held in both Queanbeyan and Jerrabomberra. Additional briefing sessions were given to the Queanbeyan Development Board and local members of parliament. The public exhibition of the draft plan closed on 14 August 2009.

While on public exhibition, members of the community were able to assess the direction QCC wanted to take to improve the city's transport network due to the development expected to occur prior to 2031.

Two information sessions to outline the key components of the plan were held, and hardcopies were available at the Queanbeyan Library and QCC's customer services centre. The plan was also made available on QCC's website.

QCC's meeting of 26 August 2009 resolved to adopt the Draft Queanbeyan Strategic Traffic Plan (2031), which recommended Option 05B consisting of a combination of the 2-lane Edwin Land Parkway Extension (Jerrabomberra to Old Cooma Road) which has since been completed, the EDE, the future four-laning of Old Cooma Road and various intersection improvements as the preferred solution for Queanbeyan's traffic needs. At this meeting, the QCC also resolved to rename the Draft Queanbeyan Strategic Traffic Plan (2031) as the Googong and Tralee Traffic Study (2031).

All issues raised in submissions during this public exhibition period were considered and addressed in the responses provided by QCC. The issues raised and comments received during this consultation informed the adoption of the plan which was included in QCC's integrated planning process.

5.1.3 C Public Transport Forum (2011)

QCC held two public transport forums, on 27 October 2011 and 8 December 2011. These forums were held to help determine strategies QCC may be able to use to help the community better understand QCC's role with respect to public transport and to inform QCC on community expectations around the provisions of public transport and pedestrian facilities.

5.1.3 D Pre REF consultation (2013)

QCC consulted with the community and stakeholders prior to the REF stage of the Proposal. This consultation process was undertaken between 20 May and 21 June 2013 to capture public comments regarding the Proposal design before starting on the detailed design work.

This consultation period was additional to any statutory requirements and included:

- Promotion
- Public information displays

Public information sessionsAdvertisements for this consultation period were provided in the Queanbeyan Age and The Chronicle, and on QCC's Facebook page and Twitter. Emails were sent to those registered on the EDE mailing list.

The following documents were made available for review and comment:

- Draft route and intersection plans
- Archaeological report
- Concept plans
- Draft SIS.

The exhibition material was available at the following locations:

- QCC office on the ground floor level of 257 Crawford Street
- QCC Library
- Riverside Plaza
- Karabar Shopping Centre
- Jerrabomberra Shopping Centre
- QCC's website under 'Documents for Public Exhibition'.

Two public information sessions were conducted; one specifically for Greenleigh and Fairlane Estate residents on 28 May 2013, and a general information session on 29 May 2013.

The first specific community consultation was hosted by QCC to capture public comments on what residents of the Greenleigh and Fairlane Estates would like see included in EDE design prior to the detailed design work. The second was a general community information session.

Letters were sent to all residents in the Greenleigh and Fairlane Estates on 15 May 2013, advising of the consultation period and providing a copy of FAQs on the Project. This letter was followed with a reminder letter on 10 June 2013 of the consultation period and providing them with a copy of the proposed connection options to either estate or a feedback form.

A deadline of 4:30pm Friday 21st June 2013 was provided for all submissions to be made to QCC; however, all late submissions were accepted. Feedback forms or written submissions were provided either in person at QCC offices, in person at the public information sessions, through mail or by emails. QCC received 212 submissions. This includes 91 submissions from Greenleigh residents and 94 submissions from Fairlane residents.

Overall, community feedback was not opposed to extending Ellerton Drive; however, some respondents expressed opposition to the project. There were consistent issues

raised during the consultation process. The key overarching themes of the community feedback were:

- Concern that important ecological values in the area including endangered species and communities, and wildlife corridors and associated connectivity would be adversely affected,
- Concern over the significant financial cost for construction and that QCC rates would rise to recoup the cost of the road,
- The importance of maintaining Queanbeyan's Country Living City Benefits brand,
- The importance of maintaining safe pedestrian access to the adjacent bushland for recreational purposes,
- Concern over the limited emergency access to the Greenleigh and Fairlane Estates,
- The importance for QCC to consider sustainable options to the traffic problems.

A full summary of the public consultation is included in the *Ellerton drive Extension – Community Consultation on Concept Plan and Preliminary Works* (QCC 2013).

As a result of the consultation process, elements of the design were modified to address community concerns. Key design elements influenced by the consultation include:

- The addition of emergency egress from Greenleigh Estate
- The addition of off-road shared pathways to provide missing links between neighbourhoods and loops for recreational purposes
- Inclusion of on-road cycle ways to provide more commuter routes
- The addition of fauna underpasses.

On 28 August 2013, QCC resolved to proceed with the engagement of a consultant to undertake detailed design of the EDE. Opus International Consultants was commissioned to undertake the detailed design.

5.1.3 E Questions on Notice

As part of processes introduced by QCC to improve overall transparency and consultation, the community has had the opportunity to ask QCC questions on various topics since 2010.

These are known as 'Questions on Notice'.

Since their introduction in 2010/11, QCC has provided responses to all these written questions and made all the information publicly available. The QCC web page includes web links to all the questions and answers, and the webpage section for the Ellerton Drive Extension includes any questions and answers specifically related to the Proposal.

5.1.4 QCC post REF exhibit consultation

In response to community requests, QCC resolved at its meeting on Wednesday 25 February 2015 (resolution 042/15) to:

- Organise an independently facilitated community forum on the Proposal at the Bicentennial Hall with the Traffic Study engineers to present and to answer questions
- Invite the people who conducted the environmental impact assessment to answer questions
- Invite Roads and Maritime Services
- Invite both local members to attend
- Promote the forum to the entire community through letterbox delivery, media release, social media, direct notification to all submitters on the Proposal, community groups and any other method deemed suitable
- That feedback be considered as part of the EDE feedback process and future forums and consultation also be implemented if deemed necessary by QCC
- That the forum be held in April 2015.

The forum was held on Tuesday 28 April 2015 at Bicentennial Hall, 253 Crawford Street, Queanbeyan. It was open to the entire community, and was independently facilitated.

In accordance with the motion, there were presentations on traffic, funding, noise and the environmental impact assessments (both SIS and REF).

A total of 273 community members formally registered their attendance for the forum. An estimated 15% - 20% of attendees did not register, and it is estimated that up to 350 people attended the community forum. The forum started at 6:35pm and concluded at 11:25pm. By about 10pm about 20% of those initially attending remained.

A summary of the feedback issues received by QCC during the initial public exhibition period for the REF was placed on each of the tables. Additionally this feedback was printed on posters and pinned to the walls around the room including additional blank sheets to allow attendees to provide additional feedback.

The community members had the opportunity to ask questions on any aspect of the project and provide additional comments and feedback.

Of the 273 people who registered, 59 had previously made one or more submissions. A total of 49 feedback forms were completed at the forum. Of those who submitted feedback forms at the forum, 12 had previously lodged submissions.

The main issues raised in the feedback forms and verbally at the forum were:

- Noise
- Traffic
- The need for more consultation
- Concerns about the consultation process and period
- The need for transparency
- Conflict of interest
- Request to undertake additional modelling
- Cost
- The need to explore other options
- The inability to change the outcome of the decision to build the road.

During the forum it was acknowledged that the QCC consultation processes could have been done in a better way.

The feedback received at the forum identified a few new issues and all feedback has been considered in the submissions report.

More than 100 questions were asked at the forum. Any questions not answered at the forum were taken on notice, and formal answers provided on the QCC website and in the submissions report.

A series of formal written questions were electronically submitted to QCC prior to the start of the forum. Whilst several of these questions were also asked at the forum, formal answers have also been provided to all the written questions.

A summary of all questions and answers at the forum was published on the QCC website by 13 May 2015, and is included in the submissions report.

In addition, community members had further opportunity to re-submit any questions they believed had not been answered or submit any new questions after the forum. Additional written questions were received by QCC in the days following the community forum.

All subsequent written questions and answers were made available on the QCC website by 21 May 2015.

5.1.5 Addendum SIS Consultation

The Species Impact Statement (SIS) (ngh Environmental 2014) was placed on public exhibition as part of the REF public consultation process. OEH and the general public raised various issues with respect to the SIS and the revised EDE project design. Ngh Environmental (2016) subsequently prepared an Addendum to the SIS addressing changes to the EDE proposal. Queanbeyan City Council placed the Addendum to the SIS for the proposed EDE on public exhibition from 4 March to 3 April 2016.

The Submissions Report for the Addendum to the SIS is currently in progress and will be submitted for consideration as part of the Part 5 assessment of the project.

5.2 Aboriginal community involvement

QCC has undertaken two rounds of community consultation.

Consultation with Indigenous stakeholders was undertaken according to the *NSW Aboriginal Cultural Heritage Consultation requirements for Proponents* 2010.

Round 1

The first round of consultation was undertaken in June 2012 with project notification and requests being sent out to known Aboriginal community groups or registered stakeholders in the area.

Advertisements for expressions of interest to be involved in consultation were placed in 5 newspapers including those with both local and national distributions, including the Koori Mail (national), Indigenous Times (national), Queanbeyan Chronicle, Canberra Times and Queanbeyan Age.

Letters inviting expressions of interests were also sent to a list of potential cultural knowledge holders constructed by Office of Environment and Heritage and Murrumbidgee Catchment Management Authority.

Six expressions of interest were received (including the Karley Ngunnawal Descendants, who could not subsequently be contacted). The following five groups attended a field investigation on 2 August 2012:

- Buru Ngunnawal Aboriginal Corporation
- Ngambri Local Aboriginal Land Council
- Ngunnawal Aboriginal Heritage Corporation
- King Brown Tribal Group
- Ngunnawal Elders Council.

Although the legislation with respect to the consultation does not require that the community be involved in fieldwork, representatives from all six groups were then invited to participate in fieldwork and the initial field survey, during which the sites in question were identified. All but the Karley Ngunnawal descendants attended.

During field work, management strategies for identified Aboriginal heritage within the area were discussed with the community representatives and no issues or concerns were raised by any of the participants. No areas of cultural significance were indicated.

The completed archaeological report including management recommendations for salvage was completed for consultation and provided to all participating community groups for review. All interested parties had 30 days to provide feedback. The report was supported by all those representatives who replied. Two groups did not provide feedback.

The report was amended to include this feedback received from the Aboriginal community.

Round 2

A second round of consultation was undertaken in September of 2014.

This second stage of consultation occurred in accordance with OEH requirements that consultation be resumed if more than 2 years had lapsed between the initial consultation process and the AHIP application if communication has not been continuous over that period.

All previously registered parties remained registered and invitations were put in newspapers for additional expressions of interest.

Invitations to express interest were again made available in local and national newspapers, letters were sent to all previously registered parties, and invitations to consult were sent to all community groups registered as having an interest in the Queanbeyan area with the OEH. Parties who had previously registered interest in the project in the 2012 round of Aboriginal consultation were automatically included in this second round, and, in accordance with the OEH requirements, additional interested stakeholders had 14 days to register interest.

This time advertisements for expressions of interest were placed in 6 newspapers (more than the minimum OEH requirement for two local papers only): Koori Mail, Indigenous Times (both national), Queanbeyan Chronicle, Queanbeyan Age, Canberra Times and Canberra Chronicle.

In addition to the original six groups (including Karley Ngunnawal Descendants), expressions of interest were received from two new groups, namely the Gunjeewong Cultural Heritage Aboriginal Corporation and Antoinette House representing the Williams, Freeman and Simpson-Wedge Families.

Methods for salvage / impact mitigation and summaries of findings were again circulated in October 2014 to all 7 registered parties, with 30 days to provide feedback in accordance with OEH consultation requirements.

Correspondence with Karley Ngunnawal Descendants was again unsuccessful with phone numbers no longer connected, email bouncing and postal documents being returned.

Feedback and concerns received during this second round of consultation were immediately addressed and incorporated into the Aboriginal Cultural Heritage Archaeological Report (ACHAR). The document was then sent back to the community group for a further 30 days of community consultation. No further comments were received on the ACHAR in the final phase of consultation for the AHIP.

5.3 ISEPP consultation

The Proposal has been assessed as permissible without consent under clause 94 of the ISEPP. Part 2 of the ISEPP contains provisions for public authorities to consult public authorities prior to the commencement of certain types of development.

As the Proposal is by the QCC, QCC is exempt from consultations with QCC as per Part 2, Division 1, section 17 (c) of the Infrastructure SEPP since they would be consulting with themselves.

Other specific consultations required by the ISEPP are with authorities responsible for administering the *National Parks & Wildlife Act*, *Fisheries Management Act* and the *Rural Fires Act*. These have been undertaken and are discussed in section 5.4.

5.4 Government agency and stakeholder engagement

QCC has undertaken consultation with the following agencies:

- NSW Office of Water
- NSW Office of Environment and Heritage
- NSW Department of Primary Industries
- NSW Department of Planning and Environment
- NSW Public Works
- Roads and Maritime Services
- NSW Rural Fire Service
- NSW State Emergency Services
- Transport for NSW
- Queanbeyan Police Department
- Commonwealth Department of Environment
- Australian Platypus Conservancy.

In addition to preliminary and follow-up phone calls, emails and meetings with key agencies, a primary consultation event was the Value Engineering and Risk Management workshop with the design and assessment team and key government stakeholders held on 8 October 2014. A summary of feedback from these consultations and individual correspondence and discussions follows.

5.4.1 Office of Water

The REF would be referred to Office of Water for concurrence under the *Water Management Act 2000*. The Office of Water is required to assess development within 40 m of water courses including the Queanbeyan River and its lower order streams. They would confirm the appropriate design of culverts and drains to prevent short term and long term scouring, obstruction of flows and water extraction during construction and operations.

Extraction of water for dust control is exempt from the Act. In the event an onsite concrete batch plant is required, the water volume extraction required for concrete may need a license.

If there are no unusual aspects to the project, they would confirm that standard industry design, management and mitigation measures are applied to the construction and operations of the infrastructure.

These issues are addressed in section 7.

5.4.2 Environmental Protection Authority

The EPA would require quantitative assurance that during construction, sediment and erosion control and pollution prevention measures would be designed to serve the sub-catchments within the construction area, especially those in the vicinity of the river and local creeks. This includes stockpile management. These would need to be designed in accordance with the relevant water quality and river flow objectives and ANZECC guidelines. The condition and sensitivity of the local catchments, and the Queanbeyan River and its local creeks would need to be provided as context to these designs.

Construction noise dust and waste management would also be required in accordance with industry standards. The potential for land contamination would need to be assessed and managed as required.

The EPA would require the appropriate level of storm water treatment in the design to protect the river and the ephemeral streams intersecting the road for the long term operation of the road. Noise and vibration from the road would need to be assessed to show operations below the required thresholds. This is also addressed in section 7.

The approach taken in the REF is to address the EPA's issues in concept, showing how road construction and operation can meet the required standards and criteria. The actual design of the pollution prevention and management features is to be provided in the CEMP prepared by the successful construction contractor, and which would require EPA approval prior to construction commencing. This approach allows the successful contractor to innovate and price their bid competitively.

The pollution risks are assessed in 6.1, 6.6, 6.7, 6.11 and 6.12 and management responses are addressed in section 7.

An Environment Protection License is not required by the legislation, but would be applied for by the Principal and transferred to the successful construction tenderer.

5.4.3 Office of Environment and Heritage: (Regional Biodiversity Conservation), (Conservation Planning), (Heritage)

QCC and representatives of the above agencies have liaised on likely requirements for their concurrence with the project.

OEH has reviewed the Species Impact Statement (SIS) with respect to biodiversity but outstanding issues include platypus, fauna underpass (location and design), fauna fencing, risk of wildlife getting caught in noise barriers, indirect impacts on flora and

fauna, habitat rehabilitation, soil erosion, weed control and protection of the LandCare restoration project at Jumping Creek.

Biodiversity issues from the SIS are addressed in 6.4 and platypus issues specifically have been addressed in section 6.4.1. The fauna underpass and fauna fencing is addressed in section 6.4.3. Mitigation measures are discussed in section 7.

European and Aboriginal heritage has been fully assessed in the Heritage Assessment Report (CHMA, 2012). Aboriginal sites within and near the construction footprint have been assessed and either approved for disturbance or approved for salvage and relocation following consultation with RAOs under s90 of the NPWS Act. This report is more than twelve months old thus additional consultation with RAOs has been undertaken, as recommended by OEH, to ensure the reports outcomes are up to date.

The Proposal would require concurrence and an Aboriginal Heritage Impact Permit (AHIP) prior to construction. An Unanticipated Find Protocol would also need to be in place as part of the CEMP.

The adverse impacts on heritage are summarised in sections 6.8 and 6.9, and management measures presented in section 7.

5.4.4 NSW Department of Primary Industries: (Fisheries Management Office), (Aquatic Ecosystems South)

The NSW Department of Primary Industries has been consulted on fisheries management. They have indicated the adverse impacts on native fish are likely to be minimal as long as sediment, pollution and temporary obstructions are managed according to best practice. The Murray Cod and Golden Perch restocking history has been provided. DPI has advised that stormwater treatments, pollutant and sediment traps, and stormwater treatment ponds are required to protect Queanbeyan River riparian and aquatic values.

Response to fisheries issues are provided in section 6.4.1 and general pollution prevention measures outlined in section 7.2.

The Proposal would require a dredging / reclamation / fish passage obstruction permit under Part 7 of the *Fisheries Management Act*, if bridge construction impedes the waterway or requires a temporary crossing.

5.4.5 Australian Platypus Conservancy

Consultation has been undertaken with the Australian Platypus Conservancy (APC) in regards to adverse impacts on platypus during bridge construction.

The location of the bridge foundations is important to the habitat and breeding of the platypus.

Living burrows are not of concern; however, nursery burrows could be affected by disturbance of the river banks during breeding season. Nursery burrows are not easy to find and change locations every breeding season.

Breeding starts around September during which time the female would look for a location for her nursery burrow, which is separate from their living burrows. Her eggs would be laid approximately during October and the juveniles would grow in the nursery burrow until late February / early March. During this period, the mother would be in and out of the burrow while her juveniles grow. The juveniles are dependent on their mother for food until late February / early March. Nursery burrow entrances are usually near the water's edge, approximately 30-60 cm below the riverbank and

inclined until the burrow reaches above the water level. Therefore if the river bank is steep, the burrow would be shorter than if the river bank was flat.

The area along the river that is intersected by the proposed road and bridge is good platypus habitat; however, the APC believe the overall habitat disturbance would not be significant, as there is a relatively large amount of good habitat available in the area.

Potential management measures are as follows:

- Locating piers and heavy machinery work well away from the water's edge would greatly reduce the adverse impact on platypus.
- The APC suggest disturbing the riverbank in the vicinity of the construction works prior to the start of the breeding season in September would deter the females from setting up their nursery burrows near the bridge construction area.
- Alternatively, consideration could be given to placing a barrier around the work area before September to prevent the female from digging a burrow at the worksite. Any barrier would need to be strong, deep and long enough to prevent the platypus from digging through, under or around it, or walk around it or have any features which would trap the platypus.
- The APC requested to review plans for the bridge and barriers, and of the timing of bridge construction works so they could comment prior to construction.
- The APC offered to assist with identification and location of nursery burrows.

5.4.6 Icon Water

Icon Water Limited (IWL), formerly ACTEW Corporation, owns and operates the water and sewerage assets, and business in the ACT.

An 1800 mm diameter water main crosses the roadway.

Icon Water has been consulted during the development of the project design. The water main has been located by potholing of their 1800 mm diameter main.

There is no requirement to relocate any of the IWL water mains.

5.4.7 Department of Trade and Investment

All road formation cut and fill batters, storm drain facilities and related infrastructure is being constructed within the road reserve. No works on Crown Lands is proposed.

5.4.8 Roads and Maritime Services

Roads and Maritime Services (RMS) has been consulted regarding the project throughout the planning phase. RMS has provided advice and discussion on the design, and has provided input in areas such as risk, safety in design and value engineering. RMS would continue to be involved in the project through the delivery phase.

5.5 Ongoing or future consultation

Ongoing or future consultation activities would occur with:

- General public
- NSW Environment Protection Authority (EPA):

QCC and RMS have consulted with the NSW EPA regarding the project, including potential licensing requirements under the Schedules of the NSW *Protection of the Environment Operations Act 1997*. QCC and RMS would continue to consult with the NSW EPA regarding the environmental performance and licensing matters. An Environment Protection Licence would be obtained prior to the start of major construction by the Principal and transferred to the successful construction tenderer.

- QCC and Traffic Management:

  A Traffic Management Plan (TMP) would be prepared by the construction contractor to guide and manage construction access, interactions between construction and local traffic, construction traffic routes, parking and other relevant issues. The TMP would be reviewed and approved by the appropriate authority, and reviewed throughout the construction process to ensure it remains appropriate for the construction stage and conditions. Special consideration would be given to the opening of the Proposal to general traffic.

- OEH in regard to fauna crossings and ongoing offset implementation:

  QCC would continue a range of current discussions with OEH to ensure that the requirements set out in the SIS are met. These discussions would include:

  - identification of offset sites,
  - the development of the strategies for offset land,
  - proposed vegetation clearing timings and methods,
  - design of fauna underpasses,
  - wildlife signs, and
  - design of road features to minimise adverse impact on wildlife where feasible.

5.6 Social impact assessment

5.6.1 Overview

Community and stakeholder consultation has been an integral part of the project planning leading to the QCC decision to approve the Traffic Study in 2009 and is ongoing. In addition to the extensive strategic traffic management planning (Section 2), and stakeholder and community consultation undertaken since 2009 during the initial EDE project phases (Section 5), QCC engaged RM Planning Pty Ltd to undertake further social impact assessment work in 2016.

The SIA has been guided by the *Environmental Impact Assessment Practice Note – Socio-economic impact assessment* (EIA-N05) (Roads and Maritime Services, 2013) document. The report has taken into account differing views of the community, experience from other transport projects, findings of investigations into the existing environment, relevant outcomes of specialist studies prepared for the EDE, and management measures that might enhance the proposal's positive benefits and avoid, remedy or mitigate its negative social impacts

5.6.2 Method

A qualitative consultation was undertaken ~~S~~as part of preparing the SIA, whereby a range of voices within the community, representing individual residents and stakeholder groups both for and opposed to the EDE, were interviewed. A further two groups provided written feedback on the SIA. Their views and those expressed in previous consultation undertaken for the EDE, were taken into account.

5.6.3 Outcome

Potential benefits during construction include job creation and anticipated flow-on effects to local businesses in the supply of materials, goods and services for the EDE and to the contractors building the road. Businesses in the CBD, industrial areas and local shopping districts in close proximity to either end of the EDE are expected to benefit from increased patronage during the construction period.

Construction of the EDE is expected to have negative impacts on the amenity of residents living in close proximity to the road footprint due to increased noise and vibration, dust, temporary changes in access arrangements, and interruption to visual amenity. Management measures are recommended to reduce these impacts.

Operation of the EDE is expected to generate significant benefits for Cooma Street, the Queanbeyan CBD and adjoining streets, as heavy vehicle movements are diverted away from these areas. The expected improvement in amenity for the CBD, is expected to provide the platform needed to revitalise the town centre by creating the preconditions for new business to establish. The benefits to Queanbeyan business and to the wider community that would be attracted to the CBD would be significant. Benefits would also be expected to flow to community uses, such as schools, in improved safety and amenity.

The EDE would have negative impacts on the amenity of residents living in close proximity to the road, mainly through increased noise and adverse impacts on views. The proposed bridge over the Queanbeyan River would introduce a major new element into the landscape and the roadway would be visible to some residents in Fairlane Estate and Greenleigh. Management measures are recommended to reduce these impacts, where possible.

On balance, the SIA assessment found that the proposed development would cause a range of social and economic benefits that would outweigh negative impacts that could not be managed.

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 considered in section 6 and are summarised in Appendix 1.

Site-specific safeguards to ameliorate the identified potential adverse impacts are discussed in section 7.

All reports relating to the EDE are available from QCC on request.

6.1 Noise and vibration

SLR Consulting Australia Pty Ltd conducted a construction and operational noise and vibration assessment for the Proposal (SLR Consulting Australia Pty Ltd, 2014). SLR (2016) published an updated report on 21 April 2016. The updated report assesses an extensive range of noise mitigation measures to try and meet the requirements of the *NSW Road Noise Policy 2011* (RNP). The following is a summary of this assessment.

6.1.1 Existing noise environment

Environmental noise monitoring was performed at selected representative locations within the project area to characterise the noise environment across the project area (in relation to both construction and operation) and to establish existing ambient noise levels upon which to base the noise emission targets. Eight noise catchment areas (NCAs) have been determined to assist with the noise assessment (Figure 14). At least one noise monitoring location was established within each NCA to assist with understanding the existing ambient environment.

Unattended noise monitoring was conducted using ARL type 316 noise monitors. An operator-attended ambient noise survey was conducted at all noise monitoring locations to support the identification and occurrence of ambient noise sources. In accordance with RMS document *Preparing an Operational Traffic and Construction Noise and Vibration Assessment Report*, traffic counting was undertaken concurrently with the noise monitoring near the Old Cooma Road and Edwin Land Parkway intersection. Traffic counting was conducted on all three existing approaches of this intersection.

A summary of the ambient noise logging results during Interim Construction Noise Guideline (ICNG) and Road Noise Policy (RNP) defined time periods (where applicable) is contained in Table 6. A summary of the 15 minute operator-attended ambient noise survey undertaken at the noise logging site, is shown in Table 7. Pre and post traffic count data are shown in Table 8 and Table 9 respectively.

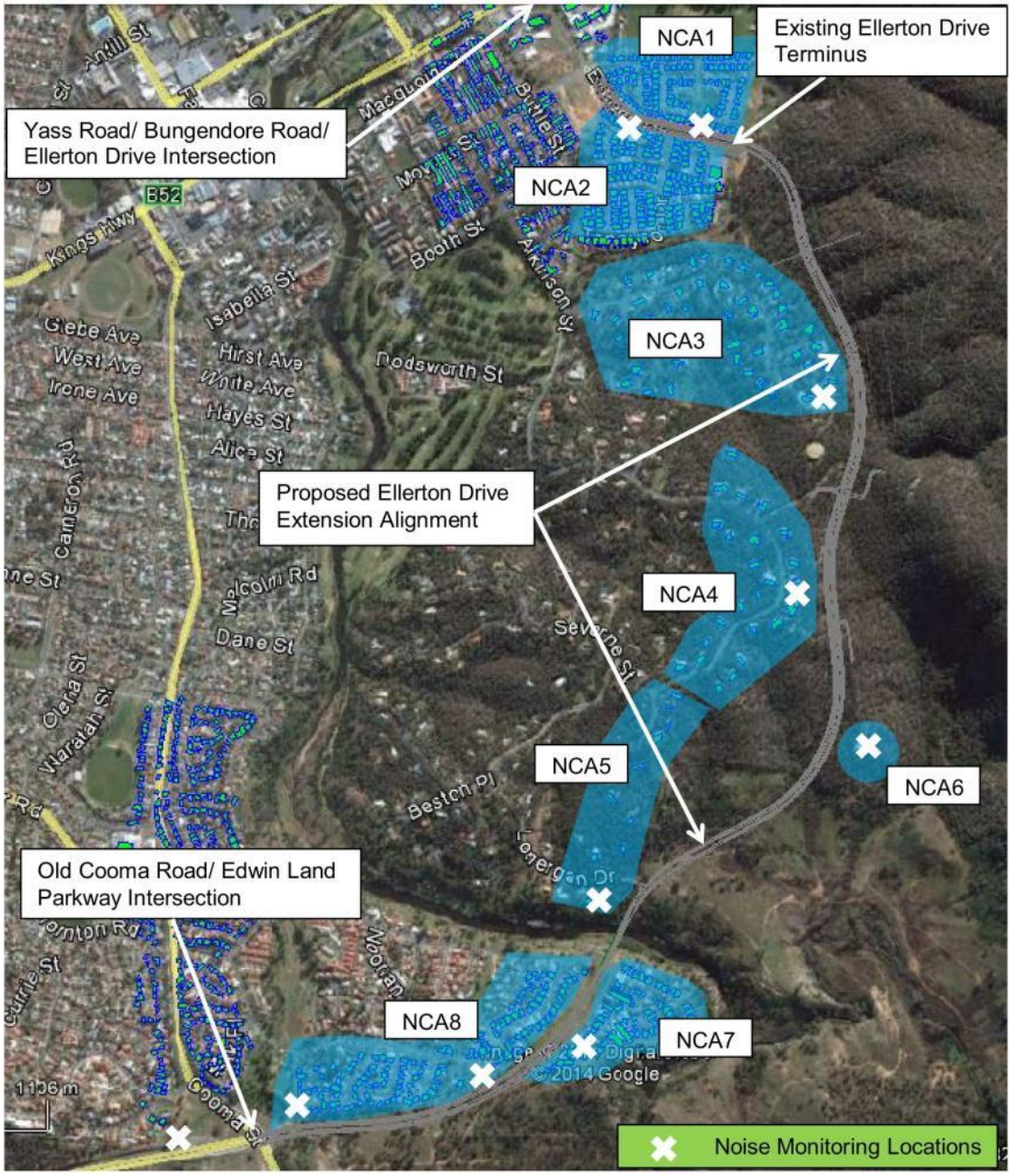

Figure 14. Proposed extension alignment and potentially affected sensitive receivers, Noise Catchment Areas (NCA), blue-green areas highlight the residential and business properties (SLR Consulting Australia Pty Ltd, 2014).

Table 6. Ambient noise unattended logging results.

Noise Monitoring Location	Ambient Noise Logging Results				
NCA1 55 Thomas Royal Garden 7 – 17 March 2014 S/N: 16-207-049	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	31	46	41	51
	Evening	28	46	40	48
	Night-time	23	40	30	38
NCA2.1 50 Stone Haven Circuit 7 – 17 March 2014 S/N: 16-207-043	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	36	50	49	59
	Evening	33	58	47	58
	Night-time	24	42	34	45
NCA2.2 16 Geebung Place 7 – 17 March 2014 S/N: 16-203-528	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	29	48	42	52
	Evening	32	44	40	46
	Night-time	26	38	67	43
NCA3 40 Taylor Place 7 – 17 March 2014 S/N: 16-203-530	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	30	57	39	49
	Evening	28	52	40	48
	Night-time	23	38	31	37
NCA4 46 Severne Street 7 – 17 March 2014 S/N: 16-306-044	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	27	46	39	49
	Evening	28	53	42	50
	Night-time	25	41	39	46
NCA5 35 Lonergan Drive	– ICNG Defined Time Periods				
	Monitoring	Noise Level (dBA re 20 µPa)			

Noise Monitoring Location	Ambient Noise Logging Results				
6 – 17 March 2014 S/N: 16-306-041	Period	RBL	LAeq	L_{10}	L_1
	Daytime	30	51	44	51
	Evening	32	57	43	48
	Night-time	29	46	39	45
NCA6 40a Serverne Street 7 – 17 March 2014 S/N: 16-203-526	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	30	45	40	47
	Evening	29	47	49	53
	Night-time	26	44	45	52
NCA7 26 Doeberl Place 7 – 17 March 2014 S/N: 16-004-033	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	30	51	41	48
	Evening	29	45	40	47
	Night-time	25	44	30	37
NCA8(A) 78 Barracks Flat Drive 7 – 17 April 2014 S/N: 16-306-044	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	30	47	43	53
	Evening	29	52	41	49
	Night-time	24	49	33	39
NCA8(B) 12 Alfred Place 7 – 17 April 2014 S/N: 16-203-526	– ICNG Defined Time Periods				
	Monitoring Period	Noise Level (dBA re 20 µPa)			
		RBL	LAeq	L_{10}	L_1
	Daytime	40	57	53	61
	Evening	34	54	49	55
	Night-time	26	53	42	50
	– RNP Defined Time Periods				
	Monitoring Period	Noise Level $L_{Aeq(Period)}$ (dBA)			
	Daytime (7am-10pm)	53			
	Night-time (10pm-7am)	48			

Noise Monitoring Location	Ambient Noise Logging Results	
Edwin Land Parkway Road Reserve near 19 Nimbus Place 7 – 17 April 2014 S/N: 16-207-049	– RNP Defined Time Periods	
	Monitoring Period	Noise Level $L_{Aeq(Period)}$ (dBA)
	Daytime (7am-10pm)	59
	Night-time (10pm-7am)	51

Note 1: ICNG Governing Periods – Day: 7.00am to 6.00pm Monday to Saturday, 8.00am to 6.00pm Sunday; Evening: 6.00pm to 10.00pm; Night: 10.00pm to 7.00am Monday to Saturday, 10.00pm to 8.00am Sunday.
Note 2: RNP Governing Periods – Day: 7.00am to 10.00pm; Night: 10.00pm to 7.00am.
RBL: Rating Background Level
ICNG: Interim Construction Noise Guideline, DECC 2009

Table 7. Operator-attended ambient noise survey at noise logging location.

Noise Survey Location	Measurement Details	Measured Noise Level (dBA)			Description of Ambient Noise Sources – Typical Maximum Noise Levels L_{Amax}
		L_{A90}	LA_{eq}	LA_{max}	
NCA1 55 Thomas Royal Garden	17/03/14 04:09 pm Light winds 1-2 m/s Cloud cover 2/8	41	44	60	Distant traffic noise: 41-42 Distant truck: up to 45 Wind in trees: 41-45 Dog barking: up to 51 Noisy exhaust from bike: up to 60 Existing background noise level dominated by distant traffic (likely to be from Bungendore Street / Kings Highway)
NCA2.1 50 Stone Haven Circuit	17/03/14 03:37 pm Light winds 1-2 m/s Cloud cover 2/8	43	50	65	Distant traffic noise: 45-49 Truck along Ellerton Drive: up to 65 Existing background noise level dominated by distant traffic (likely to be from Bungendore Street / Kings Highway)
NCA2.2 16 Geebung Place	17/03/14 03:13 pm Light winds 1-2 m/s Cloud cover 2/8	40	50	68	Distant road traffic and heavy vehicles: faintly audible Distant construction noise (excavator or the like): up to 45 Car door slam: 45-47 Constant insect noise Interference from resident: up to 66
NCA3 40 Taylor Place	07/03/14 08:42 am Wind calm Cloud cover 0/8	35	41	65	Distant traffic noise: 36-39 Household noise: up to 39 Aircraft: up to 52 Dog barking: 39-41 Birds: up to 43

					Resident door slam: up to 65
NCA4 46 Severne Street	17/03/14 05:19 pm Light winds 1-2 m/s Cloud cover 2/8	34	42	65	Distant traffic: 33-35 Birds: 46-65 Hammering noise from odd number neighbour: up to 41
NCA5 35 Lonergan Drive	06/03/14 08:20 am Light winds 1-2 m/s Cloud cover 3/8	30	44	64	Light aircraft: up to 39 Local traffic: 32-36 Car traffic within Karbar: 39-45 Bus travelling uphill along residential street in Karabar: 48-52 Distant car radio noise: up to 31 Birds (cockatoo): up to 64
NCA6 40a Serverne Street	17/03/14 04:49 pm Mild winds 2-3 m/s Cloud cover 2/8	39	44	58	Distant traffic noise: 35-38 Hammering noise from neighbour: 39-41 Birds: 46-58
NCA7 26 Doeberl Place	17/03/14 06:31 pm Wind calm Cloud cover 1/8	36	40	56	Distant traffic from Old Cooma Road:36-39 Dog barking: 53-56
NCA8(B) 12 Alfred Place	17/04/14 08:10 am Wind calm Cloud cover 1/8	42	55	79	Traffic on Old Cooma Road:44-47 Truck on ELP: 45-52 Exhaust from truck: 54-58 Birds: 65 Dog barking next door: 75-79

Table 8. Pre project traffic count data.

Traffic Counting Location		15 Hour[1]		9 Hour[2]	
		Light[3]	Heavy[4]	Light[3]	Heavy[4]
Concurrent Traffic Count (existing Edwin Land Parkway and Old Cooma Road Intersection)					
Edwin Land Parkway	Eastbound	2115	104	204	12
	Westbound	2112	120	210	11
Old Cooma Road (north of ELP)	Northbound	3206	240	297	24
	Southbound	3243	230	269	27
Old Cooma Road (south of ELP)	Northbound	1821	270	185	30
	Southbound	1883	264	203	29
Past Traffic Count Nov-Dec 2013 (Bungendore Road, Yass Road and existing Ellerton Drive intersection)					
Yass Road	Northbound	5403	548	818	73
	Southbound	5765	489	408	40

Bungendore Road (west of Yass Road)	Eastbound	10308	668	1049	69
	Westbound	10088	642	831	92
Bungendore Road (east of Yass Road)	Eastbound	5432	353	399	56
	Westbound	5069	249	527	41

Note 1: Time period for 15 Hour average daily traffic volume data is 7.00am to 10.00pm.
Note 2: Time period for 9 Hour average daily traffic volume data is 10.00pm to 7.00am.
Note 3: Vehicle types included in Light classification are Class 1 and 2 vehicles.
Note 4: Vehicle types included in Heavy classification are Class 3 to 12 vehicles.

Table 9. Post project traffic count data.

Traffic Counting Location		15 Hour[1]		9 Hour[2]	
		Light[3]	Heavy[4]	Light[3]	Heavy[4]
Within one year of project opening					
Ellerton Drive Extension	Northbound	1576	175	143	16
	Southbound	1865	207	186	21
Edwin Land Parkway	Eastbound	4228	207	435	25
	Westbound	2705	154	281	14
Old Cooma Road (north of ELP)	Northbound	7771	582	728	564
	Southbound	6013	426	564	57
Old Cooma Road (south of ELP)	Northbound	6120	907	552	88
	Southbound	5865	822	558	79
Yass Road	Northbound	7081	601	596	58
	Southbound	5539	561	483	43
Bungendore Road (west of Yass Road)	Eastbound	9200	596	864	57
	Westbound	9162	583	829	92
Bungendore Road (east of Yass Road)	Eastbound	6733	437	565	79
	Westbound	7617	374	649	51
Design Year (10 years after project opening)					
Ellerton Drive Extension	Northbound	2017	106	132	7
	Southbound	3059	161	263	14
Edwin Land Parkway	Eastbound	5929	290	577	33
	Westbound	5006	284	500	26
Old Cooma Road (north of ELP)	Northbound	9040	677	905	74
	Southbound	7144	506	702	70
Old Cooma Road (south of ELP)	Northbound	10233	1517	957	153
	Southbound	10195	1430	975	139
Yass Road	Northbound	8457	717	710	69

Traffic Counting Location		15 Hour[1]		9 Hour[2]	
		Light[3]	Heavy[4]	Light[3]	Heavy[4]
	Southbound	7255	735	646	58
Bungendore Road (west of Yass Road)	Eastbound	9316	603	888	59
	Westbound	8054	513	721	80
Bungendore Road (east of Yass Road)	Eastbound	8220	533	694	97
	Westbound	8520	419	726	57

Note 1: Time period for 15 Hour average daily traffic volume data is 7.00am to 10.00pm.
Note 2: Time period for 9 Hour average daily traffic volume data is 10.00pm to 7.00am.
Note 3: Vehicle types included in Light classification are Class 1 and 2 vehicles.
Note 4: Vehicle types included in Heavy classification are Class 3 to 12 vehicles.

These summaries provide the background against which the operational noise is modelled and against which construction noise goals are established with the EPA, post approval but prior to construction starting.

Modelling was undertaken without noise barriers initially to identify criteria exceedances. Noise mitigation, by way of noise barrier and/or low noise pavement surfaces, was then investigated / modelled. Barriers were considered in numerous locations, e.g. close to the road or shared pathway, property boundaries, or intervening location depending on the topography. New Jersey barriers were incorporated into the model where applicable.

6.1.2 Construction noise and vibration guidelines and criteria

Noise

The applicable construction noise goals (Noise Management Levels - NML) for the EDE are described in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) (ICNG). The ICNG sets out ways to manage the adverse impacts of construction noise on residences and other sensitive land uses. The ICNG provides construction noise management levels (NMLs) for residential and other noise sensitive receptors based on the background noise environment and the proposed times of construction work. The NMLs are criteria to identify where feasible and reasonable, mitigation measures are likely to be required to reduce and control noise levels. Conditions around exceptional events may be pre-negotiated with the EPA depending on the activity and the time.

Vibration

The EPA's *Assessing Vibration: a technical guideline* provides guideline values for continuous, transient and intermittent events that are based on a Vibration Dose Value (VDV) rather than a continuous vibration level. The VDV is dependent upon the level and duration of the short-term vibration event, and the number of events occurring during the daytime or night-time period.

The VDVs recommended in the document for vibration of an intermittent nature (i.e. construction works where more than three distinct vibration events occur) are presented in Table 10.

Table 10. Acceptable vibration dose values for intermittent vibration (m/s 1.75) (Assessing Vibration: a technical guideline).

Location	Daytime[1]	Night time[1]

	Preferred	Maximum	Preferred	Maximum
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

[1] Daytime is 7.00am to 10.00pm and night-time is 10.00pm to 7.00am.
[2] Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: BS 6472-1992

Structural damage vibration

Structural damage vibration limits are based on Australian Standard AS 2187: Part 2-2006 *Explosives - Storage and Use - Part 2: Use of Explosives* and British Standard BS 7385 Part 2-1993 *Evaluation and measurement for vibration in buildings Part 2*. These standards provide frequency-dependent vibration limits related to cosmetic damage, noting that cosmetic damage is very minor in nature, is readily repairable and does not affect a building's structural integrity. The recommended vibration limits from BS7385 for transient vibration for minimal risk of cosmetic damage to residential and industrial buildings is shown in Table 11.

Table 11. Transient vibration guide values for minimal risk of cosmetic damage (BS7385).

Line	Type of Building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Ground-borne (Regenerated) noise

Ground-borne (or regenerated) construction noise can be present on construction projects where vibration from activities such as road base rolling, rotary cutting and rock drilling / sawing can be transmitted through the ground and into the habitable areas of nearby buildings. Ground-borne noise occurs when this vibration in the ground and/or building elements is regenerated as audible noise within areas of occupancy inside the building.

The NSW EPA's ICNG defines internal ground-borne noise goals for residential receivers of 40 dBA $L_{Aeq(15minute)}$ during the evening (6:00pm to 10:00pm) and 35 dBA $L_{Aeq(15minute)}$ during the night-time (10:00pm to 7:00am). The goals are only applicable when ground-borne noise levels are higher than airborne noise levels.

Sleep disturbance

Guidance for the assessment of sleep disturbance given in the RNP is reproduced as follows:

"*Triggers for, and effects of sleep disturbance from, exposure to intermittent noise such as noise from road traffic are still being studied. There appears to be insufficient evidence to set new indicators for potential sleep disturbance due to road traffic noise. The NSW Roads and Traffic Authority's Practice Note 3* (Roads and Traffic Authority, Network and Corridor Planning Practice Notes, 2008) *outlines a protocol for assessing and reporting on maximum noise levels and the potential for sleep disturbance*."

NSW Roads and Maritime Services (previously the Roads and Traffic Authority) Environmental Noise Management Manual (ENMM) – Practice Note III protocol for assessing the potential for sleep disturbance is determined by performing LAFmax – LAeq(1 h) calculation on individual vehicle pass-by noise measurements. The number of night-time pass-by events where the LAFmax – LAeq(1 h) difference is greater than 15 dB is to be determined.

With regard to reaction to potential sleep disturbance events, the RNP gives the following guidance:

From the research on sleep disturbance to date it can be concluded that:

- *maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are unlikely to affect health and wellbeing significantly.*

Internal noise levels in a dwelling, with the windows open are 10 dB lower than external noise levels. Based on a worst case minimum attenuation, with windows open, of 10 dB, the first conclusion above suggests that short term external noises of 60 dBA to 65 dBA are unlikely to cause awakening reactions.

The second conclusion suggests that one or two noise events per night with maximum external noise levels of 75 dBA to 80 dBA are unlikely to affect health and wellbeing significantly.

Blasting

Where blasting is required, blasting emissions should be considered in accordance with the ICNG. Emissions would be required to comply with the ANZEC (1990) 'Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration'. A detailed blasting management plan will be undertaken once the need for blasting is confirmed and specific details are available.

6.1.3 Predicted construction noise

Construction noise modelling has been undertaken for the REF. The following summarises the findings of the construction noise level modelling assuming that construction work is undertaken during normal daytime working hours only.

Noise levels will vary due to the movement of plant and equipment about the worksites and concurrent operation of plant. Table 12 presents representative noise levels for the highest predicted level in each noise catchment area.

Table 12. Construction noise predictions in each noise catchment area.

Area	Construction Noise Level, dBA $L_{Aeq(15minute)}$					Noise Management Level, dBA	Predicted Exceedance, dBA
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5		
NCA1	52	<30	62	66	53	41	≤ 25
NCA2	52	<30	62	66	53	46	≤ 20
NCA3	54	<30	64	68	55	40	≤ 28
NCA4	52	<30	62	66	53	40	≤ 26
NCA5	57	53	67	71	58	40	≤ 31
NCA6	50	<30	60	64	51	40	≤ 24
NCA7	58	62	68	72	59	40	≤ 32
NCA8	48	60	58	62	49	40	≤ 22

Construction noise would not exceed the highly noise-affected objective of 75 dBA at any receptor; however, construction noise may exceed the Noise Management Levels by up to 32 dBA.

Based on the likely construction stages, activities and plant/equipment, it was found that predicted construction noise levels would exceed the project construction Noise Management Levels by a significant margin, but would not exceed the 'Highly Noise Affected' limit of 75 dBA $L_{Aeq(15minute)}$.

6.1.4 Construction noise and vibration safeguards

Prior to construction, a Construction Noise and Vibration Management Plan (CNNVMP) would be prepared to minimise construction noise and vibration emissions in accordance with the Interim Construction Noise Guideline. Where a vibration-intensive construction activity is identified, and assessment indicates the potential for excessive vibration, mitigation actions would be undertaken to minimise the likelihood of human discomfort and/or building structural damage. The assessment criteria have been presented in the SLR report.

Not all properties that exceed the base criteria automatically qualify for consideration of noise mitigation. All properties that exceed the base criteria would be examined to see if acoustic benefits can be gained from changes in the proposed road alignment, or other similar measures that could provide acoustic benefit.

The range of available management options are summarised in Table 13 in relation to the noise and vibration origins. These will be further refined and adjusted during the detailed design phase.

Table 13. Construction noise management options.

Impact	Noise management options	Responsibility	Timing
Construction noise and vibration impacts generally	• A Construction Noise and Vibration Management Plan would be prepared for the proposal. The plan would be in accordance with the DECC Interim Construction Noise Guideline and would detail the specific measures to be implemented to reduce construction noise levels. The plan would cover aspects including site noise planning, scheduling of high noise activities, operator instruction, plant maintenance,	Contractor	Pre-construction

Impact	Noise management options	Responsibility	Timing
	plant noise audit and complaints management.		
	• QCC would approve the plan prior to construction starting.	QCC	Pre-construction
	• Affected and potentially affected residents and businesses would be contacted prior to works commencing and would be informed of the proposed works, working hours, and the construction period. Affected residents and businesses would also be provided with a contact name and number should they wish to obtain further information.	QCC, Contractor	Pre-construction Construction
Noise emissions from construction plant	• Noise emission levels of all critical items of mobile plant and equipment would be checked for compliance with noise limits appropriate to those items prior to the equipment going into regular service.	Contractor	Pre-construction
Activities with significant noise emissions	• Where reasonable and feasible, noisier activities would be carried out during the day (7am-6pm) to minimise noise impacts.	Contractor	Construction
Out of hours works	• Construction timetabling, particularly for works outside standard hours, would aim to minimise noise impacts. Measures may include time and duration restrictions and respite periods.	Contractor	Construction
Out of hours works	• For works required outside of standard hours, the procedure contained in the RMS *Environmental Noise Management Manual - Practice Note vii – Roadworks Outside Normal Working Hours and RMS Fact Sheet No.2 – Noise Management and Night Works* as outlined in the approved noise and vibration management plan would be followed.	Contractor	Construction
Multiple operating plant	• Use of noisy plant concurrently and/or close together, adjacent to sensitive receivers would be avoided / minimised where practicable.	Contractor	Construction
Vibration	• Vibration monitoring would be conducted in response to any vibration related complaints and when measured vibration levels exceed nominated vibration criteria.	Contractor	Construction

Construction activities would be generally undertaken during standard working hours, as follows:

Monday to Friday: 7:00 am to 6:00 pm
Saturday: 8:00 am to 1:00 pm

In general, the project does not propose to undertake consistent works outside of standard working hours.

There may be times during the construction phase when noise may exceed the base criteria goal but this would not be a regular event. Occasional night work may have to occur due to safely or engineering reasons and would require dispensation from the *RMS Environmental Noise Management Manual Practice Note* and RMS Noise Management and Night Works Fact Sheet 02 and/or in accordance with any Environmental Protection Licence. The local community would be notified in advance about the potential disruptions before the start of any work outside of standard hours.

A noise mitigation sub plan would be an important component of the CEMP and would be adhered to by the contractor.

For construction work during standard hours, a Noise Management Level $L_{Aeq(15minute)}$[1] of RBL + 10 dB goal applies for residential receivers. Construction work outside of the recommended standard hours would not be undertaken without prior agreement with the EPA and with strong justification. Where construction work outside standard hours is required, a Noise Management Level $L_{Aeq(15minute)}$ of RBL + 5 dB applies for residential receivers.

These NMLs aim to represent the level above which there may be some community reaction to construction noise. Where the predicted levels exceed the noise management level, all feasible and reasonable work practices should be applied to minimise the potential noise impacts. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, and contact details.

6.1.5 Construction noise and vibration summary

Construction noise levels for the modelled scenarios / activities were predicted to be above the construction NMLs (SLR 2016); however, construction operations are temporary and transient.

A range of noise management measures would be established as part of the CNNVMP to assist in controlling noise levels to as low as reasonably practical to achieve the NMLs at all noise sensitive receivers. The CNNVMP would be a sub plan to the Contractor's overarching CEMP.

Vibration due to construction would be temporary and transient.

Vibration thresholds for continuous, transient and intermittent events that are based on a Vibration Dose Value rather than a continuous vibration level (i.e. analysis based on the level and duration of the short-term vibration event, and the number of events occurring during the daytime or night-time period) will not be exceeded during road construction.

Structural damage vibration thresholds for frequency-dependent vibration limits related to cosmetic damage will not be exceeded during road construction.

Prior to construction commencing, QCC will ensure that dilapidation surveys are undertaken of all buildings potentially subject to construction vibration effects. The purpose of such studies will be to assess the pre-existing condition of each building prior to any works occurring. Photos of pre-existing conditions will usually accompany such studies and copies provided to the landowner.

[1] The 'energy average noise level' evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts.

6.1.6 Operational noise and vibration guidelines and criteria

For traffic operating on public roads, the NSW Government's *Road Noise Policy* (RNP), issued on 1 July 2011 is appropriate for assessing potential road traffic noise impacts. The RNP noise criteria aim to protect amenity inside and immediately around permanent residences, schools, hospitals and other sensitive land uses. Although it is not mandatory to achieve the noise assessment criteria in the RNP, project proponents need to provide justification if it is not considered feasible or reasonable to achieve them.

The guideline recognises that there are generally more opportunities to minimise noise impacts from new roads and road corridors, especially those in greenfield locations, through judicious road design and land use planning. The scope to reduce noise impacts from existing roads and corridors is more limited.

The RNP criteria are applicable both at the time of project opening and also in a design year, typically taken to be ten years after project completion.

Upon completion of the proposed EDE, the entire Ellerton Drive is considered to be a sub-arterial road. Table 14 summarises the RNP assessment criteria for residences to be applied for this project. These criteria are presented for assessment against facade noise levels as measured at the most affected point in front of a building.

Table 14. RNP criteria – residential land uses.

Road Category	Type of Project / Land Use	Assessment Criteria (dBA)	
		Daytime (7am – 10pm)	Night-time (10pm – 7am)
Freeway / arterial / sub-arterial roads	1. existing residences affected by noise from new freeway / arterial / sub-arterial road corridors	LAeq(15 h) 55 (external)	LAeq(9 h) 50 (external)

In addition to the noise criteria in Table 14, the RNP describes a 'Relative Increase Criteria' of 12 dB above existing traffic noise. This criterion is primarily intended to protect existing quiet areas from excessive changes in amenity. The majority of the existing residences along the proposed extension are currently unaffected by significant traffic noise. Therefore, the 'Relative Increase Criteria' are also considered in this assessment.

6.1.7 Predicted operational noise

Operational noise has been modelled (SLR 2016) with and without mitigation. The predicted traffic noise levels without noise mitigation exceed either the absolute RNP criteria and/or the relative increase criteria at many locations. Mitigation measures were subsequently considered and Table 15 summarises the findings of the noise prediction and assessment conducted for the design year (2027, 10 years after project opening) with noise mitigation included.

In summary, the modelling suggests almost all identified receivers would experience noise above the desired 'relative increase criteria', but almost none would experience an 'acute' noise level.

Table 15. Predicted operational noise levels in year 2027.

Representative Receiver Address	Predicted Noise Levels (dBA)				Relative Increase (dBA)		Design Year 'Build' Scenario Level Above RNP Criteria (dBA) i.e. LAeq(15 h) 55 LAeq(9 h) 50		Design Year 'Build' Scenario Level Exceed 12 dB 'Relative Increase Criteria'?	
	Design Year – 'No Build' Scenario		Design Year – 'Build' Scenario							
	Daytime LAeq(15 h)	Night-time LAeq(9 h)	Daytime LAeq(15 h)	Night-time LAeq(9 h)	Daytime LAeq(15 h)	Night-time LAeq(9 h)	Daytime LAeq(15 h)	Night-time LAeq(9 h)	Daytime LAeq(15 h)	Night-time LAeq(9 h)
NCA1 53 Thomas Royal Garden	44	37	50	42	6.5	5.5	-	-		
NCA2 2 Tennyson Drive	44	37	49	41	5.1	4.0	-	-		
NCA3 40 Taylor Place	38	31	46	38	8.2	7.1	-	-		
NCA4 40 Severne Street	38	31	47	39	9.3	8.0	-	-		
NCA5 26 Lonergan Drive Ground Floor	38	33	52	43	13.6	10.3	-	-	Yes	
NCA5 26 Lonergan Drive First Floor	38	33	52	44	14.3	11.1	-	-	Yes	
NCA6 40A Severne Street r	39	32	55	47	15.9	14.7	-	-	Yes	Yes
NCA7 Unit 3, 32 Doeberl Place	39	32	51	43	11.9	11	-	-		
NCA7 Unit 13, 32 Doeberl Place Ground Floor	41	34	54	47	13.2	12.6			Yes	Yes
NCA7 Unit 13, 32 Doeberl Place First Floor	42	35	56	49	13.6	13.2	1		Yes	Yes
NCA8 108 Barracks Flat Drive Ground Floor	41	33	49	40	7.6	7.4	-	-		
NCA8 108 Barracks Flat Drive First Floor	37	29	47	39	10.7	9.7	-	-		
NCA8 20 Caroline Place	57	50	58	50	0.9	0.5	3	-		

Note 1: Acute noise is defined as day $L_{Aeq(15\ h)}$ 65dBA and night-time as $L_{Aeq(9\ h)}$ 60dBA.

6.1.8 Operational noise safeguards

Noise mitigation has been considered based on the predicted noise environment.

The Environmental Noise Management Manual (ENMM) details the procedures for which properties qualify for noise mitigation. This is a multi-step process and initially involves the identification of those properties where there is:

- Exceedance of the base objective; and
- The Proposal results in a predicted change in the noise environment of 2dBA or more, when comparing the future scenario including the Proposal and the 'future existing' scenario excluding the Proposal.

The conditions that determine properties considered for noise mitigation are presented in Table 16.

Table 16. Operational noise level matrix.

<table>
<tr><th>Overall Noise Level</th><th colspan="3">Change in Noise level</th></tr>
<tr><th></th><th>Change <0 dBA (i.e. decrease in noise)</th><th>0 <change ≤2 dBA (i.e. marginal increase)</th><th>Increase >2 dBA (i.e. noticeable increase)</th></tr>
<tr><td><Base Criteria</td><td colspan="3">No further consideration of noise mitigation</td></tr>
<tr><td>Less than 2dBA above Base Criteria</td><td colspan="2">No further consideration of noise mitigation</td><td rowspan="2">Further consideration is given to providing noise mitigation</td></tr>
<tr><td>Between 2dBA to 5dBA above the base criteria</td><td colspan="2">No further consideration of noise mitigation</td></tr>
<tr><td>More than 5dBA above the base criteria (termed acute noise level)</td><td colspan="3">Further consideration is given to providing noise mitigation</td></tr>
</table>

The predicted noise levels exceeded the project noise limits and consequently noise mitigation was considered. A detailed analysis of noise mitigation options and combinations was undertaken (SLR 2016) to assist with determining the most "reasonable and feasible" noise mitigation treatments (Table 17). Noise monitoring, focusing on the effectiveness of the noise walls one year after construction is complete would be undertaken to assess noise mitigation measures.

Table 17. Operational road traffic noise treatments.

Area	Noise Management Options	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA1	• Upgraded property boundary fences • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	2.4 3.0 3.6	13[2] 348[3] 151[4]	TBA Concrete Concrete	Property Boundary
NCA2	• Inspect property boundary fence • Upgraded property boundary fences • Road surfacing treatment	2.4 2.4	206[5] 118[6]	Concrete Concrete	Property Boundary

Area	Noise Management Options	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
	• Building treatment for receivers exceeding relevant criteria				
NCA3	• Install noise walls • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	2.4	476	Timber Infill	Outside Shared Pathway
NCA4	• Install noise walls • Road surfacing treatment	2.4	299	Timber Infill	Property Boundary
NCA5	• Install noise walls • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	2.4	109	Timber Infill	Outside Shared Pathway
NCA6	• Building treatment for receivers exceeding relevant criteria	n/a	n/a	n/a	n/a
NCA7	• Install noise walls • Install noise wall on bridge • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	4.2 2.4	345 55	Concrete TBA	Road Shoulder outside Kerb Southeast side of bridge
NCA8(A)	• Install noise walls • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	4.2	491	Concrete	Outside Shared Pathway
NCA8(B)	• Install noise walls • Road surfacing treatment • Building treatment for receivers exceeding relevant criteria	4.2	547	Concrete	Outside Shared Pathway

1. Approximate
2. Wrap around section along property boundary of 61 Thomas Royal Gardens
3. From 6 Patrick Brick Court to 37 Thomas Royal Gardens
4. From 37 Thomas Royal Gardens to 61 Thomas Royal Gardens
5. West of Tennyson Drive
6. East of Tennyson Drive

Where feasible, noise walls would be installed during the early work at the existing Ellerton Drive terminus to anticipate the noise impact from construction and operation of the road for residents and business; however, the early installation of the noise walls before the construction phase in other areas may not be possible depending on vegetation clearing requirements, access, earthworks and other issues.

It is sometimes not possible to provide noise mitigation measures that achieve compliance with RNP criteria at all sensitive receptors. Road traffic noise at 39 properties (50 floors) were predicted to remain above the project noise limits after selected noise mitigation treatments were implemented. Refer to Table 15 in the SLR (2016) report for a list of the specific properties. In these instances and where a noise barrier does not achieve RNP criteria, specific building treatments may be considered.

Treatments to buildings usually involve higher performance windows, doors and seals to keep noise out. Building treatments effectively require occupants to keep their windows and doors closed and hence alternative ventilation is usually required to

maintain adequate air flow. An obvious disadvantage is that building treatments would not have any effect on the noise levels outside the dwelling in their front or back yards.

6.1.9 Operation vibration summary

Heavy trucks passing over normal (i.e. smooth) road surfaces generate relatively low vibration levels, typically ranging from 0.01 mm/s to 0.15 mm/s at the footings of buildings located 10 m to 20 m from a roadway. Very large surface irregularities can cause levels up to 5 to 10 times higher, i.e. up to 1.5 mm/s; however this is unlikely to be the case for the Proposal as it is being designed to allow for heavy vehicles. Provided that the road is well maintained, vibration associated with heavy truck pass-by is generally unlikely to be perceptible.

6.2 Traffic and access

6.2.1 Existing traffic environment

Queanbeyan's population is expected to grow to 56,000 by 2031 with Tralee and Googong developments coming online. In response to the expected growing population and increase suburbanisation, QCC was conscious of its role in providing traffic and transport infrastructure within the region and undertook the Googong and Tralee Traffic Study (2010) to determine the effects of growth on the road network. QCC in partnership with the NSW RMS, local developers and a traffic consultant developed various road network scenarios. The Googong and Tralee Traffic Study (2010) modelled many combinations of a series of both new and upgraded road links and intersections. The traffic study looked at the following options and various combinations of them.

Dunns Creek Road

The option of connecting Old Cooma Road with the Monaro Highway was seen as a useful inclusion by the working groups but could not be justified by the projected population growth. Dunns Creek Road would:

- be approximately 8 km long (i.e. twice as long as the EDE);
- would go through extremely difficult topography regardless of the alignment chosen with significant increase in earthworks;
- require a large bridge over Jerrabomberra Creek;
- would affect a significant amount of high quality environmental land with various threatened species and communities;
- cut across as opposed to being on the fringe of the regional and local biolinks;
- provide off road shared paths and provisions for on-road cycling facilities in isolation to the rest of Queanbeyan; and
- result in a road that would cost at least twice as much as the EDE without eliminating the gridlock along Cooma Street and Queens Bridge or providing flood immunity for Queanbeyan.

Dunns Creek Road and the EDE service different traffic streams and as a result serve different purposes in the future Queanbeyan road network. The purpose of the EDE is to relieve Cooma Street and the Monaro Street - Queens Bridge corridor whereas Dunns Creek Road is to relieve the Old Cooma Road corridor when it reaches capacity. Both projects are beneficial to Queanbeyan, but within different timeframes. The nature of the expected traffic growth and the impact that the growth has on the Cooma St corridor indicates that the EDE needs to be implemented sooner as one part of a

program of recommended traffic solutions for all of Queanbeyan, rather than later whilst Dunns Creek Road may only be needed sometime after 2036.

The Northern Bypass

The Northern Bypass was originally investigated prior to the major expansion of Queanbeyan's residential lands to the south at Googong and Tralee.

The Northern Bypass has been shown to provide only limited relief of traffic volumes along Monaro Street and the Queens Bridge, as it is primarily a bypass for non-Queanbeyan traffic to avoid using the Canberra Avenue - Monaro Street route through the town centre. It also doesn't relieve local traffic travelling on the north-south route along Old Cooma Road and Cooma Street wanting to access Queanbeyan and the northern routes out of Queanbeyan.

Cost estimates have always indicated that the Northern Bypass is significantly more expensive than the EDE as it crosses very rugged terrain and includes features such as two bridges for the two crossings over the Molonglo River and complex intersections with other major roads.

In summary, the Northern Bypass is not a preferred solution as it:

- Does not solve gridlock on Cooma Street, in the CBD and on Queens Bridge
- Crosses difficult terrain, has large environmental impacts and requires multiple bridges
- The majority of the alignment is in the ACT.

Duplication of Southbar Road

Expanding Southbar Road to four roads did not improve the congestion along Cooma Street or Queens Bridge.

Duplication of Old Cooma Road

Expanding Old Cooma Road to four lanes from Southbar Road to Googong Road improved the congestion coming into Queanbeyan but did not improve the congestion along Cooma Street or Queens Bridge. This option provided no alternative route during a major flood event which would see Monaro Street, Morisset Street and other CBD roads under water.

The Old Cooma Road upgrade is currently in progress or in the planning stages, and is divided into 3 Stages:

- Stage 1 is a bypass of the previous quarry bends and has already been completed.
- Stage 2 includes duplication of the road from Edwin Land Parkway to Googong, excluding the intersections at either end.
- Stage 3 is duplication from Southbar Road to ELP including the upgrade of the Southbar and Barracks Flat signals.

Expanding Cooma Street

The introduction of clearways along Cooma Street from Southbar Road to Rutledge Street to provide four lanes improved the congestion on Cooma Street but not Queens Bridge. It would also result in reduced amenity for Cooma Street residents and not provide flood immunity for Queanbeyan.

Ellerton Drive Extension

The connection between the existing Ellerton Drive and Old Cooma Road removed expected gridlock along Cooma Street and Queens Bridge, and provided flood immunity for Queanbeyan.

As part of a suite of recommended works, the EDE provides the required Level of Service D for the Queanbeyan Road network.

Duplication of Ellerton Drive Extension

The duplication of the EDE provides all of the benefits of the EDE but the expansion to four lanes could not be justified within the known 2031 planning horizon or immediately beyond.

Duplication of Bungendore Road

Expanding Bungendore Road to four lanes at the eastern approach to Queens Bridge improved the gridlock leading up to the bridge but did not improve congestion at the bridge itself. It would also not provide flood immunity for Queanbeyan regardless of raising the dip, as the western approach at Monaro Street is submerged at a 1 in 20 year flood event.

Summary

Although a review and comparison of the environmental characteristics of the major different roads is of interest, the roads are not directly comparable.

- Ellerton Drive Extension would provide an alternative north / south route for Cooma Street and the CBD.
- Dunns Creek Road would provide an alternative east / west route for Old Cooma Road and Edwin Land Parkway.
- The Northern Bypass would provide an alternative east / west route for commuters living outside Queanbeyan.
- Expanding Cooma Street to four lanes north of Southbar Road would allow free flow of traffic into the CBD but does not relieve congestion in the CBD.

6.2.2 Key drivers for the Ellerton Drive Extension

QCC needs to ensure that there is a level of service on the road network for the entire Queanbeyan community that provides an operational road network when all of the new Queanbeyan developments are finalised. As a regional centre providing services such as health, employment and housing, it is important that Queanbeyan maintains an operational road network to ensure the region continues to be connected and is liveable.

The key drivers for the EDE are:

- The need to provide greater accessibility and connectivity;
- To ease congestion and travel times, improve reliability and avoid future gridlock;
- To improve safety for road users and pedestrians;
- To ensure access during flood events; currently Queanbeyan is only protected for a 1 in 10 year flood event;
- To improve freight, business and private travel;

- To ensure that the road environment is as safe as possible for all users; and
- To underpin transport planning for the future.

To keep the study current, QCC has undertaken a further traffic study in 2014 using most recent census data and growth forecasts for both Queanbeyan and Canberra. This study has reinforced the previous modelling results.

This major road project underpins transport planning for the future as:

- It improves movement of traffic around Queanbeyan;
- It provides potential increased capacity for public transport services;
- It provides specific infrastructure for bicycles and pedestrians;
- It provides additional routes for connecting the Queanbeyan community; and
- It increases capacity of the freight network.

There would be a 2.5 m off-road shared path for pedestrians and cyclists for the entire length of this major project. The shared path would also be connected to adjoining neighbourhoods, improving connections for these residential areas of Queanbeyan.

In addition there would also be on-road cycling provision in the road shoulder for the entire length of the project, linking with the existing facilities on the recently completed Edwin Land Parkway.

The EDE does not include upgrades of intersections that are not located between 10 Ellerton Drive and Old Cooma Road.

Other intersections are being considered separately to determine how they can be improved, and would include the roundabout at Yass Road and Bungendore Road, and the Tompsitt and Lanyon Drive roundabout.

Jerrabomberra Circle would be separately monitored to provide feedback to inform future improvements for this connection.

Community consultation undertaken in 2013 found that the majority of Greenleigh residents preferred a gated emergency access point at the end of Lonergan Drive and that the majority of Fairlane residents preferred a right in, left in/out adjacent to No. 74 Barracks Flat Drive and an onramp adjacent to No.130 Barracks Flat Drive. The design incorporates these features.

The EDE is expected to carry approximately 7,600 vehicles/day by 2031. RMS has determined that the posted speed for the road is to be 80 km/hr, except for the first section to ch1200 at the northern end of Ellerton Drive, which will be 60 km/hr.

This major road project would deliver improvements to traffic flow and to road safety for the Queanbeyan community.

6.2.3 Accident records and traffic volumes

The existing route along Bungendore Road and Old Cooma Road between Yass Road and Edwin Land Parkway has a 5 year crash history of 88 crashes causing 35 injury crashes and 42 people injured. The casualty crash rate per kilometre per year is 1.556, which is 2.5 times higher than the State average of 0.619 casualty crashes per km per year for a similar road environment. The crash reduction rate expected on the EDE has yet to be assessed.

Traffic volumes for 2012 show that Bungendore Road through the Queanbeyan CBD currently carries 21,695 vehicles per day, with heavy vehicles accounting for 8% of

traffic. Traffic modelling conducted for QCC has identified that to maintain a Level of Service D or better on the Queanbeyan Road network, the EDE is required by 2018. The construction of the EDE is projected to reduce the 2018 traffic volumes on Bungendore Road, the state road through the Queanbeyan CBD, by 15%. Other modelled road corridors do not provide this relief.

The Traffic Study found that some of the options modelled did not fulfil their intended functions, did not improve future gridlock or were too expensive. Regardless of what scenario was modelled, the gridlock on both Cooma Street and the Queens Bridge did not improve significantly without the inclusion of the EDE. The EDE is required by 2018.

6.2.4 Traffic requirements

B-Double traffic is expected to continue from the EDE along Edwin Land Parkway to the Monaro Highway. Quarry traffic would consist mainly of 'truck and dog' type heavy vehicles, and would be required to use the EDE rather than the route through the CBD.

6.2.5 Potential impacts on traffic

Network impacts

The road improvement package, including the EDE, provides a level of service that allows for some general degradation of the overall network without significant localised increases in delay. It also allows some movements at intersections to operate at a worse level of service than currently exists but still with the overall level of service maintained at Level of Service (LOS) at D or better.

Local intersections

The Proposal provides an upgrade to the intersection at Edwin Land Parkway.

Roundabouts function best when flows from each arm are roughly equal and are not excessive. To ensure that the EDE functions as required, its regional objectives are met and adjoining suburban areas such as Jerrabomberra and Queanbeyan East are not adversely affected, the upgrade of two additional roundabouts to traffic signals is likely to be required.

The construction of the EDE would place pressure on the two roundabout intersections located on the state road network at each end of the route, that is:

- Lanyon Drive and Tompsitt Drive, Jerrabomberra
- Yass Road / Bungendore Road / Ellerton Drive, Queanbeyan

The Yass / Bungendore and Lanyon / Tompsitt intersections are currently under consideration for separate improvement by RMS.

Traffic planning and analysis for these improvements has begun; however, these issues are beyond the scope of this REF. QCC would undertake separate community consultation on these issues.

QCC is also actively working on a range of other intersection and road upgrades. In addition, QCC continues to monitor road usage and access to inform its ongoing program of works. QCC will seek separate developer funding, external grants and other funding mechanisms for the development and implementation of these intersections and improvements, the majority of which would be required regardless of the construction of this Proposal.

These intersections would be designed with the Proposal in mind and the modelling shows that they would then operate at adequate levels of service.

Construction

There may be disruptions to local traffic flows during construction. The construction contractor would produce a temporary traffic management plan for each of the construction stages for RMS to review and QCC to approve. Because the proposed road is new, disruptions to existing traffic would be limited and can be managed with standard practices. Given most of the development is unavailable to traffic and is closed off from the main traffic fares, management of temporary traffic issues at adjoining intersections when required is not expected to be significantly complex or inconvenient. All local and RMS temporary traffic management guidelines would be adhered to.

6.2.6 Safeguards and management

The Contractor would be required to prepare a detailed Traffic Management Plan in accordance with the relevant Australian Standards and the RMS Traffic Control at Worksites Manual.

Construction access and material haul routes to the southern section of the project would be restricted from the Edwin Land Parkway / Old Cooma Road intersection entrance and from Barracks Flat Drive.

Construction access and material haul routes to the northern section of the project would be restricted from the Ellerton Drive entrance.

Where work would interact with local traffic, traffic management plans would be prepared by the Contractor. Affected residents would be provided with a minimum of 48 hours notification of any traffic interruptions.

Materials from local suppliers for both sections of the project would be hauled along the existing public haul routes, and would be subject to QCC and State regulations.

6.3 Property, land use and socio-economic considerations

6.3.1 Existing socio-economic environment

The proposed EDE alignment is situated to the east of Queanbeyan's CBD. The northern section of the proposed alignment is situated in the suburb of Greenleigh and the southern section is situated in Karabar.

The northern section of EDE involves works to the existing section of Ellerton Drive from 10 Ellerton Drive to the current road termination. This is an urban area with a posted speed limit of 60 km/hr. The road extension starts at the existing road termination point and extends south to the Queanbeyan River passing through bush and open grassed land. The topography in this area is undulating to steep. The land to the west of the proposed alignment is populated with low density properties surrounded by bush. The land to the east of the alignment is mountainous bush connecting to the Cuumbuen Nature Reserve, and open rural grassland, identified for a future land development known as Jumping Creek Estate.

Urban development bounds the southern section of the proposed alignment on its north side but to the south, apart from a small housing development near the river, the Proposal is bounded by disturbed woodlands. The road boundary to the north is adjacent to an urban area.

Several schools are accessed off Old Cooma Road and it is expected that the decongestion resulting from the implementation of the EDE would improve safety and operation of the access and egress streets. TAFE Illawarra Queanbeyan Campus is located on Ellerton Drive near the Old Sydney Road / Ellerton Drive roundabout.

Regional access would be improved by the Proposal. Temporary traffic management and consultation would be in place when work is required on Ellerton Drive.

6.3.2 Potential impacts on socio-economics

Proper functioning of roads and related activities is one of the essential prerequisites for a well-functioning city economy. Individual mobility is essential for many activities, which are related to work, education and leisure, and necessary for most of the suburb-to-suburb links. The EDE would allow an improvement in the movement of people and goods. In addition, the EDE would provide greater efficiencies for the road transport sector in terms of time and distance, with lower transport cost and better transport services. The EDE would provide QCC with a durable long-term asset.

Impacts on Residents and Community

A potential negative impact during the construction phase is that residents may be disrupted and inconvenienced by dust, noise, heavy traffic on existing roads, changes in the level of service, safety hazards, or interference with emergency services. This situation has the potential to make residents feel uncertain about the development. For this reason, additional consultation has been and would be undertaken with residences of the nearby estates and why management measures around noise, access and dust have been identified in this REF and would be developed in detail prior to construction.

Once the road is operational, there could be other perceived or realised, indirect and direct socio-economic impacts related to changes to such factors as noise, access, and visual and environmental amenity. Management of such impacts is proposed via noise barriers, native landscaping and revegetation, and monitoring of air and water quality.

When the road is in operation, most local and regional residents would benefit from its many positive impacts. The most significant positive impacts are likely to result from the removal of heavy traffic from the CBD and the resultant improvement in the amenity of this precinct and access improvements to Canberra and the new development estate. Travel time, fuel consumption, accidents and inconvenience to users would decrease. Access to jobs, schools, shops, recreation and other community services and amenities would improve. Access to the neighbourhoods of Greenleigh and Karabar, and access to and from new development areas would improve.

The most significant negative impacts would be an increase in noise levels for the adjacent and nearby residents. Mitigation measures in accordance with the NSW Road Noise Policy will be implemented to minimise this impact.

Impacts on Businesses and Community Services

Significant urban environmental improvements have already been made to Monaro Street over the past few years as part of the Queanbeyan CBD masterplan (2009). Together with these ongoing enhancements, the additional improvement in lower noise, visual amenity, air quality and safety, due to diversion of heavy vehicles and other traffic from the CBD to the EDE, is expected to enhance the attraction of the CBD and improve existing businesses and bring in new businesses to the CBD, helping deliver the masterplan and its social integration objectives.

In regard to positive socio-economic affects, it is expected that 45 direct and 140 indirect jobs per year would be created during the two years required to construct the road. This would be mainly due to the need to provide goods and services to the contractors such as materials, specialist expertise, accommodation and food. Many local supplier and construction related businesses would benefit from a project of this magnitude.

When the roadway is operational, changes in traffic patterns may increase or decrease the clients for some businesses and community services. The potential impact was tested in the formal community consultation, and it is overwhelmingly apparent that traffic removal, particularly trucks, from the main street is seen as a positive for business by making the centre of the city more accessible and enjoyable for local and interstate visitors. This would improve the business climate in the CBD.

Furthermore, as discussed, improvements in the CBD due to the road could attract businesses such as outdoor cafes.

The changes to the traffic in the CBD would provide an opportunity for an open discussion with the Queanbeyan business and broader community about the future of Monaro Street and implementing and/or altering the current masterplan.

Services such as schools may be adversely impacted on the occasions that temporary traffic management is required during peak times; however, the negative impacts are expected to be short-term. Construction noise and dust is unlikely to adversely impact the schools but, as discussed, reduced road congestion would improve access and improve safety. The schools would be consulted during the public consultation.

6.4 Biodiversity

A *Species Impact Statement June 2014* (SIS) (ngh Environmental, 2014) including threatened species and ecological communities listed under the NSW TSC Act was undertaken to assess the likely impacts of the EDE on biodiversity. The SIS also included survey effort and mapping of species, ecological communities and habitat for species listed under the Commonwealth EPBC Act in anticipation of a Referral requirement. This assessment included literature review, searches of relevant databases including the EPBC Protected Matters Search Tool (i.e. including a 10 km buffer search area) and seasonal field surveys, commencing in September 2012 and concluding in November 2013, to evaluate habitat.

A summary of the findings is provided in the following sections.

Ngh Environmental (2016) subsequently prepared an *Addendum Species Impact Statement* to assess potential biodiversity impacts due to modifications to the EDE proposal.

The Addendum to the SIS specifically addressed the following:

1. Key changes to the project proposal from the concept design stage through to the detailed design stage and the implications of the changes, if any, to the:
    a. Assessment of impact upon subject threatened species and communities listed under *NSW Threatened Species Conservation Act 1995* (TSC Act) and the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).
    b. Conclusions, recommendations and mitigation measures given in the SIS.
2. Additional survey, assessment and mitigation measures in response to new site information; specifically, the potential sighting of a Squirrel Glider in the study area and the presence of two mine shafts that may provide habitat for the Eastern Bentwing-bat.
3. Updated information regarding environmental offsetting requirements and BioBanking calculations.

4. Additional information in response to public submissions received during the EPBC Act Referral phase of the assessment process, specifically:
    a. Comments from scientists with expertise in native grassland management, stating that disturbance is more likely to favour weed establishment rather than Hoary Sunray establishment.
    b. Reference to vegetation surveys conducted for the proposed Jumping Creek subdivision that identified a significantly larger area of EPBC listed Box-Gum Woodland on the proposed road-line adjacent to the end of Lonergan Drive than was identified in the Ellerton Drive referral.
    c. Suggestions that Koalas are breeding in the area.

The revised proposal consisted of a larger site area and a slightly different configuration to the original proposal. Similarly to the original SIS, an impact assessment was undertaken for threatened species and communities listed under the NSW TSC Act and the EPBC Act for the amended area. Further surveys, assessment and management recommendations were provided, specifically concerning the potential sighting of a Squirrel Glider within the study area, and possible Eastern Bentwing Bat habitats.

Further information regarding the findings of the SIS Addendum is integrated into the following sections.

6.4.1 Existing natural environment

There are five broad habitat types in the study area; these include:

1) Dry Forest – two types of dry forest have been identified in the northern half of the site.

Tablelands Dry Shrub / Tussock Grass Forest occurs on steep terrain with skeletal soils and is dominated by Red Box (*Eucalyptus polyanthemos*), Scribbly Gum (*E. rossii*), Red Stringybark (*E. macrorhyncha*) and Mealy Bundy (*E. nortonii*). The understorey contains a high diversity of shrub species including Blackthorn (*Bursaria spinosa* subsp. *lasiophylla*), *Pultenaea microphylla*, Peach Heath (*Lissanthe strigosa*), Grey Guinea Flower (*Hibbertia obtusifolia*) and Poverty Wattle (*Acacia dawsonii*).

Tablelands Acacia / Grass / Herb Dry Forest occurs in flatter areas of gullies and is dominated by Yellow Box (*E. melliodora*) and Apple Box (*E. bridgesiana*), with a shrubby understorey of Birch Pomaderris (*Pomaderris betulina*) and Burgan (*Kunzea ericoides*), and exotic species such as Hawthorn (*Crataegus monogyna*), Blackberry (*Rubus fruticosus*), Privet species (*Ligustrum* spp.) and Firethorn (*Pyracantha angustifolia*).

2) Woodland (including Box-Gum Woodland) – occurs predominantly in the southern section of the alignment. It contains open woodland, dominated by Yellow Box and Apple Box. The groundcover is mostly grassy with a high diversity of forbs including Bulbine Lily (*Bulbine bulbosa*), Blue Devil (*Eryngium ovinum*), Yellow Autumn Lily (*Tricoryne elatior*) and Scaly Buttons (*Leptorhynchos squamatus*).

3) Shrubland – two shrubland areas occur in the northern section of the alignment, and are likely to be due to past clearing. They are dominated by exotic species such as Blackberry, Privet species and Firethorn.

4) Grassland – there are no natural grassland areas in the alignment; however, derived grassland occurs where natural vegetation has been cleared. These sites are dominated by exotic species and are surrounded by residential development.

5) Riverine and/or drainage lines - the Proposal crosses the Queanbeyan River. The northern side of the river is covered by dense shrubland on both the river's edge and immediately upslope. This is a mix of native species, including Burgan and Black Wattle (*Acacia mearnsii)*, and exotics, such as Cotoneaster (*Cotoneaster* sp.), Firethorn and Sweet Briar (*Rosa rubiginosa*). The southern side of the river supports fringing vegetation of reeds, grasses and shrubs, including Common Reed (*Phragmites australis*), Black Wattle, African Love Grass (*Eragrostis curvula*) and Blackberry.There is a low abundance of woody debris within the river. An ephemeral drainage line also occurs in the northern section of the alignment.

Additionally, three habitat features important to threatened local fauna are present, i.e. hollow-bearing trees, termite mounds, and rock habitats. The SIS Addendum also identified two previously unknown derelict mine sites, which may provide habitat for the Eastern Bent-wing bat (*Miniopterus schreibersii oceanensis*). The mine sites would be disturbed during construction; however, no Eastern Bent-wing bats or threatened cave dwelling species were recorded during surveys.

Native vegetation is dominant across the study area excluding the short corridor between the residential development south of the Queanbeyan River and two short sections near Jumping Creek. The majority of the study area has been subject to varying levels of disturbance. Past disturbance appears to be generally lower in the north of the study area and increasing in the south. Despite the higher levels of disturbance in the south, the native vegetation in this area exhibits a higher level of diversity and contains the more important habitat values.

During surveys in the development footprint and adjacent study area and locality, the SIS identified 288 flora species including 29 trees, 40 shrubs, 2 ferns, 7 vines, 151 forbs, 44 grasses and 15 sedges. One-hundred and fourteen fauna species were recorded during the survey periods comprising 10 microbats, a further 12 mammals, 80 birds, 6 reptiles and six frogs.

Common weed species are widespread throughout the study area (Figure 15) and 10 noxious weeds listed for the Queanbeyan City Local Control Area were detected during the surveys.

The SIS identified that the Proposal was likely to have significant impacts on Box-Gum Woodland, Rosenberg's Goanna and the Speckled Warbler.

Koalas were surveyed for and assessed in the SIS. This included scat and scratching searches, call playback and spotlighting. No Koalas or indication of a Koala was recorded during the surveys. The species is uncommon in the immediate area, with one record north of the EDE alignment, and an anecdotal record to the west at a residential property. The area supports secondary Koala feed tree species, and is considered potential but low quality habitat. Any Koalas found in the area are likely to be dispersing individuals rather than from an existing population. As such, the Proposal has been assessed as not having a significant impact on Koalas. Notwithstanding, consideration was given to SEPP44 Koala Habitat Protection.

Queanbeyan Landcare has helped restore sections of slope to the north of the Queanbeyan River. This is within the Jumping Creek estate development proposal, an area outside the proposed footprint, but which would need to be protected from secondary impacts of the Proposal.

Aquatic Biodiversity

Murray Cod, listed as threatened under the EPBC Act, are released into the Queanbeyan River near the EDE, as part of a restocking program. Approximately

12,000 Murray Cod were released in 2014, 3,500 in 2013 and 1,500 in 2012 (B. Doolan, Fisheries Management Officer, pers. comm.).

Golden Perch (not a listed threatened species) have also been released into the Queanbeyan River. Macquarie Perch, listed under state and national legislation, also occurs in the Queanbeyan River, but only upstream of Googong and would not be affected by the Proposal.

The EDE crosses the Queanbeyan River, which is home to Platypus and native Water Rats. An estimated 60 Platypus are thought to reside along 14 km of the Queanbeyan River (Australian Platypus Conservancy, 2012). Whilst not listed as threatened under local or national legislation, the platypus is an iconic species and the urban population is well known by the community and would be protected by the Proposal. The project has received specific management advice from Australian Platypus Conservancy which is included in this REF. The Queanbeyean City Council Platypus Management Plan has also been reviewed and considered.

The reduction in the bridge from 4-lanes to 2-lanes has reduced the impact of the bridge from 0.7 ha to 0.2 ha which would reduce further habitat loss from the bridge development. Breeding females have been confirmed to create nesting burrows in the banks on both sides of the river each year. The construction phase of the bridge would have a potential adverse impact on the local Platypus breeding cycles; however, once completed the bridge will have minimal adverse impact on the Platypus population.

The SIS has identified the area of riparian habitat to be affected. Additional specific safeguards and environmental measures are discussed in subsequent sections.

Ongoing consultation with relevant stakeholders on Platypus conservation would be undertaken in the pre-construction and construction phases to assist in the delivery and maintenance of the safeguards.

6.4.2 Potential impacts on biodiversity

The threatened[2] subject species and communities identified in the SIS (ngh Environmental, 2014) and revised in the Addendum to the SIS (ngh Environmental, 2016), as having the potential to be affected by the proposal are (listing status given in brackets[3]):

- Box-Gum Woodland (EEC TSC/ CEEC EPBC)
- Hoary Sunray (V EPBC)
- Pink-tailed Worm-lizard (V TSC/ V EPBC)
- Rosenberg's Goanna (V TSC)
- Brown Treecreeper (V TSC)
- Scarlet Robin (V TSC)
- Hooded Robin (V TSC)
- Diamond Firetail (V TSC)
- Painted Honeyeater (V TSC)
- Gang-gang Cockatoo (V TSC)
- Speckled Warbler (V TSC)

[2] Common (non-threatened) species are not considered by a Species Impact Statement.

[3] EEC = endangered ecological community, CEEC = critically EEC, V = vulnerable, E = endangered

- Koala (V TSC/ V EPBC)
- Eastern False Pipistrelle (V TSC)
- Eastern Bentwing-bat (V TSC)
- Golden Sun Moth (E TSC / CE EPBC)

Of these, the following were found in the study area:

- Box-Gum Woodland
- Hoary Sunray
- Gang-gang Cockatoo
- Speckled Warbler
- Eastern False Pipistrelle
- Eastern Bentwing-bat

Table 18 shows the amount of habitat for species and communities likely to be affected in the study area. It also provides a comparison of the magnitude of impact assessed in the SIS and the impacts of the revised proposal, as described in the Addendum to the SIS. The modification of the subject site affects the assessment (based on quantification) of Hoary Sunray, hollow-bearing trees, termite mounds, and of habitat and vegetation types in the SIS. The revised proposal would have a greater impact than originally assessed upon all affected species.

The 7 Part Tests undertaken in the SIS indicate a significant adverse impact on:

- Box-Gum Woodland
- Rosenberg's Goanna
- Speckled Warbler

The outcome of the 7 Part Tests are unchanged in the Addendum to the SIS and no significant impacts were considered likely for other species affected by the proposal.

The Addendum to the SIS concluded that there would be no change in any of the conclusions made in the SIS.

Table 18. Extent of occurrence or habitat for subject species and communities in the Study area, locality and original and revised subject sites (ngh Environmental 2016).

Subject species	Habitat	Extent in study area and additional areas surveyed	Estimated additional extent known in the locality in the original SIS	Extent in subject site (i.e. quantified impact areas)		Equal, greater or lesser impact compared to SIS
				Original proposal	Revised proposal	(=, > or <)
Box-Gum Woodland	NA	15.7 ha	3,121 ha (1,546 ha in moderate to good condition)	4 ha (moderate to good condition)	6.5 ha (moderate to good condition) 1 ha (low condition derived grassland)[4]	**>**
Hoary Sunray	Box-Gum Woodland and Dry Forest	7,000 individuals (a further 6000 just outside study area also) 126.8 ha	36,500 individuals recorded during SIS surveys (actual number likely to be larger)	5000 individuals 19 ha (including 4 ha good quality)	5470 individuals 29.2 ha (including 6 ha good quality)	**>**

[4] A conservative approach has been applied and 0.97 ha of exotic dominated grassland has been included as low condition EEC in the revised assessment. Although exotic dominated, the area included has a minor native component which is derived from the clearing of the EEC and as such, is considered to be derived grassland in low condition.

Subject species	Habitat	Extent in study area and additional areas surveyed	Estimated additional extent known in the locality in the original SIS	Extent in subject site (i.e. quantified impact areas)		Equal, greater or lesser impact compared to SIS
				Original proposal	Revised proposal	(=, > or <)
Pink-tailed Worm-lizard	Box-Gum Woodland and Grassland south of the Queanbeyan River	4.4 ha (potential low quality habitat only)	Unquantified, but all records of the species are south of the study area. Potential habitat in the study area is separated by roads and residential barriers from known populations.	1.9 ha (potential low quality habitat only)	3.7 ha (potential low quality habitat only)	>
Rosenberg's Goanna	Dry Grass/Shrub Forest	92.9 ha (20.1 ha important habitat) 69 termite mounds	>500 ha adjacent to the study area. Anecdotal observations and offset surveys suggest that termite mounds are common throughout the locality	13 ha habitat (5.4 ha moderate quality; 7.6 ha important habitat) 13 termite mounds	20.3 ha habitat (8.3 ha moderate quality and 12 ha important habitat) 49 termite mounds	**>**
Brown Treecreeper	Box-Gum Woodland and Dry Forest	22.6 ha (potential habitat only, sedentary species not detected during surveys)	>3,000 ha	3.9 ha habitat 2 hollow-bearing trees (potential nesting trees)	6 ha habitat 4 hollow-bearing trees (potential nesting trees)	>

Subject species	Habitat	Extent in study area and additional areas surveyed	Estimated additional extent known in the locality in the original SIS	Extent in subject site (i.e. quantified impact areas)		Equal, greater or lesser impact compared to SIS
				Original proposal	Revised proposal	(=, > or <)
Scarlet Robin **Hooded Robin**	Dry Grass Forest, Woodland and Dry Shrub Forest	123.6 ha (potential habitat only, sedentary species not detected during surveys)	>7,000 ha	19 ha habitat	28.9 ha habitat	**>**
Diamond Firetail	Shrubland, Grassland, Open Woodland, and Dry Shrub Forest	30.1 ha	Unquantified. Would include habitats identified for Brown Treecreeper and Scarlet and Hooded Robin (>7,000 ha).	6.0 ha habitat	9.6 ha habitat	>
Painted Honeyeater	Dry Shrub Forest and Box-Gum Woodland supporting mistletoe	18.4 ha (only areas supporting mistletoe, potential habitat only as species not detected and has been recorded only once in the Queanbeyan LGA)	Unquantified. Would be associated with woodland habitats (3, 121 ha) in the locality where mistletoe is present.	4.0 ha (potential marginal habitat only)	6.6 ha (potential marginal habitat only)	**>**

Subject species	Habitat	Extent in study area and additional areas surveyed	Estimated additional extent known in the locality in the original SIS	Extent in subject site (i.e. quantified impact areas)		Equal, greater or lesser impact compared to SIS
				Original proposal	Revised proposal	(=, > or <)
Gang-gang Cockatoo	All vegetated areas (good quality habitat Dry Shrub Forest and Woodland with suitable hollow-bearing trees)	155 ha (including 20.1 ha good quality habitat)	>7000 ha likely to support a similar density of hollow-bearing trees to the study area.	26.2 ha (including 7.5 ha good quality habitat) 12 hollowing-bearing trees (potential breeding sites)	37.9 ha (including 12.0 ha good quality habitat) 24 hollow-bearing trees (potential breeding sites)	**>**
Speckled Warbler	All vegetated areas (important habitat based on records and home range size)	155 ha (including 26.9 ha of important habitat for this species)	>3,000 ha Box-Gum Woodland and >7,000 ha Dry Forest habitat	26 ha (including 4.5 ha important known habitat)	37.9 ha (including 7.0 ha important known habitat)	**>**
Koala	All woodland and forest habitat types of the study area	112.6 ha (potential habitat only. Low quality due to the absence of primary feed trees)	>10,000 ha of similar forest and woodland habitat	20 ha (potential low quality habitat)	29.2 ha (potential low quality habitat)	**>**

Subject species	Habitat	Extent in study area and additional areas surveyed	Estimated additional extent known in the locality in the original SIS	Extent in subject site (i.e. quantified impact areas)		Equal, greater or lesser impact compared to SIS
				Original proposal	Revised proposal	(=, > or <)
Eastern False Pipistrelle	All vegetated areas (good quality habitat good condition Dry Forest with hollow-bearing trees)	155 ha	>10,000 ha (foraging habitat) >7000 ha of Dry Forest likely to support a similar density of hollow-bearing trees to the study area.	26 ha (including 7.5 ha good quality) 31 hollow-bearing trees (potential roost trees)	37.9 ha (including 15.8 ha good quality) 53 hollow-bearing trees (potential roost trees)	**>**
Eastern Bent-wing Bat	All vegetated areas (foraging) Mines, caves and similar structures (roosting and breeding)	155.0 ha (foraging habitat) Two underground derelict mines (potential roosting habitat only, unlikely to be maternity sites)	>10,000 ha (foraging habitat) Three mine sites known to occur to the east of the study area (potential roosting habitat)	26.2 ha (foraging habitat) No mines were known to occur at the time of the SIS.	37.9 ha (foraging habitat) Two underground derelict mines (potential roosting habitat only, unlikely to be maternity sites)	**>**
Golden Sun Moth	Box Gum Woodland	4.4 ha (potential low quality habitat only, species not detected during targeted surveys)	Unquantified. Associated with Box-Gum Woodland and natural and derived grasslands with specific habitat components	1.9 ha (low quality habitat not supporting the species)	3.7 ha (low quality habitat not supporting the species)	>

Construction effects include:

- Noise and dust generation from construction machinery and activities that may disturb local fauna and inhibit the function of plant species and communities.
- Barrier effects through habitat fragmentation, which restricts the ability of fauna to move across the landscape.
- Aquatic habitat disturbance and loss due to bridge construction, increased erosion and sedimentation.
    - Potential adverse construction impacts on Murray Cod and other native fish are expected to be minor and temporary, as indicated by DPI. The bridge pylons would be located on the river banks and work in the river itself under normal flow conditions is not required.
    - Adverse impacts on Platypus and Water Rats would be temporary. Platypus territories may overlap and the works could temporarily disturb the social structure of several of the 60 Platypus recorded along this stretch of the river from the dam to the weir. Construction would comply with recommendations made in the Platypus Awareness and Conservation Strategy (Australian Platypus Conservancy, 2012; Eco Logical Australia, 2012) and more recent advice from the APC. Specific safeguards and environmental management measures are discussed in subsequent sections. Protective measures for the Platypus would also be effective for Water Rats.
    - This development can be implemented without significant adverse impact to the aquatic and riparian environments if best practice and the above precautions regarding Platypus are followed.
    - The land has been shown to be susceptible to erosion. Comprehensive erosion and sediment control would be required across the site especially in the slopes above the river and in the northern quarter where soil is friable, to ensure adverse downstream habitat impacts are minimised.

Operational impacts

The following potential adverse impacts have been identified;

- Noise; traffic noise may influence fauna use of adjacent habitat
- Collision risks, e.g. fauna may collide with traffic causing injury or mortality
- Barrier effects, e.g. lighting, fencing and road infrastructure may influence fauna use of adjacent habitat
- Edge effects, e.g. ingress of weeds and potential for pollutants to enter habitats along the boundary of the development
- Human activity, e.g. increased rubbish dumping and weed spread may result from increased access
- Pests and pathogens, e.g. edge effects, weed introductions and a cleared landscape may encourage pest species.
- Aquatic fauna habitat disturbance and loss due to the bridge.
    - Long term adverse impacts on Platypus and Water Rats from the presence of the bridge would be minimal. The nesting practices whereby the females dig burrows in banks on both sides of the river

each year will resume after construction activities are completed. As far as possible, any bank reconstruction under or near the bridge should consist of a 'soft engineered' approach.

- Habitat connectivity
    - The SIS indicates that there is habitat connectivity to the north, east and south of the study area. There is no habitat connectivity to the west of the study area due to residential development and existing dwellings. A regional biolink borders the eastern edge and southern end of the project site. The reduction of the regional biolink would adversely affect the movement of threatened and protected species; however, as the site sits on the western fringe of the regional biolink, the project does not adversely impact the integrity of the biolink, as sufficient habitat remains to ensure the biolink would continue to function. Management measures, such as underpasses and the revegetation of certain areas, will maintain local habitat connectivity and allow both threatened and protected species to move either side of the EDE. QCC is currently investigating offset sites that occur in the regional and local biolinks with the aim of improving and securing areas of important habitat connectivity.
    - The Queanbeyan River also provides an important habitat corridor for fauna species, in particular birds and microbats.

The Australian Research Centre fort Urban Ecology, University of Melbourne, on behalf of the NSW Office of Environment and Heritage conducted an additional targeted survey for Squirrel Gliders following notification to QCC of a possible anecdotal record near the subject site (University of Melbourne 2016). The Squirrel Glider is listed as Vulnerable under the NSW TSC Act. It is not listed as threatened under the Commonwealth EPBC Act.

No Squirrel Gliders were captured or observed during the survey program; however, Sugar Gliders were observed. Sugar Gliders are not listed as a threatened species. The report (University of Melbourne 2016) concluded that the likelihood of Squirrel Gliders occurring within the EDE area was low, because of (i) the relatively high survey effort using three different survey techniques; (ii) the sub-optimal and low quality habitat for the species and (iii) the lack of historical Squirrel Glider records within the area. The Sugar Glider population within the alignment was of low density but widespread, and appeared to be functioning as expected.

Impacts on Protected Species

The current activities may adversely impact protected fauna species under the *National Parks and Wildlife Act 1974*. Fauna groups have been identified which may be adversely impacted by the construction and operational phase. Table 19 shows that construction for the revised proposal would have a minimal adverse effect on these species. If adverse effects occur, management measures proposed for threatened species will reduce the adverse impact of the road

Figure 15. Woody weed species dominating the shrubby northern side of the Queanbeyan River along the EDE alignment.

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Table 19. Potential adverse construction impacts on protected species.

Common Fauna Assemblage	Typical Examples	Potential Adverse Impacts	Regional / Local Impact
Large ground Marsupials	Swamp Wallaby, Eastern Grey Kangaroo, Red-necked Wallaby, Bare-Nosed Wombat	• Loss of grazing habitat. • Restriction in movement and dispersal due to changes in behavior; however, underpasses will allow them to move between areas. • Increased risk of road mortality but mitigation measures such as fences and underpasses can be applied to reduce the risk.	Negligible / Minor
Arboreal Marsupials	Sugar Glider, Common Ringtail Possum, Common Brush-tail Possum Squirrel Glider	• Loss of hollow bearing trees. Installing artificial hollows can reduce the effect. • Loss of foraging habitat. • Increased risk of predation, as animals would be forced onto the ground because of habitat loss. • Restrict movement and dispersal. • Increased road mortality. Mitigation measures can reduce this effect.	Negligible / Minor
Microbats	White-striped Freetail Bat, Gould's Wattle Bat, Southern Freetail Bat, Long-eared Bat, Eastern Bent-wing Bat	• Loss of hollow bearing trees and foraging habitat. Installing bat boxes can reduce the effect. • Loss of potential habitat within any identified mine shafts. • Revegetation of surrounding degraded habitat can increase foraging habitat.	Negligible / Minor
Amphibians	Smooth Toadlet, Banjo Frog, Bibron's Toadlet	• Minor loss of pools in creek lines but potential for new habitat in new drainage lines reducing the barrier effect the road can impose. • Run-off from the road can reduce habitat quality.	Negligible / Minor

Common Fauna Assemblage	Typical Examples	Potential Adverse Impacts	Regional / Local Impact
Reptiles	Grass Skink, Delicate skink, Robust Ctenotus, Bearded Dragon	• Loss of shelter from removal of rocks and logs. • Increased road mortality due to behaviour (e.g. basking on roads). • Road can create a barrier causing reduced dispersal. • The addition of underpasses will assist in the movement and rehabilitation of the surrounding area (e.g. installing rocks/logs in suitable areas) and maintain habitat for reptile species.	Negligible / Minor
Hollow-dependent tree birds	Sulphur Crested Cockatoo, Galah, Crimson Rosella, Eastern Rosella	• Loss of hollow-bearing trees. Providing artificial hollows will reduce the impact. • Loss of foraging habitat. • Increased traffic noise can adversely impact on species. • Increased road morality.	Negligible / Minor
Forest Birds	Eastern Yellow-Robin, Bassian Thursh, Olive-back Oriole, Grey Currawong, Spotted-Quail Thrush, Shining Bronze-cuckoo	• Loss of foraging habitat. Rehabilitation of disturbed areas will reduce the impact. • Increase habitat fragmentation in the area; however, road placement does not fragment large areas. • Edge effect created by the road can reduce habitat quality. • Reduction of habitat quality through weed invasion. Weed management will reduce the impact. • Increased traffic noise can adversely impact on species.	Negligible / Minor
Woodland Birds	Striated Pardalote, White-throated Tree Creeper, Australian Magpie, Yellow-Rumped Thornbill, Yellow-faced Honeyeaters, Brown-	• Loss of foraging habitat. • Increased habitat fragmentation in the area; however, road placement does not fragment large areas. • Edge effect created by the road can reduce habitat quality. • Reduction of habitat quality through weed invasion. Weed management will reduce the impact. • Increased traffic noise can adversely impact on species.	Negligible / Minor

Common Fauna Assemblage	Typical Examples	Potential Adverse Impacts	Regional / Local Impact
	headed Honeyeater, Rufous Whistler	• Increased predator access.	
Riverine Birds	Clamorous Reed Warbler, Australian Wood Duck, Pacific Black Duck, Sacred Kingfisher, Eastern Spinebill	• Minor impact on the creek-line but potential for new habitat to be created. • Reduction in habitat quality. Rehabilitation of areas will reduce the impact. • Increased traffic noise can adversely impact on species. • Water run-off can reduce water quality.	Negligible / Minor

These potential adverse impacts on common species do not change the assessment outcome and do not result in a significant adverse impact on flora and fauna.

6.4.3 Biodiversity avoidance, safeguards and management measures

The proposed alignment has been designed along the eastern edge of Queanbeyan city (Figure 2) avoiding the more significant direct adverse impacts of other routes and minimising adverse impacts on wildlife connectivity.

The Proposal has been determined as a controlled action under the EPBC Act. QCC is required to finalise offset strategies for the TSC Act-listed species, e.g. identifying open dry forest habitat for fauna such as the Rosenberg Goanna, and Speckled Warbler, and for EPBC Act-listed Box Gum Woodland and Hoary Sunray. The offset evaluation is presented in the Addendum to the SIS, Section 7 (ngh Environmental 2016).

The calculator identifies biobank credits (i.e. the habitat area) required to offset the area adversely impacted and the credits generated by potential offset sites. QCC are considering various potential offset sites in Bungendore, North Poplars, Royalla and land QCC owns adjacent to the road corridor in the Barracks Flat area. For outstanding TSC requirements, QCC is considering land near the end of the current Ellerton Drive between the existing Ellerton Drive and the Cuumbean Reserve, which would preserve more of the regional biolink, and several alternate parcels in the region.

Section 7 of the Addendum to the SIS addresses the offsets necessary. An assessment of adequacy for Box-Gum Woodland and the Hoary Sunray is also being undertaken using the Commonwealth Offset Assessment guide according to the EPBC Act Environmental Offsets Policy. The Commonwealth deemed that there will also be a significant impact on the Hoary Sunray; therefore, this species is also being considered as part of the offset strategy.

The EPBC Act offset strategy must be approved prior to construction starting and TSC offset strategies would have to be finalised within 12 months of construction starting.

Additional indirect loses of flora and fauna due to road construction and operation would be managed to the greatest extent. Biodiversity management measures based on the cumulative adverse impacts of the proposal, are summarised in Table 20.

Table 20. Biodiversity management measures.

Impact	Environmental Safeguards	Responsible Party	Timing
Loss of threatened fauna habitat and endangered ecological communities	• Significant property biodiversity offsets would be put in place following the approval of an offset strategy under the EPBC Act approval. A gap analysis would be undertaken to ensure that State listed species are also protected by this strategy in accordance with TSC Act requirements. • The Unexpected Threated Species Finds procedure prepared by ngh Environmental (2016) would be implemented to ensure appropriate responses are undertaken in the event that a threatened species is unexpectedly encountered during excavation / construction activities.	QCC	Pre-construction, construction

Impact	Environmental Safeguards	Responsible Party	Timing
Loss of vegetation / habitat resources during clearing	• Vegetation clearing would be kept to that required for construction. Clearing would comply with RMS and QCC guidelines. • Large logs and rock habitats disturbed during the clearing process would be re-used on site at fauna crossings and in native landscaping. • The worksite would be clearly demarcated with temporary fencing, flagging tape or similar. No works or movement of equipment or machinery would occur outside these areas. • Prior to the commencement of any construction activities, all workers would be required to undertake an environmental induction that covers the intent of ecological safeguards. The induction would be designed by a qualified ecologist familiar with the site and its issues and proposed activities. • Early autumn clearing (early March) of areas with a high density of termite mounds is recommended to help discourage use of the subject site and minimise impact to Rosenberg's Goanna. • Where early autumn clearing is not practicable, pre-clearance surveys should be arranged in advance from late January to mid-April.	Contractor / QCC	Pre-construction, construction
Loss / disturbance of native fauna	• If practicable, clearing of native vegetation would be timed to avoid the main nesting / breeding season (i.e. spring). Select habitat, such as hollow bearing trees, would be cleared in autumn to avoid the chance that native fauna is nesting just prior to clearing in later winter. • Vulnerable native fauna would be trapped and removed from the site just prior to clearing and grubbing, and relocated to habitat agreed with OEH by suitably experienced or trained ecologists. • Identified hollow bearing trees would be lowered to the ground and searched by suitably trained or experienced ecologists. Injured or stunned fauna would be processed in accordance with best practice. This would involve liaison with appropriate stakeholders. Uninjured animals that do not or cannot safely move to adjoining bushland would be relocated to a nearby habitat location agreed with OEH.	QCC, Contractor	Pre-construction

Impact	Environmental Safeguards	Responsible Party	Timing
	• Pre-clearance surveys would be undertaken for Rosenberg's Goanna (around termite mounds) and Eastern Bent-wing Bat (within two derelict mine sites).		
Erosion, sedimentation and pollution of water ways and aquatic habitats	• Best practice soil and water management, including erosion controls, sedimentation controls (as per 'Blue Book') would be implemented. Sub-catchments within the site would be assessed and channel, flow and sedimentation basins would be designed according to Blue Book criteria to ensure adverse impacts on waterways are minimised. • Stormwater management features meet guideline requirements to protect waterways. • Maintenance of same is assured during operations. • Adequate measures (e.g. grass or rip rap swales) would be provided along the road edges to reduce scouring and hydrocarbons being washed from the road surface into adjacent vegetation.	Contractor / QCC	Pre-construction,, construction, post-construction
Degradation of adjoining Box-Gum Woodland and other native communities	• A CEMP for the site that includes vegetation management, weed management, soil management and site rehabilitation sub-plans would be prepared. • Ongoing monitoring and control of weeds in and adjoining the work site would be undertaken throughout the construction phase, with particular focus on the higher quality woodlands and habitats adjoining the site. • Standard spill response protocols would be in place to manage hazardous materials and guide remediation should a spill occur. • Maintenance of site landscaping and rehabilitation for three years post construction.	Contractor, QCC	Pre-construction, construction, post-construction
Road mortality prevention measures	• Two fauna culvert underpasses would be included within the road corridor supported by natural habitat features and lead-ins such as logs, ground timber and rocks, harvested from clearing and grubbing. • Fauna crossing enhancements would be provided at bridge crossing locations including the provisions of natural habitat	QCC, Designer, Contractor	Pre-construction, Construction

Impact	Environmental Safeguards	Responsible Party	Timing
	features such as logs, ground timber, and rocks harvested from clearing and grubbing. • Fauna exclusion fencing would be provided 100 m each side of the fauna crossings and extensively in the other areas such as opposite the green corridor leading to the golf course to prevent access to the road by medium and large fauna. These designs would be refined (as per RMS model drawings R201) and approved by QCC prior to construction following consultation with stakeholders. • Vegetation enhancement and/or rehabilitation with appropriate plantings to improve the connectivity to adjacent habitats and promote movement through the fauna culverts. • Vegetation planted such that it would not overhang fauna fences. • A rope crossing over the EDE would be placed in a suitable location adjacent to Severne Street and a fauna rope bridge placed under the road bridge over the Queanbeyan River adjacent to Lonergan Drive.		
	• The road is designed to an 80 km speed limit and this would help to reduce animal collisions. • Advisory signage alerting drivers to the presence of fauna.	QCC	Post Construction
Inappropriate fire regime develops	• Fire management and access plan to be developed in conjunction with the Rural Fire Service (RFS) and OEH prior to the end of construction. • The contractor is to prepare a Bushfire Ignition Management Plan as a sub plan of the CEMP.	QCC, RFS, OEH	Pre-construction
Road effects on flora and fauna	• A monitoring program would be designed and implemented to determine the effectiveness of the management measures. This would include pre-construction, construction and post construction monitoring programs. • An ecological monitoring program would be developed to determine the success or otherwise of fauna crossings, fencing structures and habitat restoration (e.g. weed management). Monitoring would include fauna crossing monitoring with IR cameras.	QCC	Pre-construction, Construction, Post-construction

Impact	Environmental Safeguards	Responsible Party	Timing
Loss of Platypus and habitat	All practicable measures would be undertaken to minimise the adverse impact on Platypus and its habitat. This would involve liaison with stakeholder groups to develop specific environmental measures. Some practical activities and safeguards that may be applied are: • Timing of construction works would avoid the Platypus breeding season. • Machinery work would be kept away from the water's edge where practicable. • Pre-construction survey to find and close possible Platypus nursery sites. • A barrier (sheet piles) may be installed around the river bank work areas before September to prevent female Platypus from digging a burrow in or near the work site. These would be high enough up the bank to discourage animals from walking around the barriers. • The sites would be monitored.	Contractor	Pre-construction, Construction
	• The Platypus burrow survey should take place before construction begins.	QCC	Pre-construction
Loss of aquatic habitat, impacting platypus, water rats and other fauna	• To provide protective cover in the vicinity of the bridge, native shrubs and ground cover overhanging the water would be retained / planted / regenerated post construction to grow along the banks immediately upstream, under and downstream of the bridge for a distance of at least 20 m in either direction. • Rows of coarse woody debris would be placed parallel to the river under abutments to provide cover for small fauna to pass under the bridge on each side. Final design of these would occur pre-construction.	QCC	Construction, Post-construction

Fauna Crossings

Fauna crossings would facilitate general fauna movement across the roadway corridor. Crossings are required to connect the native bushland isolated west of the EDE and Greenleigh Estate with the high quality and extensive woodland and dry forest habitats to the east including Cuumbean Nature Reserve and its bio links.

SMEC has undertaken a review of potential fauna underpass locations. These crossings need to be in locations where the topography allows underpasses to be engineered (i.e. locations where gulleys are located that allow fill to be placed over the top of suitable sized culverts under the roadway).

Five potential underpass crossing points were identified.

The most northerly location identified is a corridor between Taylor Place and Tennyson Drive, and links the Cuumbuen Nature Reserve with urban open space; however, this location is considered unsuitable because it would allow kangaroos and other wildlife access to the golf course.

The most southern location is in an existing culvert crossing near the Old Cooma Road / EDE / Edwin Lane Parkway intersection. This location was considered a potential crossing because it provides a link between the woodlands south of the Proposal and the Queanbeyan River; however, this habitat is considered highly urbanised and not suitable for large macropods. Smaller native species currently residing in the area have access along the river to other habitat. This location subsequently has not been recommended for inclusion in the project.

The three remaining potential crossing locations consist of two fauna underpass locations at approximately ch1900 and ch2600 that are relatively close together but still provide appropriate biolink connections and an underpass under the northern bridge abutment (Figure 16).

The underpasses are designed to provide passage between habitat areas for reptiles, ground marsupials (e.g. native mice and rats, wallabies, kangaroos and wombats), arboreal marsupials to a lesser extent (e.g. possums) and frogs. The underpasses would comprise dry culverts with rocks and logs, on and above the ground, extending through the culvert for animal refuge. Cleared trees would be used for this purpose. The surface treatment should ideally extend into the natural vegetation on either side of the culvert to provide a safe escape route.

In addition to the underpasses, glider poles with rope bridges suitable for both Gliders and Possums will be installed at suitable locations. The University of Melbourne (2016) squirrel glider study indicated that regular rope bridges along the EDE should be considered. Rope bridges are proposed adjacent to Severne Street and under the Queanbeyan River bridge to specifically target the larger arboreal animal populations isolated by the EDE in these locations.

Glider poles provide take off platforms for gliders, with the poles tall enough for gliders to glide across the road. The poles are considered to be a medium term treatment until planted trees reach a mature height.

A woven box rope bridge design is preferred for the rope bridge, as it provides refuge from predators, e.g. owls and eagles, and allows animals crossing from opposite sides to manoeuvre around each other. The installation of a rope ladder crossing would also bridge the gap between trees on either side of Ellerton Drive. The details of these structures would be confirmed within the finalised Environmental Management Plans.

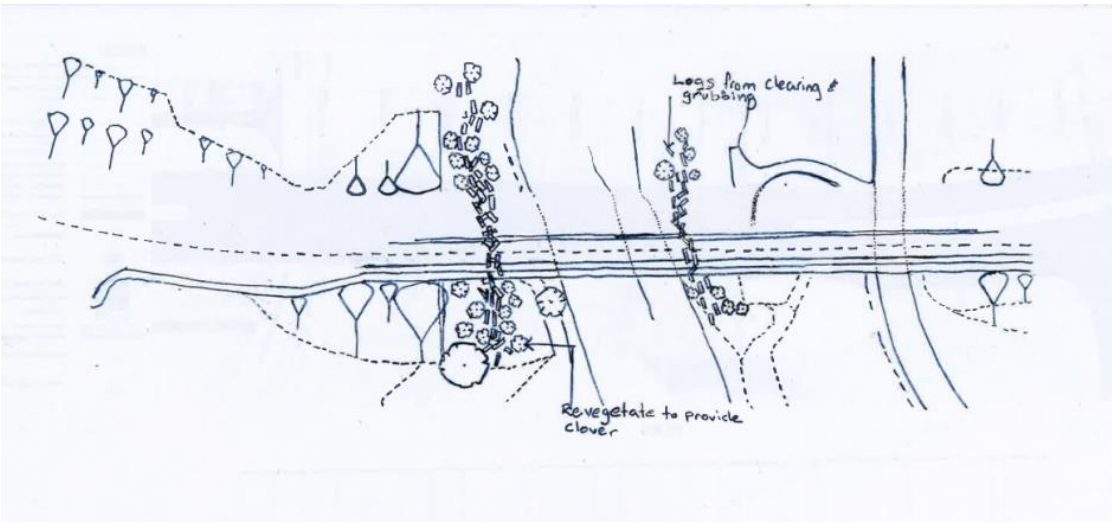

Figure 16. Fauna crossing concept under the EDE bridge over Queanbeyan River.

6.5 Visual and landscape character

6.5.1 Existing environment

Visual and Landscape Amenity

Visual and landscape amenity assessment from QCC / Opus

The northern section of the EDE involves upgrade works to the existing section of Ellerton Drive from number 10 Ellerton Drive to the current road termination. The greenfield construction of the EDE starts at the road termination point and extends south to the Queanbeyan River passing through bush and open grassland. The topography in this area is undulating to steep. The land to the west of the alignment is populated with low density properties surrounded by bush. The land to the east of the alignment is hilly bush connecting to the Cuumbuen Nature Reserve, and open rural grassland, identified for the future land development known as Jumping Creek Estate. The southern section of the alignment from the Queanbeyan River has urban development either side of the road corridor boundary. From ch3500 to the Edwin Land Parkway – Old Cooma Road intersection, the alignment extends south and west over a large crest. The road boundary to the north of this section is adjacent to an urban area. The EDE from ch3840 to the southern road boundary is adjacent to sparsely populated bushland.

6.5.2 Potential impacts on visual and landscape amenity

Introduction

Generally the EDE passes through areas of intact and disturbed native vegetation in a corridor abutting the eastern edge of Queanbeyan City. It passes over the Queanbeyan River in a scenic area that supports riparian vegetation and a unique natural environment set in an urban context. The Cuumbuen Nature Reserve and associated ridge line forms an appealing backdrop to Queanbeyan City and the Proposal potentially impacts negatively on this feature, particularly in regard to the proposed cuttings on the highest ridge lines.

The Proposal would have a temporary adverse impact on visual amenity during construction and a residual adverse impact during the operational phase. It is accepted that there is little that can be done to reduce adverse visual impacts during construction; however, the contractor would be under an obligation in the CEMP to

keep the work site tidy and in good order. Early installation of noise walls where feasible would also assist in reducing the visual impact of the construction works.

Landscaping works for the EDE would help maintain visual amenity. Median strips and roadsides would be revegetated with native grasses, and locally sourced native shrubs and trees would be considered for strategic locations such as around fauna crossings, adjacent to local residences, as buffers to important habitat, e.g. box-gum woodland and to maintain habitat connectivity.

Overall, the EDE would generally have a low to moderate adverse impact on visual amenity for adjacent residential areas, especially after noise walls are installed and screening vegetation (i.e. existing and rehabilitation plantings) recovers and becomes established. The EDE's visual impact will; however, be significant and intrusive in several areas, e.g. the bridge infrastructure over the Queanbeyan River and exposed slopes opposite Taylor Place and Severne Street. These adverse change to the local environment cannot be feasibly mitigated with noise walls or vegetation screens and would be a permanent, long-term feature of the landscape.

Construction

Construction would be visible to adjacent residences. Plant, machinery, materials and construction activities would cause minor, temporary adverse visual impacts. Earthworks and vegetation clearing would also expose subsoil in some areas which would be visible in the landscape.

Excavated moderate to freshly weathered bedrock would require crushing and screening to meet the nominated engineered fill criteria. This crusher would have temporary adverse visual and noise impacts.

Operations

Sides Collective (Sides Collective, 2014) conducted a visual impact assessment for the EDE Proposal. Eight locations were chosen that are likely to be impacted (through various treatments) by the proposed EDE. The locations are as follows and are indicated in Figure 17.

- Location A1: Ellerton Drive (Eastbound)
- Location A2: Ellerton Drive (Westbound) and Geebung Place
- Location A3: Taylor Place
- Location A4: Severne Street
- Location A5: Lonergan Drive, Woodman Place and Pike Place
- Location A6: Rural Property
- Location A7: Doeberl Place
- Location A8: Barracks Flat Drive and Southern Connecting Streets

Noise remediation measures assessed for visual impact are based on the updated recommended noise remediation measures detailed in the *Ellerton Drive Noise and Vibration Assessment Operation and Construction 21 April 2016* (SLR 2016).

Figure 17. Key focus areas for the visual impact assessment (Sides Collective 2014).

An assessment matrix was used to assess the visual impact. It presents three overall rating categories for visual impact – Green (low visual impact), Yellow (moderate visual impact), and Red (High visual impact) (Table 21).

Table 21. Visual impact rating guide.

	Likely Visual Significance to Receivers / End Users					
Likely adverse impact to existing condition		1 Nil Receivers are unlikely to be impacted	2 Low Receivers are likely to experience minor visual impact only	3 Medium Receivers are likely to experience visual impact short term only	4 Medium-High Receivers are likely to experience visual impact long term	5 High Receivers are likely to experience significant visual impact long term
	Low Nil or minor alteration to pre-existing condition	1	2	4	7	10
	Medium Moderate alteration to pre-existing condition	3	5	8	11	13
	High Substantial disturbance with undesirable alternation to pre-existing condition	6	9	12	14	15

The following section provides the assessed visual impact rating, key findings for each location and recommended treatments.

Eastbound (A1)

Assessed Visual Impact Rating 2

Key Findings

- There appears to be sufficient allowance for implementation of expansion within the current streetscape due to the existing configuration. Any changes proposed to the road are likely to have minimal visual impact.
- Existing advanced tree stock (e.g. trees within verges) are generally in good health and are unlikely to be adversely impacted by proposed road works.

- Other existing plantings (e.g. *Lomandra* planting in central median) are likely to be adversely impacted by general road works; however, these have relatively low significance and are readily replaceable.

Recommended Treatment:

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA1	2.4	13[2]	TBA	Property Boundary
	3.0	348[3]	Concrete	
	3.6	151[4]	Concrete	

1. Approximate
2. Wrap around section along property boundary of 61 Thomas Royal Gardens
3. From 6 Patrick Brick Court to 37 Thomas Royal Gardens
4. From 37 Thomas Royal Gardens to 61 Thomas Royal Gardens

A1 Noise Walls

Assessed Visual Impact Rating 7

Key Findings

- The introduction of proposed noise walls up to 3.6 m high does not represent a significant change / impact to existing boundary conditions. The increase in height along the residential boundary result in a typical 1 m increase above existing fence levels.

  Much of the existing boundary fence (timber paling) is in disrepair. New concrete noise walls are proposed in line with the urban character of the neighborhood. Noise wall implementation is likely to have a positive effect on general aesthetics and streetscape consistency pending the final design, material selection, and associated landscape works.

Westbound and Geebung Place (A2)

Assessed Visual Impact Rating **5**

Key Findings

- There appears to be sufficient allowance for implementation of expansion along Ellerton Drive within the current streetscape. Due to the existing configuration, any changes proposed to the road are likely to have minimal visual impact. The current streetscape is nondescript and lacks general character creating little risk of significant adverse visual impact.
- Other existing plantings along Ellerton Drive (e.g. *Lomandra* planting in the central median) are likely to be adversely impacted by general road works; however, these have relatively low significance and are readily replaceable.

  The eastern fringe, as viewed from Geebung Place, is characterised by a dense woodland / bush setting, with evidence of slight disturbance due to fences and overhead power lines. Given the proposed road alignment, the existing topography and vegetation would limit the visual impact upon receivers to a low level (if any).

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA2	2.4	206[2]	Concrete	Property Boundary
	2.4	118[3]	Concrete	

1. Approximate
2. West of Tennyson Drive
3. East of Tennyson Drive

A2 Noise Walls

Assessed Visual Impact Rating **7**

Key Findings

- The introduction of proposed noise walls up to 2.4 m high does not represent a significant change / impact to the existing boundary condition. The increase in height along the residential boundary would vary 0.5-1 m above existing fence levels.
- Much of the existing boundary fence (timber paling) is in disrepair or varies in consistency. New concrete noise walls are proposed in line with the urban character of the neighborhood. Noise wall implementation is likely to have a positive effect on general aesthetics and streetscape consistency pending the final design, material selection, and associated landscape works.

Taylor Place (A3)

Assessed Visual Impact Rating

Key Findings **14**

- The proposed road alignment is situated on the opposite side of the valley to the residential blocks, creating the potential for high adverse visual impact to the majority of receivers.
- The proposed works include a significant length of fill batter which is likely to be within range of receiver (majority) viewpoints.
- There is a large cut batter proposed adjacent the property in the south-east corner of A3, where the proposed road comes in close proximity and approaches a ridgeline. A portion of which is likely to be within receiver viewpoints.
- Due to the extent of proposed cut and fill batters, disturbance to existing vegetation is likely to require extensive clearing to allow for construction. This is likely to create a high adverse visual impact with detriment to current amenity in the short and long term pending amelioration and mitigation measures, and other design considerations.
- Due to the native woodland character surrounding the proposed road alignment, artificial measures of screening the road are considered unreasonable.

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA3	2.4	476	Timber Infill	Outside Shared Pathway

1. Approximate

A3 Noise Walls

Assessed Visual Impact Rating **14**

Key Findings

- Continuous noise walls are proposed along the shared pathway adjacent to the EDE on the opposite side of the valley to local residences.
- The introduction of proposed noise walls up to 2.4 m high would help screen local residences from the EDE and potential noise but the noise walls themselves would have significant adverse visual impacts on existing woodland views therefore reducing visual amenity for residents.
- Existing woodland and revegetation along the EDE between the local residences and noise walls may, in time, help screen the noise wall and reduce their adverse visual impact.
- The noise wall proposed timber construction is designed to blend in with the woodland surrounds and would further mitigate the adverse visual impact.

Severne Street (A4)

Assessed Visual Impact Rating **12**

Key Findings

- The proposed road alignment is situated in undulating terrain, creating the potential for moderate to high adverse visual impact intermittently from receiver viewpoints.
- The proposed works include a series of cut and fill batters in sequence, as the alignment passes through the existing topography. Due to the extent of proposed cut and fill batters, disturbance to existing vegetation is likely to require extensive clearing to allow for construction. This is likely to create a moderate adverse visual impact detrimental to current amenity in the short term pending amelioration and mitigation measures, and other design considerations.
- The existing topography and dense native vegetation would aid in screening the proposed alignment somewhat from receiver viewpoints. Visual impacts are likely to be mitigated upon reinstatement of landscape character pending amelioration and mitigation measures, and other design considerations.
- Due to the native woodland character surrounding the proposed road alignment, artificial measures of screening the road are considered unreasonable pending consideration of design options.

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA4	2.4	299	Timber Infill	Property Boundary

1. Approximate

A4 Noise Walls

Assessed Visual Impact Rating **15**

Key Findings

- Noise walls are proposed along the rear property boundary of 4 residences on Severne Street.
- The introduction of proposed noise walls up to 2.4 m high would help screen local residences from the EDE and potential noise but the noise walls themselves would have significant adverse visual impacts on existing woodland views therefore reducing visual amenity for residents.
- A woodland buffer would remain between the noise wall and the EDE; trees therefore would be visible over the top of the noise wall.
- The noise wall proposed timber construction is designed to blend in with the woodland background and would further mitigate the adverse visual impact, although a significant adverse visual impact would still remain.

Lonergan Drive, Woodman Place and Pike Place (A5)

Assessed Visual Impact Rating **13**

Key Findings

- The proposed road alignment is situated amongst undulating terrain, creating the potential for moderate to high adverse impact upon the existing condition intermittently from receiver viewpoints.
- New property allotments are present at the end of Pike Place. Development and subsequent clearing of vegetation on these properties may affect the outcome of this VIA from some viewpoints with re-assessment potentially required pending scheduling / stage of works.
- The proposed works would generally follow existing topography with introduction of moderate fill batters in parts. Given the typically cleared character surrounding the alignment, areas of native vegetation are unlikely to be adversely impacted by the proposed works and therefore have a reduced impact on visual amenity.
- Existing disturbance through dirt tracks and fences creates an interrupted landscape. Therefore the adverse impact upon the existing condition is reduced, in comparison to more disruptive works elsewhere along the proposed road alignment.
- The proposed bridge over the Queanbeyan River and bridge abutment to the south east of Lonergan Drive is likely to have a high level of adverse impact to houses along Lonergan Drive, particularly the residences from 29 to

35 Lonergan Drive, upon the existing condition. Vehicle lighting, particularly headlights of vehicles traveling in a north easterly direction, would also be an adverse addition to the nighttime environment.

- Residential housing in Karabar does provide a backdrop to the new bridge; therefore the structure would be imposed on a largely built environment. Existing native vegetation and rehabilitation plantings are likely to partly screen the bridge approaches; however, complete mitigation of the bridge's adverse visual impact is not feasible

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA5	4.2	109	Timber Infill	Outside Shared Pathway

1. Approximate

A5 Noise Walls

Assessed Visual Impact Rating **11**

Key Findings

- Continuous noise walls are proposed along the shared pathway adjacent to the EDE from the bridge abutment to Lonergan Drive.
- The introduction of proposed noise walls 2.4 m high would help screen local residences from the EDE and potential noise.
- The proposed noise wall timber construction is designed to blend in with the woodland surrounds, and a woodland buffer would remain between the noise wall and the properties. The noise walls themselves would have moderate adverse visual impacts on existing woodland views therefore reducing visual amenity for residents.
- Existing vegetation and planted revegetation along the EDE between the local residences and noise walls may, in time, help screen the noise wall and reduce their adverse visual impact.

Rural property (A6)

Assessed Visual Impact Rating **14**

Key Findings

- The proposed road alignment performs a sweeping curve adjacent to the property within close proximity, creating the potential for high visual adverse impact to the receiver(s).
- As the property is situated near the external curvature of the proposed road, there is potential for high adverse visual impact via elongated views of the road corridor as it extends to the north and south-west.
- The proposed works include fill batters in sequence adjacent the property as the alignment passes through the existing topography. Due to the extent of proposed fill batters, disturbance to existing vegetation is likely to require extensive clearing to allow for construction. This is likely to create a high

adverse visual impact with detriment to current amenity in the short and long term pending amelioration and mitigation measures, and other design considerations.

- The existing topography and dense native vegetation would aid in screening the proposed alignment somewhat from receiver viewpoints. Visual impacts are likely to be mitigated upon reinstatement of landscape character pending amelioration and mitigation measures, and other design considerations.
- Due to the native woodland character surrounding the proposed road alignment, artificial measures of screening the road are considered unreasonable pending consideration of design options.
- Amelioration works specific to the one property are unlikely to be feasible.

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA6	n/a	n/a	n/a	n/a

Doeberl Place / Barracks Flat Drive East of the EDE (A7)

Assessed Visual Impact Rating **15**

Key Findings

- The new bridge and bridge abutment would be immediately adjacent housing either side of Barracks Flat Drive. Approximately ten houses would view the underside and side of the bridge as it passes above and to the west. The bridge would be imposed on the more natural forested northern river bank and be a major change to the existing viewscape. The elongated view north along the proposed alignment has the potential for greater adverse visual impact at night when vehicle headlights contrast with the darker background.
- While the bridge itself may be relatively aesthetically pleasing, mitigating its presence in the landscape for the local residences is not feasible.
- The proposed road alignment in reserved land immediately to the west of Doeberl Place, presents a lower risk of visual impact. Whilst there would be a moderate alteration to the existing condition, this is not considered to be of visual significance as the reserved land currently offers little visual amenity or remnant native vegetation. The current state of the reserved land is fairly unkempt with end user access at a minimum or not permitted. Additional residential housing and boundary fencing already forms a modified backdrop to the narrow corridor of reserve land.
- The proposed works include fill batters predominantly servicing the proposed bridge abutment. Due to the elevated location of most receiver dwellings, fill batters to the lower slopes are likely to have low adverse visual impact.
- Due to the suburban character, artificial measures of screening the road may be considered acceptable in this circumstance pending consideration of design options and community consultation.

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA7	4.2	345	Concrete	Road Shoulder outside Kerb
	2.4	55	TBA	Southeast side of bridge

1. Approximate

A7 Noise walls

Assessed Visual Impact Rating **11**

Key Findings

- Continuous noise walls are proposed at the road shoulder outside the kerb from the bridge abutment to the junction with the southbound onramp. A 55 m long noise screen attached to the western side of the bridge is also proposed.
- The introduction of proposed noise walls up to 4.2 m high would help screen local residences from the EDE and potential noise but the noise walls. Whilst there would be a moderate alteration to the existing condition, this is not considered to be of visual significance as the reserved land currently offers little visual amenity or remnant native vegetation and the backdrop across the narrow corridor of reserve land is already modified.
- The adverse visual impact on views extending out from dwellings is likely to be low to moderate due to the limiting of potential views across the southbound onramp to open grassy woodland by the higher noise walls.
- The existing boundary fences are a mix of colorbond and timber paling fences. New concrete noise walls are proposed in line with the urban character of the neighborhood. Noise walls located along road shoulder would have little effect on providing streetscape consistency due to its distance from the property boundaries.

Barracks Flat Drive West of the EDE and Southern Connecting Streets (A8)

Assessed Visual Impact Rating 8

Key Findings

- The new bridge and bridge abutment would be immediately adjacent housing on Barracks Flat Drive and less so on River Drive. Approximately five houses would view the underside and side of the bridge as it passes above and to the east. The bridge would be imposed on the more natural forested northern river bank and be a major change to the existing landscape. The elongated view north along, the proposed alignment, has the potential for greater adverse visual impact at night when vehicle headlights contrast with the darker background.
- The proposed road alignment in reserved land immediately adjacent to Barracks Flat Drive, presents a lower risk of adverse visual impact. Whilst there would be a moderate alteration to the existing condition, this is not considered to be of visual significance as the reserved land currently offers little visual amenity or remnant native vegetation. The current state of the

reserved land is fairly unkempt with end user access at a minimum or not permitted. Additional residential housing and boundary fencing already forms a modified backdrop to the narrow corridor of reserve land.

- As the road extends towards its terminus, i.e. connecting with Edwin Land Parkway, the landscape character transitions into open grassy woodland of moderate disturbance (e.g. fences, trails and erosion are present). Road works through the open grassy woodland (south-west end) are likely to create a moderate to high adverse visual impact for bush walkers; however, the adjacent bushland in this area is privately owned and continued bush walking access will be discouraged. Moderate adverse visual impact is likely for receivers within southern connecting streets (off Barracks Flat Drive) when adjacent to proposed clearing of native vegetation.
- Due to the suburban character, artificial measures of screening the road may be considered acceptable in this circumstance pending consideration of design options and community consultation.

Recommended Treatment

Area	Barrier Height, m	Barrier Length[1], m	Barrier Type	Wall Location
NCA8(A)	4.2	491	Concrete	Outside Shared Pathway
NCA8(B)	4.2	547	Concrete	Outside Shared Pathway

1. Approximate

A8 Noise Walls

Assessed Visual Impact Rating 11

Key Findings

- QCC is proposing noise walls along the outside of the shared pathway along EDE up to 4.2m high.
- The introduction of proposed noise walls up to 4.2 m high would help screen local residences from the EDE and potential noise.
- Much of the existing boundary fences are a mix match of timber paling and colorbond fences, often in disrepair. New concrete noise walls are proposed in line with the semi-urban character of the neighborhood. Noise wall implementation is likely to have little effect on general aesthetics and consistency, as users would be primarily based in single dwellings.
- A limited woodland buffer would remain between the properties and the noise wall; trees therefore would be visible between the property fences and the noise wall.
- The adverse visual impact on views extending out from dwellings is likely to be low to moderate due to the limiting of potential views to open grassy woodland by the higher noise walls. The residences nearer the Queanbeyan River are opposite a similar residential subdivision, while those residences nearer Old Cooma Road are adjacent to fragmented grassy woodland but generally look towards their immediate road frontage.

6.5.3 Safeguards and management measures

Table 22 presents the visual and landscape amenity environmental safeguards.

Table 22. Visual and landscape amenity environmental safeguards.

Potential Impact	Environmental safeguards	Responsible Party	Timing
Failure of landscaping	• Revegetation should take place in early autumn, giving grass and strategic plantings time to establish before the summer heat. • In excessively dry conditions, grass and planted stock would be watered manually. • Revegetated areas would be monitored, and bare grass patches and failed plantings would be replaced after one year.	QCC	Construction, Post construction
General Visual amenity	• Final construction design and management for proposed works would maximise the retention and protection of all existing verge trees. • The landscaping plan would be reviewed and refined as necessary during pre-construction to ensure adverse visual amenity impacts, as identified in the visual impact assessment, may be mitigated to the greatest extent. • Construction practices would also have a focus on minimising disturbance to existing native vegetation and soils. This may include considerations / investigations of road gradients and edge treatments (for example) to minimise the extent of disturbance due to cut and fill batters. • Final design and construction practices specific to the bridge abutment would focus on minimising disturbance to existing native vegetation, especially within the riparian corridor. • Other visual design features should be considered to minimise impact such as intermittent screening to reduce overall adverse visual impact.	Design team, QCC	Pre-Construction, Construction
Visual amenity due to the installation of a noise barrier	• Supplementary plantings may be considered in strategic locations between noise walls and residences to improve the general amenity of the road and filter screen the noise walls.	Design team, QCC	Construction

6.6 Lighting

6.6.1 Existing environment

The Proposal links the existing Ellerton Drive in East Queanbeyan to the existing intersection at Edwin Land Parkway and Old Cooma Road in Karabar. The site of the proposed road is located to the east of Queanbeyan. To the east of the proposed road there is generally undeveloped land and the Cuumbuen Nature Reserve. To the west is mainly suburban and low density housing.

The existing section of Ellerton Drive has existing street lighting from ch0 - ch700; however, this lighting does not comply with the required Category V3 standard lighting levels. Street lighting along Ellerton Drive and the intersections of the EDE and Old Cooma Road will therefore be upgraded for consistency and to meet lighting regulations. New street lighting will also be installed at the intersections at 74 Barracks Flat Road and at the future Jumping Creek Estates.

6.6.2 Potential lighting impacts on the environment

SLR Consulting Australia (SLR) conducted a qualitative lighting assessment of the Proposal (SLR, 2015). SLR found that there may be some potential for light spill from the proposed EDE lighting at the Barracks Flat intersection

Current EDE designs show the EDE beyond the existing Ellerton Drive section, between the proposed intersections described earlier and over the new Queanbeyan River Bridge will not have any lighting. Light spill, other than from vehicles, would therefore be relatively localised and downward facing to minimise light spill even further.

Proposed lighting for the EDE would be modelled and the light levels on potentially affected residences would be calculated during the detailed design phase.

Temporary lighting may be used during construction; however, most construction activities should be undertaken during the day. Works outside standard hours where lighting is required would be kept to a minimum. Security lighting, if necessary, for compounds will also be sited to minimise light spill on the surrounding environment.

6.6.3 Safeguards and management measures

Table 23 presents lighting environmental safeguards.

Table 23. Lighting environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Poor lighting along Ellerton Drive	• Lighting upgraded to the appropriate regulatory standard, i.e. Category V3.	Design team	Pre - construction
Night works with potential light spill	• Most works would be carried out during the day (7am-6pm). Only in exceptional circumstances will there be evening works during (6pm-10pm) to minimise lighting requirements.	Contractor	Construction
Night works with potential light spill	• Construction timetabling, particularly for works outside standard hours, would aim to minimise the need for lighting.	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	Measures may include time and duration restrictions and respite periods.		
Light spill from security lighting	• Minimise the need for security lighting, minimise the lighting used and direct lights away from sensitive receptors.	Contractor	Construction
Lighting along the EDE adversely affecting local residents and Platypus	• Lighting would be restricted to major intersections and feature directional lighting to minimize light spill on the surrounding areas.	Design team	Pre - construction
	• The new Queanbeyan River Bridge would not have any fixed lighting therefore Platypus disturbance would be minimised.	Design team	Pre - construction

6.7 Geology, soils and water

6.7.1 Existing environment

Geology

Fieldwork for the geotechnical investigation (Coffey, 2014) was carried out between 28 May and 6 June 2014 and comprised the investigation of the proposed route alignment, the Queanbeyan River bridge crossing and a pavement investigation of an existing portion of Ellerton Drive. The investigation comprised drilling 17 boreholes to a target depth of approximately 1 m below the proposed final cut level ranging from 3 m to 9.3 m and the excavation of 65 test pits to a target depth of 3 m or prior refusal on bedrock along the proposed route alignment. The main geotechnical units within the investigation area were topsoil, fill, colluvium, residual soil, alluvium, and bedrock of the Pittman Formation, Barracks Creek Formation and Colinton Volcanics.

Groundwater

The geotechnical investigation did not find ground water along the alignment. This suggests the substrates are very porous. On this basis, it is understood little or no adverse impact on local hydrology would result from the proposed road development.

Surface water

The proposed EDE crosses undulating to steep topography with large cuts and fill required to create a safe and easily navigable alignment. Three main ephemeral drainage lines are crossed by the proposed construction site.

Overland flow paths cross the proposed alignment requiring extensive cross drainage to prevent localised flooding. Drains deliver intercepted water at regular intervals back into the natural drainage lines in accordance with guidelines, as discussed below.

Soil characteristics

The northern half of the site between Ellerton Drive and a point about 400 m north-east of Lonergan Drive occurs on relatively steep and dissected terrain with skeletal soils derived from Ordovician metasiltstone. The southern half is underlain by metamorphosed sedimentary rocks. The soils for the study area include lithosols and alluvial, residual and colluvial deposits. Small bedrock outcrops are sparsely

distributed across the site. Figure 18 shows the erosion potential of soils on the site particularly in the northern section.

Figure 18. Soil erosion in the northern section of the EDE alignment.

6.7.2 Potential impacts on soil and water environments

Construction activities would require clearing of vegetation and excavation, which would expose soils to a risk of erosion. The fine grained soils (clays) at the site are likely to become disturbed and soften when exposed and subjected to wetting.

There could be a risk of pollution from spillage of hazardous materials such as oil and fuel. This could cause localised soil contamination or off-site impacts to receiving waters.

Run off from the road could reduce water quality in water ways and the river by introducing sediment, rubbish, oil and other pollutants. Gross pollutant traps, sediment traps and stormwater treatment ponds would help maintain the water quality in the Queanbeyan River.

6.7.3 Safeguards and management measures

Table 24 presents geology, soil and water environmental safeguards.

Table 24. Geology, soil and water environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Project approval	• Environmental Protection License	Principal / Contractor	Pre-construction
Mobilisation of fine and weakly bound soils and sediments	• Erosion and sediment control measures would be implemented and maintained in accordance with the managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book).	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Sedimentation and degraded water quality from erosion of excavated material	• An erosion and sediment control plan would be prepared prior to construction.	Contractor	Pre-construction
	• The EPA would approve the erosion and sediment control plan prior to construction works starting.	QCC	Pre-construction
	• The erosion and sediment control plan would be reviewed regularly and revised as required. • Erosion and sediment control measures would be implemented and maintained in accordance with the *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book). This would include regular monitoring and maintaining of the site until work is complete. • Disturbed areas would be progressively stabilised and rehabilitated as far as practicable during the works.	Contractor	Construction
Surface water disruption	• Scour protection has been provided in the design for pavement drainage discharges into open drains via a batter chute, dumped rock, riprap, aprons, using open grass as much as possible to aid in pollution protection. • Scour protection has been provided where the velocity of flow in drainage pipe outlets is more than 1.7 m/s in a 50 year ARI rain event. • Inlet protection would be provided where required in accordance with RMS standard drawings. • Cut batters designed at no greater than 2:1 with drains diverting water from crests of batters. • Trees felled during construction would be mulched and placed as mounds to filter water, protect swales and to achieve reasonable quality run-off. Trees not required for this would be disposed of offsite.	Design team, Contractor	Construction
Soil contamination or pollution of receiving waters from spillage of hazardous materials	• No hazardous materials would be stored on site as far as practicable. • Any hazardous materials stored on site would be kept in a secure bunded area. • Any transfer of fuels and other hazardous materials would be	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	undertaken in a designated bunded location. • Spill containment kits matched to the volumes and chemicals being stored would be kept on site during construction. • Construction personnel would be trained in use of spill containment kits. • Site induction would include identification of the location and use of the spill containment kit.		
Soil and water pollution from road run off	• Run off from Queanbeyan River bridge and approach roads to discharge into stormwater system and its sumps, rather than directly into the river. • Protection has been provided for pavement drainage discharges into open drains via batter chutes, dumped rock, riprap, aprons and open grass swales to aid in pollution protection.	Designer	Pre-construction, construction

6.8 Air quality

6.8.1 Existing environment

The majority of the EDE alignment is on undeveloped or previously cleared bushland. Despite the urban nature of these locations, the low level of industry and the nature of the area means that air quality in the area is high and is similar to most regional areas. Areas that may already be adversely impacted in a minor way are Ellerton Drive, Edwin Land Parkway and River Drive; however, the level of pollutants generated is expected to be too low to cause any health, amenity or environmental problems.

Construction-related air quality impacts associated with the Proposal area would primarily be associated with dust generation and mobilisation. Dust mobilisation has the potential reduce visual amenity when settling on properties and may cause general discomfort for the surrounding community. The main activities that may cause dust generation include crushing and milling of excavated material, clearing of vegetation, mobilisation of exposed soil and general earthworks. Vehicle access to the construction compound site may also cause airborne dust.

The amount of dust generated by construction of the Proposal would depend on the soil silt and moisture content, the types of activities undertaken, and the implementation of appropriate safeguards and management measures.

Construction of the Proposal would also cause exhaust emissions from construction vehicles, plant and machinery.

Once operational, the Proposal could cause increased air pollution from vehicle using the road. Over time, traffic is expected to increase along the road; however, the Proposal would cause operational efficiencies through reduced congestion and improved flow across the Queanbeyan area. This would reduce vehicle emissions from

reduced start/stop motoring, particularly in the Queanbeyan CBD which currently experiences congestion.

6.8.2 Safeguards and management measures

Table 25 presents air quality environmental safeguards.

Table 25. Air quality environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Construction air quality	• Appropriate measures, such as watering or covering exposed areas, would be used to minimise or prevent air pollution and dust, and would be described in the air quality /dust management sub plan of the CEMP. • Works would not be carried out in weather conditions when high levels of dust or air borne particulates would be produced. • Vegetation or other materials would not be burnt on site. • Vehicles transporting waste or other materials that may produce odours or dust would be covered during transportation. • Stockpiles or areas that may generate dust would be managed to suppress dust emissions in accordance with the RMS's Stockpile Site Management Guideline (2011). • The construction site compound would be established and operated to minimise emissions.	Contractor	Construction

6.9 Non-Aboriginal heritage

6.9.1 Existing environment

Cultural Heritage Management Australia (CHMA) assessed the project area in 2012, to determine the impact of the Proposal on European heritage items (Cultural Heritage Management Australia, 2012).

An initial desktop assessment was undertaken to determine whether the Proposal would be likely to harm European heritage items, and whether further assessment would be required. This involved searches of:

- Australian Heritage Database (AHD), including:
  - The World Heritage List
  - The National Heritage List
  - The Commonwealth Heritage List
  - The Register of the National Estate
- The State Heritage Inventory;

- National Trust of Australia (NSW) register;
- A review of literature and reports from the area.

No historic sites were identified within the EDE road alignment from the desktop study or the site investigation. The Queanbeyan LEP identifies two historically significant sites within the broader area; the Marchiori's Lime Kiln and Quarry and the White Rocks Limestone Kilns, however these are well outside of the proposed road alignment.

6.9.2 Potential impacts on Non-Aboriginal heritage

It is not expected that the Proposal would have any direct or indirect impacts on listed heritage items. However, there is a duty of care imposed under the *Heritage Act 1977* with respect to protection of relics. The Jumping Creek area was historically a site for mining, quarrying and agriculture, and there is potential for unknown historical sites to occur within the Jumping Creek section of the EDE alignment.

6.9.3 Safeguards and management measures

Table 26 presents heritage environmental safeguard.

Table 26. European heritage environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Unexpected impacts on non-Aboriginal heritage values	• Should archaeological material be unexpectedly uncovered during construction, an *Unexpected Archaeological Finds Procedure* would be followed.	Contractor	Construction

6.10 Aboriginal heritage

6.10.1 Existing environment

CHMA assessed the project area in 2012 to determine the impact of the Proposal on Aboriginal heritage items (Cultural Heritage Management Australia, 2012). The report is summarised below.

An initial desktop assessment was undertaken to determine whether the Proposal would impact on Aboriginal cultural heritage, and whether further assessment would be required. This involved searches of:

- NSW Aboriginal Heritage Information Management System (AHIMS) on the 20 June 2012
- Australian Heritage Database (AHD), including:
    - The World Heritage List
    - The National Heritage List
    - The Commonwealth Heritage List
    - The Register of the National Estate
- Native Title Tribunal on the 20th June 2012
- A review of literature and reports from the area

The AHIMS search identified eight sites within 100 m of the proposed EDE route. A further 60 sites were identified within the broader area from the AHIMS search and a review of background literature.

A site survey was conducted on 2 August 2012 and included representatives from five Aboriginal groups. Three previously identified sites, all low-density artefact scatters, were re-located. Four of the sites could not be relocated due to increased ground cover; the remaining recorded site had been previously destroyed. An additional six previously un-recorded, low-density artefact scatters were identified.

Two sites were identified as forming part of a single large open artefact scatter extending across a broad ridge crest. The site shows the same range of raw materials and artefact classes as have been identified elsewhere in the region; however, its size is relatively unusual in the area. The remaining four of these sites were of low scientific significance and had low conservation values, on the grounds that these sites showed the same range of raw materials and artefact classes as had been identified elsewhere in the region. It is also likely that a low-density spread of artefacts is present beneath the vegetation within the proposed road corridor.

6.10.2 Policy setting

During the current investigations, no heritage items listed for indigenous values under the NSW *Heritage Act 1977*, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, EPBC Act or the *Australian Heritage Council Act 2003* were identified; however, the Aboriginal sites and objects within the alignment are protected under the NSW *Parks and Wildlife Act 1974*.

A process of Aboriginal community consultation for this project was undertaken in 2012 in accordance with the requirements for Aboriginal community consultation outlined by the OEH (DECCW 2010). This process was undertaken for a second time in September / October 2014, due to the amount of time elapsed between the initial survey and consultation period, and the current development. The two consultation periods resulted in seven different representatives for the Aboriginal community registering interest in the project. Comments on the method for the management of adverse impacts on heritage sites within the development area have been received; however, the period for comment is still open. These comments would be incorporated into the documentation for the final AHIP permit.

6.10.3 Potential impacts on Aboriginal heritage

The proposed EDE would cause direct harm to the Aboriginal sites located within the road corridor.

6.10.4 Safeguards and management measures

Table 27 presents Aboriginal heritage environmental safeguards.

Table 27. Aboriginal heritage environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Disturbance of identified Aboriginal heritage sites	• The proponent must obtain a S90 Aboriginal Heritage Impact Permit (AHIP) from the OEH in consultation with the registered Aboriginal parties. The AHIP should be obtained over the entire impact area to address s86(2) requirements of the NP&W Act and the management measures.	QCC	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	• Conditions of the AHIP would be adhered to.		
Disturbance of unidentified Aboriginal cultural heritage	• The site induction is to include a cultural awareness element and reference to responsibilities and obligations under the NP&W Act. • The induction must clearly state that all vehicular travel must be limited to within the surveyed corridor to minimize risks of adversely impacting sites outside the easement, and outline the OEH penalties that can be imposed for knowingly or unknowingly disturbing heritage sites. • Should Aboriginal material be unexpectedly uncovered during construction, the *Unexpected Archaeological Finds Procedure* would be followed.	Contractor	Pre-construction, Construction

6.11 Climate change and greenhouse gases

6.11.1 Policy setting

Climate change predictions for south east Australia include temperatures up to 3ºC warmer, decreased winter rainfall, reduced snow cover in the alps, and more severe impact of the El Niño–Southern Oscillation (QCC, 2012). In response to these predictions, QCC has prepared a Climate Change Action Plan (2012). The Plan aims to establish a context and background for climate change issues in Queanbeyan and identify actions that both QCC and the community can take. The focus of the actions is on positive measures that would have benefits for a wide range of community members as opposed to just focusing on reducing greenhouse gas emissions.

The action plan includes transport actions. Specific to the EDE Proposal is: “Seek funding from other levels of government for road upgrades and allocate some Council funds”. This action aims to result in redirection of traffic away from the main street of Queanbeyan, and upgrades to improve flood access over the Queanbeyan River. Reducing congestion in the CBD would reduce greenhouse gas emissions, ultimately improving quality of life. The construction of a cycle lane along the EDE would also satisfy the requirements of the Climate Change Action Plan by making cycling an easier and safer option than currently exists.

6.11.2 Potential impacts

Climate change

Climate change has the potential to result in warmer temperatures, increased sea level and increased storm intensity (IPCC, 2007). The future road should be designed to appropriate standards to withstand storm intensities likely to occur. Expected impacts of climate change in the south east region include:

- Expected increases to the mean daily maximum and minimum temperature of between 1°C and 3°C by 2050 which could cause damage to infrastructure.

- Increased maintenance costs of infrastructure, as materials may need to be replaced more often (possibly with more resilient products).
- Up to 50% increase in summer rainfall, which may affect the existing stormwater system and flood event size or frequency.
- Bridge height design considers the latest flood data to ensure safe passage during 1 in 100 year flood levels and up to a possible 1:2000 year flood event.

Erosion control measures must take into account the possibility of increased storm events.

The potential impacts of climate change on the Proposal have been managed by adapting design standards considered necessary to reduce the vulnerability of infrastructure to predicted effects. The Proposal improves the resilience of Queanbeyan City's infrastructure to flood by providing a flood free route over and above the 1% ARI (100 year flood level).

The large scale removal of forest in the south east region would have an impact on climate change by reducing the amount of carbon dioxide from the atmosphere that has been stored in the forest ecosystem; however, the removal of 49.6 ha of native vegetation would have a minimal adverse impact on any climate change scenario. Nonetheless, safeguard measures such as habitat restoration and offsetting would assist in the reducing any impacts the Proposal may have on human induced climate change.

Greenhouse gases

There would be additional greenhouse gas produced from the production and use of the road. Road construction would cause the emission of greenhouse gases from the following*:*

- Embodied energy in construction materials, including concrete
- Fuel used by vehicles, plant and machinery
- Emissions associated with any electricity use
- Emissions increase due to vehicle use of the road.

Despite this, reduced greenhouse gas emissions have been identified as a potential benefit of the project primarily based on reduced fuel consumption; however, this is yet to be quantified. Reduced congestion in the Queanbeyan CBD, along with more efficient, free flowing traffic along the EDE, is expected reduce overall greenhouse gas emissions for the Queanbeyan region over and above a 'do-nothing' response. Queanbeyan is also delivering a public transport and cycling plan which as part of an overall strategy is expected to reduce greenhouse gases on a per capital basis.

6.11.3 Safeguards and management measures

Table 28 presents climate change environmental safeguards.

Table 28. Climate change environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Greenhouse gas emissions	• Plant and equipment would be switched off when not in use where practicable.	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	• Vehicles and construction equipment would be properly maintained so as to achieve optimum fuel efficiency. • Waste management sub plan would ensure recycling and reuse of construction by-products saving on energy production. • Vegetation clearing would be minimised. • Revegetation with potential to re-absorb CO_2 emissions.		

6.12 Waste management

6.12.1 Potential impacts

Construction of the EDE would cause the production of waste materials. These may cause pollution and contamination of the landscape, soils or waterways and reduced amenity of the area. The likely sources of waste due to the Proposal include:

- Asphalt from existing pavement
- Excavated spoil unsuitable for reuse on site
- Concrete rubble from kerbing, drainage pipes, etc.
- Cleared vegetation
- General garbage and refuse.

There would be no operational issues with regard to waste management related to the Proposal.

6.12.2 Safeguards and management measures

Table 29 presents waste material environmental safeguards.

Table 29. Waste material environmental safeguards.

Impact	Environmental safeguards	Responsible Party	Timing
Waste generation from construction activities.	Waste would be managed using the following hierarchy of control: • Waste avoidance and/or waste reduction • Waste reuse, recycling and reclamation • Waste treatment • Waste disposal To ensure waste minimisation: • Order appropriate quantities of materials • Control quality of materials supplied to site to reduce re-work and problems due to quality • Use recycled materials if the quality and costs are comparable	Contractor	Construction

Impact	Environmental safeguards	Responsible Party	Timing

	• Use prefabricated materials where possible (e.g. pits, end walls)
	• Re-use topsoil on-site
	• Provide appropriate size and type of waste disposal bins or containers for site
	• Ensure waste is contained in bins or waste areas in high winds or rain events
	• Keep all adjacent public roads, footpaths and areas clean and free of debris by washing or cleaning
	• All waste would be treated in accordance with the *RMS Environmental Procedure Management of Wastes on Roads and Maritime Services Land* (RMS 2014a)
	• All noxious weeds and exotic plant species removed would be disposed of at a licensed landfill facility
	• Surplus soils and wastes generated from the Proposal would be reused or disposed of according to their classification
	• A waste register would be used to record the details of all waste leaving the site, including:
	  ○ Waste type and classification
	  ○ Waste volume
	  ○ Receptacles for storing waste
	  ○ Who is transporting the waste
	  ○ The destination of the waste and whether it is to be reused, recycled or disposed of
	Where putrescible waste is encountered on site, the superintendent shall be notified. Putrescibles and other waste encountered or generated shall be contained to prevent odour emissions, the generation of windblown litter, and birds or animals spreading or disturbing the litter. Any contaminated water associated with the waste shall be contained, extracted and treated prior to disposal.		

6.13 Contamination

6.13.1 History

Contaminated soils can occur at a site due to past land uses, including agricultural chemical use, landfill, mining or existing structures, or as natural soils such as acid sulphate soil.

The Jumping Creek Site, adjacent and slightly overlapping with the proposed EDE site, has been assessed for contamination (Environmental Strategies, 2010; Coffey Environments Pty Ltd, 2010; Coffey Environments Pty Ltd, 2009).

Potentially contaminating activities that have occurred at this site in the past include:

- Pastoral activities, including one identified sheep dip
- Mining for the extraction of lead, copper, zinc and possibly gold
- Possible minerals processing activities
- Limestone quarrying and lime processing in a kiln

6.13.2 Potential impacts

A Preliminary Site Investigation (PSI) of the proposed EDE was undertaken (SMEC Australia, 2014), which assessed the potential for contamination to be present along the road corridor.

The available PSI data indicated that the proposed EDE comprises forested ridges, agricultural land and a parcel of land that was previously used for mining (i.e. the Jumping Creek Site). Features of the site include areas of native vegetation, areas of cleared land, hardstand areas and the Queanbeyan River.

A previous investigation undertaken by Coffey (2010) identified that the southern portions of the proposed EDE near to the Jumping Creek site have a history of mixed land use including agriculture since the 1840s, industrial /mining near to the Jumping Creek site since the 1850s and residential development since at least 1960. Features of the Jumping Creek site adjacent to the proposed EDE include a former sheep dip facility, former mine facilities and areas of remnant vegetation.

The PSI identified four Areas of Environmental Concern (AEC) at the site; the AECs were based on a review of the available historical aerial photographs, consultants' reports and background information made available to SMEC. A summary of the identified AECs is provided in Table 30.

Table 30. Areas of environmental concern.

Area of Environmental Concern	Comments	Contamination Potential
AEC01 ACM	The proximity of the proposed extension to structures built before 1980, indicates a risk potential for Asbestos Containing Materials (ACM) to occur within soil and fill material within or adjoining the site. ACM lined pipes may have been used to transfer liquids within the adjacent residential and industrial structures. A review of aerial photographs indicates that water may have been stored along the ridge.	Low
AEC02 Surface Soils	Areas in the southern portion and possibly other areas of the proposed EDE were previously used for agricultural purposes. As such there's a potential for herbicide / pesticide impacts to surface soils present within the proposed EDE. Furthermore, the Jumping Creek site was identified to contain a sheep dip. There remains a potential for there to be small unsystematic pockets of surface soils impacted with metals / pesticides (i.e. drip from dipped	Low

Area of Environmental Concern	Comments	Contamination Potential
	sheep); however, this is considered unlikely to affect the proposed EDE given: • The Jumping Creek site has been assessed as suitable for residential land use, following remediation. As outlined in the Environmental Strategies 2012. *Site Audit Report, Jumping Creek Queanbeyan, NSW*. REF# 9014 SAR 146 • The portion of the proposed EDE that bisects the Jumping Creek site is a 'filled' portion of road and would not make contact with the current surface level soils	
AEC03 Metals in soils / surface water / groundwater / bedrock	The proposed EDE is adjacent to the Jumping Creek site that has previously been mined for metals. Previous environmental investigations in areas adjacent to the site have identified elevated concentrations of metals in soil, and surface and groundwater (Coffey 2010). These metal concentrations were attributed to mineralisation of endemic materials. The nature and extent of these materials is currently unknown, as such, there is potential for the surrounding geology including the proposed EDE to contain elevated metal concentrations in soil / bedrock. Generally background metal concentrations within this area are elevated. The likelihood that this is the case is high, therefore appropriate mitigation measures would need to be implemented during the proposed works including wearing appropriate PPE. It may also be beneficial to use an X-Ray Fluorescence (XRF) instrument to screen for elevated metals for staff safety.	Moderate
AEC04 Septic tanks	Septic tanks and discharge trenches may be present within residential properties adjacent to the proposed EDE. Septic tanks / trenches may contain nutrient rich material and/or pathogens.	Low

Based on a desktop review of the available data including previous environmental investigations, aerial imagery, government searches and registered bore details, SMEC considers the potential for contamination to be low to moderate. The Proposal may disturb or mobilise metal oxides but these are already elevated in the environment and pose little or no risk to the local environment. Screening of rock faces and stockpiles is recommended in accordance with industry standards so that staff exposure to naturally occurring metals in the local geology can be managed.

6.13.3 Safeguards and management measures

Table 31 presents contamination environmental safeguards.

Table 31. Contamination environmental safeguards.

Impact	Environmental safeguards	Responsibility	Timing
Soil and water contamination	• A CEMP would be prepared for the proposed works in advance and should include an Unexpected Finds Protocol (UFP). • The UFP would include a response to the possibility that earth works disturb contaminants of concern, including hydrocarbons and metal oxides that may be mobilised and moved into waterways. The UFP would provide information on how to identify and manage risk associated with such contaminants and, if required, result in remediation of the contamination. Observations made onsite may include visual and olfactory signs of contamination. • If ACM material is noted, all works must STOP and an A class asbestos assessor or equivalent consulted in managing asbestos risk • Cut batters may require treatment • Ponds may require monitoring and treatment to maintain local water quality • Use an XRF and PID during construction works to screen for metals and hydrocarbons • If any material (e.g. excess spoil) from the proposed works requires off-site disposal, the material would need to be stockpiled, sampled and analysed for Contaminants of Concern and a Waste Classification report prepared to determine the soil status	Contractor	Construction

6.14 Cumulative impacts

6.14.1 Overview of cumulative impacts

No single project can provide relief from congestion throughout the entire network to maintain an acceptable Level of Service throughout Queanbeyan.

The EDE Proposal is part of a recommended program of works to improve the Queanbeyan traffic network up to 2031. Other network improvements are required in addition to the EDE. Thus regardless of whether the EDE is included into the road network or not, other roads and intersections will also require improvements as they act independently to the EDE and different roads service different traffic streams. Additional improvements would still be required regardless of whether the EDE was constructed or not.

There is no doubt that new road improvements are required due to future housing developments and these developments will have cumulative impacts. These impacts are both negative and positive.

The growth of Queanbeyan will continue to place pressure on the city's biodiversity and heritage values. QCC is putting in place several measures to ensure there is a strategic land use plan for future developments to protect and enhance the biodiversity values of the city whilst accommodating sustainable development.

These measures include the commissioning of the Queanbeyan Biodiversity Study 2008 and the requirement for detailed site specific flora and fauna investigations to inform the rezoning of land. Other measures include the requirement for developments to maximise the retention of native vegetation and rehabilitate disturbed areas to conserve biodiversity *in-situ*. The process of rezoning land and the release of urban developments also includes the input of OEH.

Similar measures are adopted for the cumulative impacts on Aboriginal heritage. Site specific heritage investigations are required for proposed urban developments with areas of high Potential Aboriginal Deposits. QCC consider the results of these investigations; however, OEH are the ultimate approval authority for any destruction and salvage of artefacts. In this process OEH would consider the cumulative impacts of the proposed development in the context of the overall destruction of artefacts in the city.

These measures are consistent with the measures taken for the zoning of land, alignment selection and the EDE approval process.

As the REF outlines, cumulative impacts of the EDE can also be positive.

Part 2 of the South Jerrabomberra and Queanbeyan Analysis 2014 looked at the fuel consumption and greenhouse gas emissions between the do no road improvements options and other various road improvement options including and excluding the EDE. This report identified that the options with the lesser number of road improvements are expected to have higher fuel consumptions and produce higher greenhouse gas emissions, and were options where vehicles were on the road network longer.

Proposed facilities such as the off-road shared path and provisions for on-road cycling will provide links to existing facilities in Edwin Land Parkway and shared paths in the CBD. They will also provide links to future facilities in the expansion of Old Cooma Road to four lanes, Cooma Street and the river corridor while providing a link to future on-road cycling facilities along Yass Road. This would encourage greater recreational use and greater use by commuters, providing some improvement to sustainable transport within and through the city.

There is potentially a loss of regional character to the landscape, particularly around the new bridge over the Queanbeyan River; however, only around 600 m of the road is sited above the scenic protection area level. Some cumulative loss of biodiversity and wildlife connectivity is also inevitable in this scenario. The direct losses in landscape amenity, biodiversity, wildlife connectivity and aboriginal heritage are addressed in the REF, SIS and ACHAR. Overall small losses will accumulate, but not to the extent that it would cause the EDE project to generate an overall 'significant adverse impact' outcome.

Positive impacts of social improvements (e.g. through improved connectivity and reduced congestion), increase employment opportunities and economic growth. These improvements, together with an increase in recreational facilities, are expected to improve the liveability of Queanbeyan.

6.14.2 Potential cumulative impacts

Cumulative impacts can occur as follows:

i. As multiple impacts on a single receiver

ii. As similar impacts at multiple locations associated with a proposal

iii. In conjunction with impacts from other nearby past and present projects

iv. Cumulative impacts can be positive / beneficial or negative / adverse.

The first type of cumulative impact could arise from the combination of individual environmental aspects as documented in Sections 6.1 to 6.11. Some of the negative cumulative impacts that could occur are as follows:

- Reduced visual amenity as the EDE is imposed on the existing landscape; this is particularly relevant to the new bridge over the Queanbeyan River.
- Reduced biodiversity through loss of habitat, weed infestations and increased animal disturbance from light and noise
- Increased noise and emissions (e.g. dust and vehicle exhausts) associated with the EDE's construction and operation may combine to intrude on residents quality of life
- Reduced water and habitat quality in the Queanbeyan River due to road run off and sediment from exposed surfaces and eroded water courses.

The second type of cumulative impact is not considered relevant to the proposal as the possible impacts are consistent along the alignment and do not aggregate or focus on any particular location.

The third type of impact could arise in conjunction with development of the proposed Jumping Creek Estate identified in the local LEP; however, as Jumping Creek Estate has not yet been formally submitted to QCC, the scope and scale of these impacts are un predictable at this time.

Cumulative impacts can also be positive, as follows:

- Improved transport services and operations for both business and private travel through improving freight efficiency and travel times.
- Improved safety and security through improved road design.
- Improved connectivity to jobs, schools, stores, recreation and other community services.
- Reduced congestion in the CBD enhancing accessibility and enjoyment for local and interstate visitors.
- Improved flood access as the EDE would provide an alternative access across the Queanbeyan River.
- Long term transport access in and around Queanbeyan due to reduced travel times and distances.

6.14.3 Intersection upgrades

Lanyon Drive / Tompsitt Drive roundabout

The proposed EDE does not require the upgrade to the Lanyon Drive / Tompsitt Drive intersection. Improvements to this intersection are largely due to expected growth in the Poplars and South Jerrabomberra areas and existing sections of Queanbeyan

such as Jerrabomberra. As a result the Lanyon Drive / Tompsitt Drive intersection is currently under consideration for improvement by RMS.

The Proposal will have little direct impact on the traffic along Edwin Land Parkway to the Lanyon Drive / Tompsitt Drive intersection as it provides an alternative route around the Queanbeyan CBD, and thus its direct impact on traffic in Jerrabomberra is limited. Jerrabomberra will be adversely impacted in the future due to increased population and general traffic density and the associated adverse impacts due to Queanbeyan's population growth regardless of whether the Proposal proceeds or not. The traffic growth through this intersection due to the construction of the EDE would thus be minimal.

Kings Highway / Yass Road / Ellerton Drive roundabout

The traffic studies show that a substantial proportion of traffic leaving Googong in the morning peak period will proceed north on Old Cooma Road to access destinations in Queanbeyan and use the Bungendore Road, Yass Road and Canberra Avenue routes out to areas outside Queanbeyan.

Redirecting traffic via the EDE may cause an imbalance of peak flows entering the Kings Highway / Yass Road / Ellerton Drive roundabout that necessitate an intersection upgrade to traffic signals so that delays are evenly distributed to all approaches. The intersection will also need an upgrade due to general growth in traffic in the area.

RMS is currently reviewing this intersection to determine a suitable design and timing for upgrades and is currently considering improvements to the Yass Road / Bungendore Road / Ellerton Drive, Queanbeyan intersection.

No single project can provide an acceptable Level of Service throughout Queanbeyan and relieve congestion throughout the entire network. Additional network improvements are required in addition to the EDE. Thus regardless of whether the Proposal is part of the road network or not, other roads and intersections will also require improvements as they act independently of the EDE. All other improvements recommended in the traffic studies are required regardless of whether EDE is built or not.

6.14.4 Jumping Creek Estate

It is difficult to establish the extent of the adverse impact on Jumping Creek Estate when the development has not been submitted for review or approval. Some cumulative loss of visual amenity, biodiversity and wildlife connectivity is predicted; however, the extent would be able to be assessed when and if the development obtains approval.

The development of the EDE and other road network improvements are an integral part of economic growth, as they will allow more efficient operation of the Queanbeyan roads for businesses and private motorists. Positive impacts of social improvements (e.g. improved connectivity), increase employment opportunities and an increase in recreational facilities are expected. Negative impacts such as the loss of visual amenity, biodiversity and reduction in wildlife connectivity will accumulate in small areas but not to the extent that it would cause a significant cumulative adverse impact.

7. Environmental management

7.1 Overview

The environmental management chapter describes the process to ensure that the safeguards and management measures detailed in the REF are implemented, and also includes consideration of any licenses, permits or approvals required to carry out the work.

7.2 Early works

Early works prior to the award of the main road construction contract are not under active consideration.

In the event that project development is delayed or for various reasons early works become necessary or desirable, proposed construction works could involve the following general activities and overall sequence:

- Potential for early works:
  - Archaeological salvage works in accordance with the AHIP would need to be completed prior to the commencement of any onsite works.
  - Early works could be initiated to meet seasonal clearing constraints, and would depend on the date of contract award to the main civil contractors and potential major construction commencement dates
  - Selective felling of hollow bearing habitat trees. Affected trees would be bumped, lowered by a special machine, then inspected by ecologists for fauna which would be processed as per agreed protocols
  - Limited clearing for related early works, so that the soil remains protected and the waterways including the Queanbeyan River are less exposed to sedimentation risks during autumn and winter
  - Perimeter fencing
  - Utility relocation
  - Noise wall construction where feasible

Early works would be required before May / June to install perimeter fencing, begin utility work, install noise walls and remove habitat for species that may begin to nest over winter.

Hollow bearing trees would eventually be used to provide fauna habitat in verge areas adjoining woodland sites. Other trees would be mulched and stockpiled to be used for erosion and sediment control during the main construction phase.

An Environmental Protection Licence (EPL) will be obtained by the Principal and transferred to the successful tenderer. This EPL would also cover any proposed early works.

7.3 Environmental management plan

Safeguards and management measures have been identified from the proceeding review of potential impacts to minimise adverse environmental impacts. These include measures to mitigate noise, dust, soil and water degradation and further biodiversity loss. These management measures include those that are incorporated into the design or implemented during the construction or operation of the Proposal.

A contractor's CEMP would be prepared to describe safeguards and management measures for the construction stage. This plan would provide a framework for establishing how these measures would be implemented and who would be responsible for their implementation. The safeguards and measures are described here at the concept level. The contractor would prepare the CEMP prior to construction of the Proposal which must be reviewed and certified by the Principal prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and would be updated as necessary to respond to specific project or regulatory requirements. The CEMP would be developed in accordance with the RMS specification guides:

- QA Specification G36 – Environmental Protection (Management System)
- QA Specification G38 – Soil and Water Management (Soil and Water Plan)
- QA Specification G40 – Clearing and Grubbing.

Given the friable nature of the soil and its potential to contain weeds and pollutants and the EDE's proximity to residential areas, a key aspect of the CEMP would be the contractor's monitoring, reporting system and maintenance response system. The CEMP would contain an Unexpected Finds Protocol that contains procedures to be implemented if unexpected heritage, contamination and any other unexpected item is found or situation occurs.

The temporary pollution prevention channels and structures would require design to ensure they divert clean water around or through the site and serve the exposed sub catchments within the construction footprint. Also, as major earthworks may commence sometime after the clearing and grubbing, there would need to be an interim schedule of activities that ensure the site is safe during this down time.

7.4 Operation environmental management

Once built, the EDE would be part of the Queanbeyan road network and managed in accordance with QCC road network operation plans and policies, which is typical of other NSW city councils.

7.5 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the Proposal, the construction planning and management, contractual documents, contractor's site management plans and construction operations and operation of the road as part of the QCC network. These safeguards would minimise potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 32.

Table 32. Summary of site specific environmental safeguards.

No.	Impact	Environmental safeguards	Responsibility	Timing
1	General	• All environmental safeguards listed must be incorporated appropriately within the following documents: - Detailed design stage - Contract specifications for the Proposal (in tender documents) - Contractor's Environmental Management Plan	Project manager	Pre-construction
2	General	• A risk assessment would be carried out on the Proposal in accordance with the RMS Audit Pack and OSD risk assessment procedures to determine a monitoring and audit program for the works. The recommendations of the risk assessment are to be implemented. • 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 Proposal is appropriate. • Any works resulting from the Proposal and covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during.	Project manager and regional RMS environmental staff	Pre-construction After first audit
3	General	• The environmental contract specification G36 - Environmental Protection (Management System), G38 - Soil and Water Management (Soil and Water Plan), and G40 - Clearing and Grubbing must be forwarded to the RMS Senior Environmental Officer for review at least 10 working days prior to the tender stage. • A contractual hold point must be maintained until the CEMP is reviewed by the Principal's Environment Manager.	Project manager	Pre-construction
4	General	• The Project Manager must notify the RMS Environmental Officer, Southern Region at least 5 days prior to work commencing.	Project manager	Pre-construction
5	General	• All businesses and residences likely to be affected by the proposed works must be notified at least 5 working days prior to the commencement of the proposed activities.	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
6	General	• Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors. • Pre-construction protocols and training would be provided for Early Works contractors for the start of the early works. • Relevant protocols and training would be repeated prior to the start of the main civil works.	Contractor	Pre-construction and during construction as required.
7	Construction noise and vibration impacts generally	• A Construction Noise and Vibration Management Plan (CNVMP) would be prepared for the Proposal. The plan would be in accordance with the DECC Interim Construction Noise Guideline and would detail the specific measures to be implemented to reduce construction noise levels. The plan would cover aspects including site noise planning, scheduling of high noise activities, operator instruction, plant maintenance, plant noise audit and complaints management.	Contractor	Pre-construction
8	Construction noise and vibration impacts generally	• The CNVMP must be approved by the Principal's environment staff prior to the start of construction and included in the CEMP.	RMS project manager	Pre-construction
9	Out of hours works	• For works required outside of standard hours, the procedure contained in the RMS Environmental Noise Management Manual - Practice Note vii – Roadworks Outside Normal Working Hours and RMS Fact Sheet No.2 – Noise Management and Night Works as outlined in the approved noise and vibration management plan would be followed.	Contractor	Construction
10	Vibration	• Vibration monitoring would be conducted in response to any vibration related complaints. A dilapidation study is to be undertaken for relevant residents along the EDE.	Contractor	Construction
11	Traffic disruptions during construction	• A Construction Traffic Management and Safety Plan would be prepared to ensure traffic and access controls are implemented and maintained during all lane or road closures. This plan would be based on RMS Design & Construct G10 Traffic Management	Contractor	Pre-construction, Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Specification, RMS Traffic Control at Worksites Manual and AUSTROADS Guide to Traffic Management 2009. • Where practicable, deliveries of construction plant and materials would be undertaken outside of peak traffic periods. • Affected residents would be provided with a minimum of 48 hours notification of any traffic interruptions.		
12	Partial property acquisition	• Required acquisition would proceed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* for the Curtis Estate road corridor and offset land.	QCC	Pre-construction
13	Loss of vegetation / habitat	• Prior to clearing works, delineate the maximum extent of the required clearing through temporary fencing, flagging tape or similar to minimise the risk of over-clearing of vegetation / potential habitat.	Contractor	Pre-construction, Construction
14	Long term visual amenity	• Final alignment and construction practices for proposed work would be place where possible to retain and protect verge trees. • Landscaping would be reviewed and refined as necessary during the pre-construction stage to ensure visual amenity impacts, as identified in the visual impact assessment, may be mitigated where practical. • Other visual design considerations, such as installing downward-facing street lighting with minimal light spill, would be considered to minimise overall visual impact. • Noise wall material and design would be considered to improve general amenity and aesthetics.	Project manager	Pre-construction
15	Visual amenity during construction	• The worksite would be left in a tidy manner at the end of each work day. • Where practicable, restoration of work areas would be completed progressively.	Contractor	Construction
16		• An erosion and sediment control plan would be prepared as part of the CEMP prior to construction.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	Sedimentation and degraded water quality from erosion of excavated material	• The Principal would approve the erosion and sediment control plan prior to construction works starting.	Project manager	Pre-construction
		• Erosion and sediment control measures would be implemented and maintained in accordance with the Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) prior to construction (including early work) and before the main civil work. • Erosion and sedimentation controls, including clearing of sediment from behind barriers, would be checked and maintained on a regular basis and records kept for reporting purposes. • Erosion and sediment control measures would be retained until the works are complete or areas are stabilised. • Disturbed areas would be progressively stabilised and rehabilitated as far as practicable during the works.	Contractor	Construction
17	Soil contamination or pollution of receiving waters from spillage of hazardous materials	• No hazardous materials would be stored on site as far as practicable. • Any hazardous materials stored on site would be kept in a secured area. • Any transfer of fuels and other hazardous materials would be undertaken in designated locations. • A spill containment kit would be kept on site during construction. • Construction personnel would be trained to use a spill containment kit. • Site induction would include identification of the location of the spill containment kit.	Contractor	Construction
18	Revealed asbestos contamination	• A CEMP is prepared for the proposed works in advance and would include an Unexpected Finds Protocol. • If ACM material is noted, all works must STOP and an A class asbestos assessor or equivalent consulted in managing asbestos risk.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
19	Contamination from naturally occurring metal oxides in local geology	• A CEMP is prepared for the proposed works in advance and would include an Unexpected Finds Protocol. • Cut batters may require treatment. • Ponds may require monitoring and treatment to maintain local water quality. • Use an XRF and PID during construction works to screen for metals and hydrocarbons. • If any material (e.g. excess spoil) from the proposed works requires off-site disposal, the material would need to be stockpiled, sampled and analysed for Contaminants of Concern and a Waste Classification report prepared to determine the soil status.	Contractor	Construction
20	Construction air quality	• Appropriate measures, including watering or covering exposed areas, would be used to minimise or prevent air pollution and dust. • Works, including the spraying of paint and other materials) would not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely. • Vegetation or other materials would not be burnt on site. • Vehicles transporting waste or other materials would be covered during transportation. • Stockpiles or areas that may generate dust would be managed to suppress dust emissions in accordance with the RMS's Stockpile Site Management Guideline (2011). • The construction site compounds would be established and operated to minimise emissions.	Contractor	Construction
21	Noise impacts	• Manage construction noise and vibration in accordance with the noise management plan in the CEMP to keep noise and vibration below the criteria set out in section 6.1.2. • Building mitigation delivered to receivers in accordance with criteria and guidelines in Table 16.	Contractor QCC	Construction Post construction

No.	Impact	Environmental safeguards	Responsibility	Timing
22	Biodiversity	• Implement EPBC and TSC biodiversity offset strategy. • Mark out and fence construction footprint to exclude access to adjoining bushlands. • Habitat resources such as course woody debris and rocks would be reused in rehabilitation areas and adjoining fauna passages. • Two fauna underpasses and a rope bridge to be installed at appropriate locations. The fauna underpass adjacent to Lonergan Drive is to include a rope bridge. • An ecological section is to be included in the environmental induction program. • Timing of works is to avoid breeding seasons for species identified in the SIS. • All practicable measures would be undertaken to minimise the adverse impact on Platypus and its habitat. • Site fauna would be removed and relocated prior to clearing and grubbing. Actions include lowering and searching of habitat trees. • An Unexpected Threated Species Finds procedure would be implemented to ensure appropriate responses are undertaken in the event that a threatened species is unexpectedly encountered during excavation / construction activities.	QCC	Pre-construction, construction
23	Weed impacts	• Noxious weeds on site would be managed in accordance with the weed management sub-plan.	Contractor	Pre-construction, Construction
24	Unexpected impacts on non-Aboriginal heritage values	• Should apparent archaeological material be unexpectedly uncovered during construction, it would be assessed in accordance with the Unexpected Archaeological Finds Procedure in the CEMP. All such matters would be dealt with on a case by case basis. Heritage staff from OEH will be contacted immediately.	Contractor	Construction
25	Unanticipated disturbance of	• Site induction to include a cultural awareness element and reference to responsibilities and obligations under the *National Parks and Wildlife Act 1974.*	QCC – via OEH. Only qualified archaeologists in accordance with the requirements of s1.6 of	Pre-construction, Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	identified Aboriginal heritage sites	• Should apparent archaeological material be unexpectedly uncovered during construction, it would be assessed in accordance with the Unexpected Archaeological Finds Procedure in the CEMP. All such matters would be dealt with on a case by case basis. Heritage staff from OEH will be contacted immediately. • The CEMP must clearly state that all vehicular travel must be limited to within the surveyed corridor to minimize risks of adversely impacting sites outside the easement, and must outline the OEH penalties that can be imposed for knowingly or unknowingly impacting heritage sites.	the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW, would assess the unanticipated finds	
26	GHG emissions	• Plant and equipment would be switched off when not in use, noting that WHS concerns must take priority. • Vehicles and construction equipment would be properly maintained so as to achieve optimum fuel efficiency	Contractor	Construction
27	Night works with potential light spill	• Most works would be carried out during the day (7am-6pm). Only in exceptional circumstances will there be evening works during (6pm-10pm) to minimize lighting requirements.	Contractor	Construction
28	Light spill from security lighting	• Minimise the need for security lighting, minimise the lighting used and direct lights away from sensitive receptors.	Contractor	Construction
29	Lighting along the EDE adversely affecting local residents and Platypus	• Lighting would be restricted to major intersections and feature directional lighting to minimize light spill on the surrounding areas. • The new Queanbeyan River Bridge would not have any permanent lighting therefore Platypus disturbance would be minimised.	Design team	Pre - construction
30	Waste generation from construction activities.	• The resource management hierarchy detailed by the *Waste Avoidance Resource Recovery Act 2001* would be adopted, namely to avoid unnecessary consumption; resource recovery and disposal as a last resort. • All waste would be treated in accordance with the RMS Waste Minimisation and Management Guidelines (RTA 1998).	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		• All noxious weeds and exotic plant species removed would be disposed of at a licensed landfill facility. • Surplus soils and wastes generated from the Proposal would be reused or disposed of according to their classification. • All work areas would be maintained, kept free of rubbish and cleaned up regularly.		

7.6 Licensing and approvals

Table 33 lists the licenses and permits required prior to or during construction of the EDE. Further information on these may be found in the *REF consultation guidance note* (EIA-P05-G03).

Table 33. Licenses and approvals required for the EDE.

Authority	License	Responsibility	Timing
National Parks & Wildlife Service	S90 Aboriginal Heritage Impact permit (AHIP) – to be obtained prior to works over the entire impact area, in consultation with the registered Aboriginal parties. All Aboriginal artefacts must be salvaged prior to works and the relocation sites lodged with the Office of Environment and Heritage.	QCC	Pre - construction
Environment Protection Authority	Environmental Protection Licence - *Protection of the Environment Operations Act 1997*. The Principal will obtain the EPL and transfer it to the contractor. The Environmental Protection License would cover items including: • Noise • Working hours • Air pollution, including dust • Water pollution The licence would apply to the project construction only.	Principal – will be assigned to the contractor	Pre-construction
Department of Primary Industries	A fisheries permit under the *Fisheries Management Act 1994* (part 7) is unlikely to be required; however, one would be sought if required.	QCC	Pre - construction
Environment Protection Authority / WorkCover	Dangerous goods transportation license - *Dangerous Good (Road and Rail Transport Act) 2008*. The EPA regulates on-road transport of dangerous goods while WorkCover regulates activities prior to transport, including correct classification, packaging and labelling. A license may be required if dangerous goods are used during construction.	Contractor	Pre - construction
Environment Protection	Hazardous Chemicals Permit - the *Environmentally Hazardous*	Contractor	Pre - construction

Authority	License	Responsibility	Timing
Authority	*Chemicals Act 1985*. A permit would only be required if environmentally hazardous chemicals are used during construction of the Proposal and there is potential for a significant adverse impact on the environment.		
Office of Water	Controlled Activity Approval - *Water Management Act 2000,* Works are within 40 m of a waterway so a Controlled Activity Approval (Section 91) is required. A water use approval may be required to dewater footings and trenches during construction (Section 89). Final consultation is required with the NSW Office of Water prior to road construction.	Contractor	Pre - construction
Department of Trade and investment	*Approval under Crown Lands Act 1989* – for any activities that maybe required on Crown Land following consultation with the Department of Trade and Investment.	QCC	Pre – construction, construction

8. Justification and Conclusion

8.1 Justification

The EDE proposal is needed to improve safety and traffic flows in the Queanbeyan CBD and wider area, provide a 100 year flood connection across the Queanbeyan River and service Queanbeyan's economic development as expressed in the Business Case. Should the Proposal not proceed, traffic systems are likely to fail by 2031, pedestrian accidents would continue to occur in the CBD and emissions and dust from heavy vehicles would continue to adversely affect the CBD and neighbourhoods along Cooma Street reducing the amenity of the civic area. Development investment in Queanbeyan is also likely to reduce, as road service levels decline.

The Proposal will have adverse environmental impacts; however the route is in a corridor historically identified for future road development. Although the alignment does reduce the area of Box Gum Woodland and some other native habitat elements within the footprint, much of the alignment is already disturbed by historic activities such as mining, grazing, recreational use and other edge effects originating from its close proximity to the city.

Alternative routes to the Proposal have been considered.

Upgrades of existing roadways such as Cooma Street would have minimal adverse impact on environmental factors, but by itself would not provide a road network with an acceptable level of service.

Alternative options that involve new road construction such as Dunns Creek Road or the Northern Bypass address different traffic problems, do not provide a road network with an acceptable level of service and/or have significantly greater adverse environmental impact.

On balance, the proposed alignment is shown to be the most technically and economically efficient option providing the required traffic solutions with a manageable adverse impact on the environment.

Other potential adverse environmental impacts associated with the Proposal have been identified. These include construction and operational noise and vibration, loss of native vegetation, loss of moderate value Aboriginal artefacts, reduced visual amenity and potential reduced aquatic habitat quality associated with the Queanbeyan River.

These adverse impacts have been avoided or minimised where possible during design development and by the management concepts established in this REF. These will be included in a CEMP that will follow RMS environmental management guidelines. RMS, EPA and QCC will be required to endorse the CEMP prior to construction starting. The CEMP would contain sub-plans for vegetation, noise, water and air quality management, amongst others. These sub-plans would be written and implemented in accordance with the RMS construction environmental management guidelines and the 'Blue Book' (managing storm water on construction sites) guidelines.

Residual significant adverse impacts on biodiversity, including the loss of Box Gum Woodland, Rosenberg's Goanna and Speckled Warbler habitat, are to be addressed by offset strategies to be endorsed by the Commonwealth Department of Environment and the NSW Office of Environment and Heritage.

Positive impacts of the Proposal include providing adequate access for all Queanbeyan residents to employment, business and recreational hubs, improved traffic flow efficiencies, improved pedestrian and motorist safety in and around the CBD, reduction in noise and air

pollution in the CBD and surrounds, and protection of the community from disconnection by a 1 in 100 year flood.

On balance, the economic, social and environmental benefits derived from proceeding with the Proposal are considered to outweigh the potential adverse impacts. The Proposal is therefore considered justified.

8.2 Objectives of the *Environment Planning and Assessment Act*

The Proposal is consistent with the objectives of the EP&A Act (Table 34).

Table 34. How the Proposal meets the objectives of the EP&A Act.

Object		Comment
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.	The Proposal would improve the efficiency of traffic movement in Queanbeyan CBD and surrounds delivering wide economic, social benefits while minimising the adverse environmental impact.
5(a)(ii)	To encourage the promotion and co-ordination of the orderly economic use and development of land.	The Proposal would improve traffic efficiency and connection to employment and business hubs for new and existing residents.
5(a)(iii)	To encourage the protection, provision and co-ordination of communication and utility services.	Design development for the Proposal has given full consideration to potential impacts on affected utilities and has included consultation with utility owners.
5(a)(iv)	To encourage the provision of land for public purposes.	The Proposal would benefit commuters through more efficient movement of public and private transport.
5(a)(v)	To encourage the provision and co-ordination of community services and facilities.	The Proposal would improve a component of the transport network on which the community relies and improve environmental quality of public areas in the CBD.
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 have some unavoidable adverse impacts on the environment. Management measures have been identified to minimise these as far as practicable. Significant residual adverse impacts are to be offset under EPBC and TSC Act deliverables.

Object	Comment
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.2.1 – 8.2.4.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Proper and appropriate access to new and existing residential estates, employment and business hubs is important for maintaining fair and equitable public and private housing balance.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Irrelevant to the Proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The level of public involvement is commensurate with the nature and scale of the Proposal. Two rounds of community consultation would be undertaken including special consultation for the adjoining estates and the local Aboriginal community.

8.2.1 The precautionary principle

The precautionary principle deals with uncertainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

The threat of serious or irreversible environmental damage is one of the essential preconditions to the engagement of the precautionary principle. In undertaking the assessment, no threat of serious or irreversible environmental damage was identified; accordingly it was considered there was no need to apply the precautionary principle.

8.2.2 Intergenerational equity

Intergenerational equity is concerned with the equitable distribution of economic, social and environmental costs and benefits across present and future generations. The Proposal impacts have mostly been identified as short term (i.e. associated with the anticipated construction period of 12 months) and manageable. Some long term impacts such as operational noise on sensitive receivers would be mitigated by technical programs on the road and in the community. Benefits would be experienced over a longer period commencing at the completion of construction. Future Queanbeyan residents would become accustomed to the travel benefits of the road.

8.2.3 Conservation of biological diversity and ecological integrity

Given the peri-urban setting of the Proposal, there would be relatively minor adverse impacts on biodiversity and ecological integrity. A habitat connectivity review has established that the Proposal is aligned in a way that minimises adverse impacts on adjoining habitat and wildlife corridors identified in the LEP. These nevertheless have been considered during the design and assessment process with a view to identifying, avoiding, minimising and mitigating such impacts where practicable.

The Proposal's significant adverse biodiversity impacts would be offset for the betterment of those entities. Measures have been identified to minimise and mitigate other potential adverse impacts such as on soil, water, and riparian and visual quality.

8.2.4 Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources, including air, water, land and living things, which may be affected by a proposal. While it is often difficult to place a reliable monetary value on a proposal's residual, environmental and social effects, the value placed on environmental resources affected by this Proposal is reflected in the extent of environmental investigations, planning and design of impact management measures to avoid or minimise adverse environmental impacts.

8.3 Conclusion

The proposed extension of Ellerton Drive is subject to assessment under Part 5 of the EP&A Act. This REF has examined and taken into account matters affecting or likely to affect the environment by reason of the proposed activity. This includes consideration of matters under the *National Parks & Wildlife Act, Threatened Species Conservation Act, Water Management Act, Fisheries Management Act, Protection of the Environment Operations Act* and *Crown Lands Act*. This REF has been developed using the Project REF template (EIA-P05-G02-T02) and addresses the relevant matters listed under clause 228 (1) and (2) of the *Environmental Planning and Assessment Regulation 2000*.

Potential adverse environmental impacts due to the Proposal have been avoided or reduced where possible during the preliminary design and options assessment phases. The Proposal, as described in this REF, best meets the Proposal objectives; however, it is still expected to cause some adverse impacts with regard to construction and operational noise, visual amenity, threatened species, native vegetation and water quality. Management measures, as detailed in this REF, would ameliorate or minimise these expected impacts to levels as low as reasonably possible.

A referral has been submitted to the Federal Department of Environment under the *Environment Protection and Biodiversity Conservation Act*. The project has been deemed to be a 'controlled action' under the Act and is to be determined by preliminary documentation.

Although avoidance measures in the design and mitigation measures in the construction have been applied, the accompanying Species Impact Statement has identified that of all the biodiversity impacts, the Proposal may adversely impact 'significantly', as per the EPBC and TSC Acts, on Rosenberg's Goanna (NSW listed), Speckled Warbler (NSW listed) and Box Gum Woodland (Commonwealth and NSW listed). These impacts are to be offset by agreement on an offset strategy under the EPBC approval using the Commonwealth's Biodiversity Offset Policy and associated Guidelines prior to construction starting. The offset strategy would be developed to offset significant adverse impacts on both the Commonwealth and State listed species.

Post approval but prior to construction, it is also necessary for the appropriate licenses and permits to be obtained and the project's Construction Environment Management Plan to be approved by QCC, the EPA and other consent authorities such as the Office of Water and Department of Primary Industries to ensure construction environmental impacts are managed as outlined in this REF.

QCC should approve this REF under Part 5 of the *Environmental Planning and Assessment Act 1979*, given the overall low level of impact, the accompanying biodiversity offset strategy and the safety, social and economic benefits of the EDE Proposal.

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10. Appendices

Appendix 1

Consideration of clause 228(2) factors

Clause 228(2) Checklist

Factor	Impact
a. Any environmental impact on a community?	
Construction noise, dust, noise, heavy equipment traffic on existing roads, changes in the level of service, safety hazards, or interference with emergency services would impact residences, particularly on the southern and northern ends of the alignment where the construction footprint is adjacent to residential properties. Affected residents would be contacted regarding works and provided with contact details for any issues that might arise. A Construction Noise and Vibration Management Plan would be prepared which would detail the specific measures to be implemented to reduce construction noise levels. The plan would cover aspects including site noise planning, scheduling of high noise activities, operator instruction, plant maintenance, plant noise audit and complaints management. Additional consultation with residents would take place to discuss management measures used in the project.	Negative, short term, local
Out of hours works would adversely impact on residences in close proximity to construction activities. Construction timetabling, particularly for works outside standard hours, would aim to minimise noise impacts. Measures may include time and duration restrictions and respite periods.	Negative, short term, local
There would be disruptions to local traffic flows during construction. The construction contractor would produce a temporary traffic management plan for each stage of construction. Because the proposed road is new and most of the development is unavailable to traffic, disruptions to existing traffic is limited and can be managed with standard practices. Management of temporary traffic issues at adjoining intersections when required is not expected to be significantly complex or inconvenient.	Negative, short term, local
When the road is in operation, most local and regional residents would be benefit from its many positive impacts. The most significant positive impacts are likely to result from removing heavy traffic from the CBD and the resultant improvement in the amenity of this precinct and access improvements to Canberra and the new development estate. Travel time, fuel consumption, accidents and inconvenience to users would in generally decrease. Access to job locations, schools, shops, recreation and other community services and amenities would improve. Access to the neighbourhoods of Greenleigh and Karabar, and access to and from new development areas would improve.	Positive, long term, regional
Operational traffic noise along the new road would adversely impact on nearby residences. An 80 km/hr speed limit would reduce noise. Adjacent properties with exceedances in operational noise levels would receive building treatments and upgraded property boundary fences.	Negative, long term, local
b. Any transformation of a locality? Clearing of mature trees and woodland areas for the road may change the look and feel of the area, particularly for local residents and regional residents who use the area for passive recreational purposes. The proposed works would, where possible, retain and protect verge trees to minimise this impact. The landscaping plan would be reviewed and refined as necessary to ensure adverse visual amenity impacts may be managed. Noise wall material and design would be considered to improve general amenity and aesthetics. Other visual design consideration for factors, such as street lighting, would be considered to minimise overall visual amenity.	Negative, long term, regional

Factor	Impact
c. Any environmental impact on the ecosystems of the locality? As outlined in section 6 of the REF, a species impact statement (SIS) and an Addendum to the SIS have been prepared and impacts on native flora and fauna have been assessed. This includes the impact on local woodlands. A significant adverse impact on the Box Gum Woodland endangered ecological community has been identified and this is to be offset under the EPBC and TSC Acts. Furthermore, a wildlife corridor / connectivity assessment has been undertaken and the effects on local animal and plant movements are assessed as minimal. The aquatic ecosystem of Queanbeyan River is not measurably affected by the proposal.	Minor negative, long term
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The assessment did not identify any significant features or uses in this regard that would be affected directly or indirectly by the Proposal; however, the area's naturalness would be adversely affected and area's aesthetics would be adversely affected by native vegetation removal and road construction. The Proposal includes landscape plans which aim to stabilise the site and reduce the adverse visual impacts.	Minor, negative, long term
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The assessment did not identify any significant features or uses in this regard that would be affected directly or indirectly by the proposal; however, the area's naturalness would be adversely affected and area's aesthetics would be adversely affected by the native vegetation removal and road construction.	Minor negative, long term
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*) As outlined in section 6 of the REF, an SIS and an Addendum to the SIS have been prepared and impacts on native flora and fauna have been assessed. This includes the impact on local woodlands. A significant adverse impact on the Box Gum Woodland endangered ecological community has been identified and this is to be offset under the EPBC and TSC Acts. Other common native species would be adversely affected; however, the alignment has been selected to minimise native habitat disturbance and offsets would also serve common species.	Minor, negative, long term
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? As outlined in section 6 of the REF, an SIS and an Addendum to the SIS have prepared and impacts on native flora and fauna have been assessed. This includes the impact on local woodlands. A significant adverse impact on the Box Gum Woodland endangered ecological community has been identified and this is to be offset under the EPBC and TSC Acts.	Minor, negative, long term
h. Any long-term effects on the environment? As identified in the 'impact' column of this table. Prominent negative impact results from the removal of native vegetation and replacement with linear infrastructure. Long term positive effects come from social and economic improvements duet to the road.	Minor, negative long term Significant positive, long term

Factor	Impact
i. Any degradation of the quality of the environment? In some areas built infrastructure would replace natural habitat, so the naturalness of the environment would be reduced. In some areas landscaping would actually improve some areas of the site which are weedy, denuded and eroding.	Minor, negative, short term and long term local. Some minor positive, local effects
j. Any risk to the safety of the environment? Construction activities are unlikely to involve work practices or materials that could represent a risk to the environment. If plant refuelling is required on site, this would take place in a designated location and appropriate safeguards, such as a spill containment / clean up kit would be required to be available. Overall road safety would be improved in the wider area and less traffic and pedestrian accidents are predicted due to the Proposal.	Neutral short term, significant positive long term
k. Any reduction in the range of beneficial uses of the environment? Some loss of public passive recreation opportunities may be experienced but additional cycling and walking facilities would be provided.	Minor, negative, long term. Positive significant long term
l. Any pollution of the environment? A potential risk to the environment would occur during construction and be associated with such risks as oil / fuel spills, and erosion of unconsolidated material. Accepted management practices are available to effectively manage such risks.	Negative, short term, local.
m. Any environmental problems associated with the disposal of waste? Excavated material would be reused on site as far as practicable. Unsuitable material would be disposed of at a suitable waste facility. Minor amounts of surplus construction materials would also likely be generated from construction activities. In descending order of disposal, these would be reused, recycled or disposed of at an appropriate waste / handling facility. Cleared vegetation would either be reused on site for erosion control and habitat reinstatement or mulched and transported off site to a suitable recycling facility.	Negative, short term, local
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? Implementation of the road would not require the use of any materials or resources that are in or likely to become in short supply. Excavated material would be reused on site where practicable, which would contribute to reducing demand on natural resources.	Negative, long term, local
o. Any cumulative environmental effect with other existing or likely future activities? Overall, road development is part of the economic development for the Queanbeyan area. It would contribute to increased access to employment, education and recreational opportunities and increase safety in the CBD and surrounds.	Positive, significant, long term

Factor	Impact
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? Not applicable	Not applicable

Appendix 2

Referral of Proposed Action

Referral of proposed action

Project title:	Ellerton Drive Extension

1 Summary of proposed action

Shape files provided as Attachment 1.

1.1 **Short description**

Construction and operation of a new four lane dual carriageway of sealed road. The proposed new road will be an extension of Ellerton Drive at East Queanbeyan and would provide a link to Old Cooma Road at Karabar, New South Wales. The new section of road would be 4.6km long.

1.2 **Latitude and longitude**

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds
Existing Ellerton Drive	-35˚	21’	10.61”S	149˚	15’	06.85”E
Edwin Land Parkway/ Cooma Street	-35˚	22’	44.34”S	149˚	14’	10.60”E

1.3 **Locality and property description**

The subject site is located approximately 1.3km south east of the centre of Queanbeyan and 13.5km south east of the centre of Canberra. It will extend from East Queanbeyan at the termination point of the existing Ellerton Drive, wind around the edge of the current Queanbeyan south-eastern residential areas of Karabar and Greenleigh and come to an end at Old Cooma Road, Karabar. It is approximately 4.6km.

The area occupies disturbed open grassy woodland in the far south with some areas more extensively cleared, including a power line and water main easement. The area within the road reserve just south of the Queanbeyan River (where residential areas occur on both sides) is completely cleared and consists largely of introduced (exotic) grasses. North of the Queanbeyan River, there are more heavily disturbed areas of woodland and dry forest vegetation, with large areas completely cleared and supporting extensive weed infestations. North of these areas is relatively undisturbed dry forest, up to the junction with the eastern end of the existing Ellerton Drive.

1.4 **Size of the development footprint or work area (hectares)**

The total development footprint (the subject site) is approximately 26 ha in area.

1.5 **Street address of the site**

The proposal would create a new section of road, extending from Ellerton Drive to the intersection of Old Cooma Road and Edwin Parkway.

1.6 **Lot description**

Council owns approximately half of the land in the road corridor and has begun the process of acquiring the rest of the land by agreement. Specifically, the land owned by Council includes:

- Lot 49 DP754907
- Lot 3 DP 1097427
- Lot 2 and Lot 3 DP 869386
- Lot 52 and Lot 53 DP 835313
- Lot 205 DP 771021
- Lot 141 DP 718941
- Lot 67 DP 264406
- Road corridor between Lot 2 DP 8669386 and the Queanbeyan River.
- Lot 1, 2, 3 DP 872684
- Lot 4 DP 800542
- Roads within DP 15222 and DP15764

Land council is looking to purchase includes:

- Lot 174 DP 793880
- Lot 4 and 5 DP 872684
- Road corridor through Lot 1 DP711905
- All Lots of DP 15222 and DP15764.

1.7 **Local Government Area and Council contact (if known)**

The works would occur entirely within the Queanbeyan LGA. The Queanbeyan City Council would be both the proponent and determining authority under Part 5 of the NSW Planning and Environmental Assessment Act 1979. The Council contact is Lorena Blacklock, Manager Development Control, 02 6285 6115.

1.8 **Time frame**

The works would be undertaken in two stages.

- Stage 1 (2015-2017) would consist of earth works and the construction of a single carriage way (two lane road) with provisions for cyclists. Earthworks and vegetation clearing conducted during Stage 1, would be completed to the extent that would accommodate a dual carriage way (four lane road).
- Stage 2 (required sometime after 2031) would involve the construction of the additional two lanes within the area that would be cleared and stabilised during Stage 1.

1.9	**Alternatives to proposed action**	No	No feasible alternatives were identified. Refer to Section 2.2 for further information.
1.10	**Alternative time frames etc**	No	No alternative time frames were identified. The proposed time frames are based on the dates the traffic studies expect the current road network to exceed capacity.
1.11	**State assessment**	Yes	Refer Section 2.5

1.12	**Component of larger action**	No	The proposal includes two stages, but this is described in Section 1.8.
1.13	**Related actions/proposals**	No	
1.14	**Australian Government funding**	Yes	The Commonwealth Government are contributing $25 million towards construction of the road. The State Government have contributed another $25 million towards construction of the road.
1.15	**Great Barrier Reef Marine Park**	No	

2 Detailed description of proposed action

2.1 Description of proposed action

Queanbeyan City Council (QCC) is proposing to construct a 4.6 kilometre extension of Ellerton Drive, Queanbeyan, to link East Queanbeyan and Karabar at the west. The development proposal involves the construction of a dual carriageway (two lanes in each direction) sealed road with bridge crossings over the Queanbeyan River. The new section of road would form an important link in the regional transport corridor and is considered necessary by Queanbeyan's Transport Plan, The Googong and Tralee Traffic Study 2031 (Gabites Porter 2010). The benefits of the route and alignment include:

a) Provision of a free flow controlled access road for local residents as well as traffic travelling through Queanbeyan,
b) Provision of the only connection between the east and west of Queanbeyan during a 1 in 100 year flood event (which sees much of the CBD underwater),
c) Additional connections to Fairlane Estate and Greenleigh Estate (emergency access only) for properties which currently have only one access.

The works would be undertaken in two stages. Stage 1 (to be constructed between 2015 and 2017) would consist of earth works, the construction of a single carriage way (two lane road) and the construction of a two lane bridge with provisions for cyclists. Earthworks and vegetation clearing conducted during Stage 1, would be completed to the extent that would accommodate a dual carriage way (four lane road). Stage 2 (to be constructed sometime after 2031) would involve the construction of the additional two lane road and two lane bridge within the area that would be cleared and stabilised during Stage 1.

The proposed construction works would involve:

- Clearing of native vegetation
- Soil disturbance from excavation, filling and compaction
- Importation and stockpiling of materials
- Establishment of construction compounds and facilities
- The use of various vehicles, plant and machinery

The extent of the proposed clearing and potential locations of stockpiles and construction compounds is shown on Figure . Stockpiles would be sited in areas that would be cleared during the Stage 1 works for the future Stage 2 duplication of the road (within the development footprint). Potential construction compounds are proposed in existing cleared, highly disturbed areas.

There is no requirement to relocate the communication or electrical infrastructure that crosses the site. It is possible that there may be a need to relocate some of the QCC's 300mm diameter water main. Some services may require relocation on Barracks Flat Drive, within the study area just south of the Queanbeyan River however, these services are located in previously disturbed areas.

The development footprint is defined as the final formed extent of the earth works required for the proposal, including all cut and fill batters. The development footprint is approximately 26 ha in area, 4.6km long, and ranges in width from approximately 40 m to 110 m.

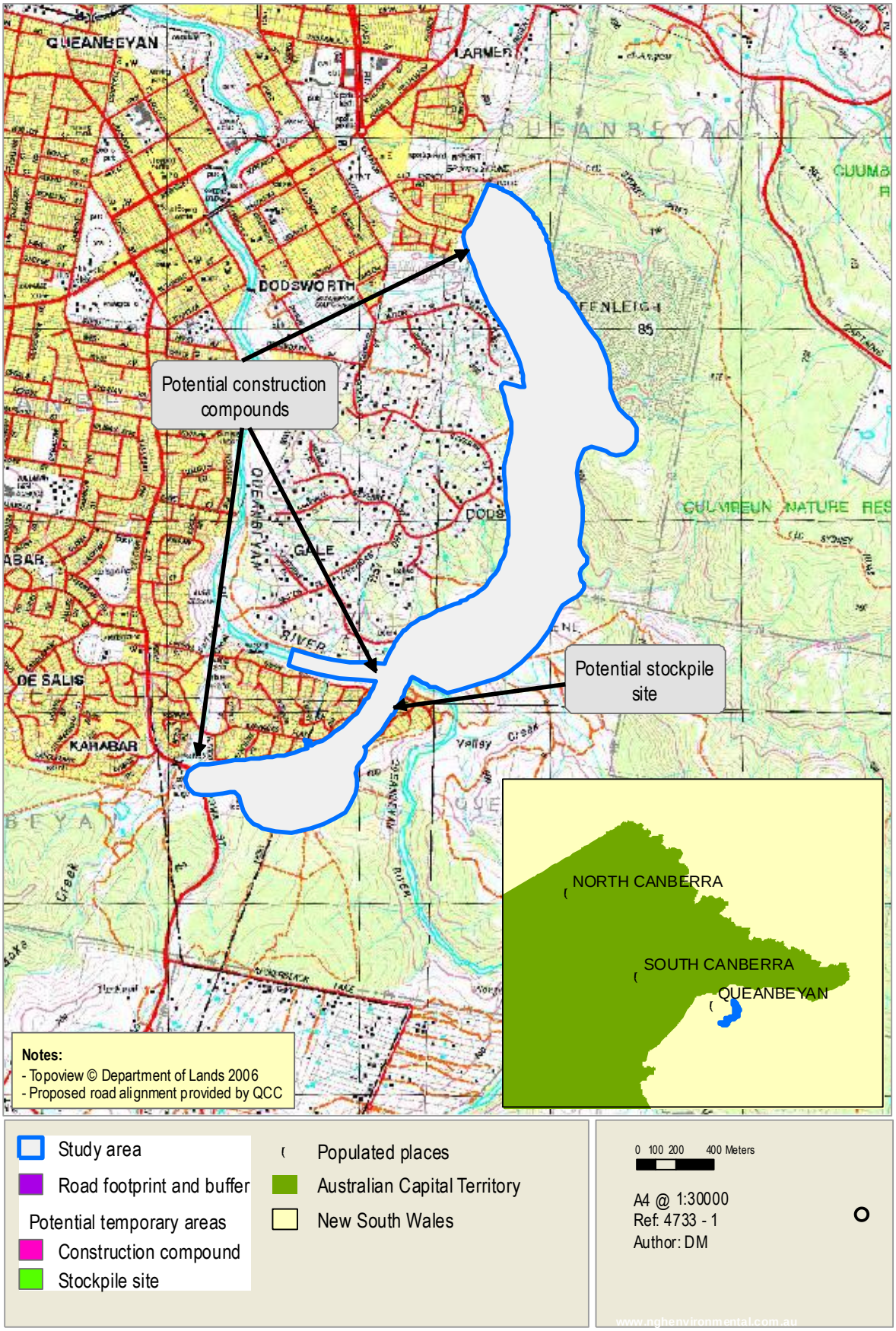

Figure 1 Location of the proposal.

2.2 Alternatives to taking the proposed action

In response to the growing population and increased suburbanisation within the Queanbeyan LGA, Queanbeyan City Council is conscious of their role in providing traffic and transport infrastructure within the region and have undertook several traffic studies to determine the effects of growth on the road network. Traffic studies found that the locations most congested included Cooma Street and the Queens Bridge as the lack of river crossings forces traffic through the CBD. Alternative routes for the Ellerton Drive Extension have been assessed as part of these traffic studies.

The original Googong and Tralee Traffic Study 2031 (Gabites Porter 2010) modelled many combinations of a series of both new and upgraded road links and intersections. The scenarios were developed by a working group comprising of Queanbeyan City Council, Roads and Traffic Authority (now RMS), a traffic consultant and local developers. The traffic study looked at the following options as well as various combinations of them:

a) Dunns Creek Road - the option of connecting Old Cooma Road with the Monaro Highway was seen as useful to include by the working group but could not be justified for the known growth as it didn't reduce congestion along Cooma Street or the Queens Bridge. It is currently estimated to cost twice as much as Ellerton Drive Extension with greater environmental affects and subsequently greater required offsets which would add to the project cost.
b) The Northern bypass (connection of the Kings Highway from the Ridgeway area to the ACT with connections to Pialligo Avenue and Canberra Avenue) - the RTA eliminated this option as the benefits gained were currently insufficient to warrant the substantial cost of the project
c) Duplication of Southbar Road - did not improve the congestion along Cooma Street
d) Duplication of Old Cooma Road - improved the congestion coming into Queanbeyan but did not improve the congestion on both Cooma Street and the Queens Bridge
e) Four laning Cooma Street (Southbar Rd to Rutledge St) - the introduction of clearways to provide four lanes on Cooma Street improved the congestion on Cooma Street but did not improve the Queens Bridge while reducing amenities to Cooma Street residents
f) Ellerton Drive Extension - improved the congestion on both Cooma Street and the Queens Bridge
g) Duplication of Ellerton Drive Extension - was not justified within the current 2031 planning horizon
h) Duplication of the Bungendore Road (at the approach to the Queens Bridge) - improved the congestion leading up to the Queens Bridge but did not improve the congestion at the bridge itself.

Queanbeyan's traffic study found that some of the options modelled above did not fulfill the role intended, did not improve future network deficiencies or were too expensive. Regardless of what scenario was analysed, the congestion on both Cooma Street and the Queens Bridge did not improve significantly without the inclusion of the Ellerton Drive Extension.

The ‘do nothing’ approach (not developing the Ellerton Drive extension) would not provide the necessary transport infrastructure to accommodate the future transport demands of Queanbeyan and the region. Pressures on existing roads would continue to increase, eventually exceeding the capacity of the current road network. This would cause substantial traffic congestion and delays in the regional transport corridor and ultimately restrict the growth potential of the Queanbeyan area. To do nothing would also take away the only east west connection in Queanbeyan during a 1 in 100 year flood event. Currently the only crossing of the Queanbeyan River is at the CBD and a good part of the road network in the CBD is under water during a 1 in 100 year flood event.

2.3 Alternative locations, time frames or activities that form part of the referred action

N.A.

2.4 Context, planning framework and state/local government requirements

State Policies

Queanbeyan City Council Residential and Economic Strategy 2031

The NSW Department of Planning published the *Queanbeyan City Council Residential and Economic Strategy 2031* (DoP 2007), which acknowledged a need for further work on transportation modelling and studies to highlight the likely impacts and measures required to respond to future demands resulting from residential developments. The report outlines the need to eventually connect Edwin Land Parkway to the Kings Highway as a means to support future growth in Queanbeyan.

Local

Queanbeyan Local Environment Plan 2012

As the Queanbeyan population grows within the Queanbeyan LGA, the Council is conscious of their role in improving traffic and transport infrastructure within the region. Much of the route for Ellerton Drive Extension has been zoned SP2 Infrastructure in the current *Queanbeyan Local Environmental Plan 2012* with provisions within the remaining land zones for the inclusion of the road. Ellerton Drive Extension is specifically mention in Part 6 Clause 6.6 'Access to Jumping Creek' in the QLEP. This regulation prevents the development consent for development at Jumping Creek land unless vehicular access to and from the development will be provided by Ellerton Drive Extension.

Queanbeyan Tomorrow Community Vision 2021
In 2006 Queanbeyan City Council consulted widely with the Queanbeyan community to develop a long term Community Vision for the city. The vision gives direction and focus for Council's future activities. One of the outcomes was to obtain a Bypass (which includes the Ellerton Drive Extension) that takes heavy vehicles out of the CBD, that allows traffic to flow easily between suburbs and the CBD, and will assist traffic flow through Queanbeyan from the ACT to the coast.

Legislation
The works are proposed by the Queanbeyan City Council (QCC). QCC would be both the proponent and determining authority under Part 5 of the NSW *Planning and Environmental Assessment Act 1979*. This act provides the most relevant state planning framework for the proposal.

Additional legislation relevant to the proposal includes:

- Clause 228 of NSW Environmental Planning and Assessment Regulation 2000

QCC are obliged to consider clause 228 of NSW Environmental Planning and Assessment Regulation 2000 with regard to identification of environmental impacts of proposals. The factors specified under this regulation (*What factors must be taken into account concerning the impact of an activity on the environment?)* form the scope of the REF.

- Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 aims to conserve and protect threatened, endangered and vulnerable species, populations and ecological communities, listed in NSW.

- Noxious Weeds Act 1993

This act aims to prevent the establishment, reduce the risk of spread and minimise the extent of noxious weeds. The Noxious Weeds Act 1993 guides the management of declared noxious weeds within Local Government Areas (LGAs).

- Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 (POEO Act) provides an integrated system of licensing for polluting activities within the objective of protecting the environment. The Environment Protection Authority (EPA) must be notified when a ‘pollution incident’ occurs that causes or threatens ‘material harm’ to the environment.

- Heritage Act 1977

The NSW Heritage Act 1977 (Heritage Act) is a statutory tool developed to conserve the cultural heritage of NSW. It is used to regulate development impacts on the State’s heritage assets. Administered by the NSW Heritage Office, the Act details the statutory requirements for protecting historic buildings and places and includes any place, building, work, relic, movable object or precinct, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value.

- Water Management Act 2000

The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. Should the proposal require the extraction of water from a bore, then additional approvals under the WM Act may apply.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

An environmental assessment will be prepared under Part 5 of the NSW EP&A Act 1979. A Review of Environmental Factors (REF) is the prescribed format for Part 5 assessments. The relevant Council contact is Lorena Blacklock Manger Development Control.

Several specialist studies have already been completed to inform the REF. These include:

- A community consultation plan has been prepared and implemented, as part of this process, refer Section 2.6.

- A Species Impact Statement (SIS), attached to this referral. Because of the likelihood of a significant impact resulting for a listed endangered ecological community (White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland), a referral to NSW Office of Environment and Heritage was made and a Species Impact Statement was prepared, in accordance with this agency's proposal-specific guidance documents. It is noted that several Commonwealth listed entities, including White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland and Hoary Sunray *Leucochrysum albicans var. tricolor*, are covered by the SIS. The SIS has now been finalised in agreement with OEH. The OEH contact is Allison Treweek, Senior Team Leader Planning-South East Regional Operations Group.

- Archaeological Assessment of the Proposed Ellerton Drive Extension, Queanbeyan, attached to this referral.

2.6 Public consultation (including with Indigenous stakeholders)

Consultation with Indigenous stakeholders commenced in June 2012 with project notification and requests being sent out to known Aboriginal community groups or registered stakeholders in the area. An advertisement for interested stakeholders were also places in the Koori Mail, Queanbeyan Chronicle, Indigenous Time, Canberra Times and Queanbeyan Age in July 2012. Letters inviting expressions of interests were also sent to list of potential cultural knowledge holders constructed by Office of Environment and Heritage and Murrumbidgee Catchment Management Authority. The following registered stakeholders expressed interest in the project and were called 1 August 2014 to provide a representative to complete fieldwork on 2 August 2012:

- Buru Ngunawal Aboriginal Corporation
- Ngambri Local Aboriginal Land Council
- Ngnunawal Aboriginal Heritage Corporation
- King Brown Tribal Group
- Ngunnawal Elders Council
- Karley Ngunnawal Descendents

The completed Archaeological Report was submitted to all participating community groups, requesting comments and feedback. The report was amended to include this received feedback from the Aboriginal Community.

Broader public consultation has been undertaken between 20 May and 21 June 2013. Advertisements for this consultation period were provided in the Queanbeyan Age, The Chronicle, Council's facebook page and twitter. Emails were sent to those registered on the Ellerton Drive Extension mailing list. Letters sent to all residents in the Greenleigh and Fairlane Estates on the 15 May 2013 advising of consultation period and providing a copy of FAQS on the Project. This letter was followed up with a reminder letter on the 10 June 2013 of the consultation period and providing them with a copy of the connection options to either estate and a feedback form.

The consultation included the public exhibition of the Archaeological Report, concept plans and draft SIS. These were placed on display between Monday 20 May 2013 and Friday 21 June 2013 at the following locations:

- Council office on ground floor level of 257 Crawford Street
- Queanbeyan City Council Library
- Riverside Plaza
- Karabar Shopping Centre
- Jerrabomberra Shopping Centre
- Council's website under "Documents for Public Exhibition".

Two public information session were conducted. One specific for Greenleigh and Fairlane Estate residents on the 28 May 2013 and a general information session on the 29 May 2013.

Further public consultation will be conducted through the public exhibition of the preliminary design, Species Impact Statement, Review of Environmental Factors and this referral, as part of the Part 5 assessment process later in 2014.

2.7 A staged development or component of a larger project
N.A.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

No world heritage properties are relevant to the proposal

Nature and extent of likely impact
N.A.

3.1 (b) National Heritage Places

Description

No national heritage places are relevant to the proposal.

Nature and extent of likely impact
N.A.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

No Wetlands of International Importance are relevant to the proposal.

Nature and extent of likely impact
N.A.

3.1 (d) Listed threatened species and ecological communities

An SIS of the proposed action was undertaken to assess the likely impacts of the action on biodiversity including threatened species and ecological communities listed under the NSW TSC Act. The SIS also included survey effort and mapping of species, ecological communities and habitat for species listed under the Commonwealth EPBC Act in anticipation of a Referral requirement. This assessment included literature review, searches of relevant databases including the EPBC Protects Matters Search Tool (10km buffer search area) and seasonal field surveys, commencing September 2012 and concluding in November 2013, to evaluate habitat. Seasonal surveys included:

Flora:	Spring 2012 Spring 2013	Fauna:	Spring 2012 Summer 2012 Autumn 2013 Spring 2013

A habitat evaluation for all threatened entities returned from a Commonwealth EPBC Protected Matters Search (10km buffer search area) was undertaken as part of the Species Impact Statement (SIS). The evaluation is a preliminary assessment to identify which species required further consideration within the SIS.

The likelihood of occurrence is evaluated based on presence of suitable habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the impact, the ecology of the species and its likelihood of occurrence. The evaluation is presented below.

Communities

EEC	Presence of habitat	Likelihood of occurrence	Possible impact?
White Box Yellow Box Blakely's Red Gum Woodland EPBC-CEEC	Present	Present	High.
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions EPBC-E	Absent	None	No
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory E EPBC	Absent	None	No

Flora

Species	Presence of habitat	Likelihood of occurrence	Possible impact?
Eucalyptus parvula Small-leaved Gum EPBC-V	Absent	None	No
Eucalyptus pulverulenta Silver-leafed Gum EPBC-V	Marginal	Unlikely.	Low
Westringia kydrensis Kydra Westringia EPBC-E	Absent	None	No
Pomaderris pallida Pale Pomaderris EPBC-V	Present	Unlikely. Targeted searches did not detect this species.	Low
Zieria adenophora Araluen Zieria EPBC-E	Absent	None	No
Zieria citriodora Lemon Zieria EPBC-V	Absent	None	No
Dodonaea procumbens Creeping Hop-bush EPBC-V	Absent	None	No
Rulingia prostrata Dwarf Kerrawang EPBC-E	Absent	None	No
Calotis glandulosa Mauve Burr-daisy EPBC-V	Marginal	Unlikely	Low
Leucochrysum albicans var. *tricolor* Hoary Sunray E EPBC	Present	Present	High.
Rutidosis leiolepis Monaro Golden Daisy EPBC-V	Absent	None	No

Rutidosis leptorrhynchoides Button Wrinklewort EPBC-E	Present	Unlikely. Targeted searches did not detect this species.	Low
Lepidium hyssopifolium Aromatic Pepper-cress EPBC-E	Present	Unlikely. Targeted searches did not detect this species.	Low
Swainsona recta Small Purple-pea EPBC-E	Present	Unlikely. Targeted searches did not detect this species.	Low
Thesium australe Austral Toadflax EPBC-V	Absent	None	No
Lepidium ginninderrense Ginninderra Peppercress V EPBC	Absent	None	No
Pelargonium sp. Striatellum Omeo Stork's-bill E EPBC	Absent	None	No
Prasophyllum petilum Tarengo Leek Orchid TSC-E, EPBC-E	Absent	None	No
Species	**Presence of habitat**	**Likelihood of occurrence**	**Possible impact?**
Caladenia tessellata Tessellated Spider Orchid, Thick-lipped Spider Orchid EPBC-V	Present	Unlikely	Low
Diuris aequalis Buttercup Doubletail EPBC-V	Present	Unlikely. Targeted searches did not detect this species.	Low
Diuris pedunculata Small Snake Orchid EPBC-E	Marginal	Unlikely	Low

Fauna

Species and Status	Presence of habitat	Records in the Locality (10 km)	Possible Impact
Golden Sun Moth *Synemon plana* CE EPBC	Marginal	Yes. Five records west and south west of study area.	Low, however, this species is assessed further within the SIS.
Giant Burrowing Frog *Heleioporus australiacus* V EPBC	Absent	No	No
Green and Golden Bell Frog *Litoria aurea* V EPBC	Absent	No	No
Yellow-spotted Tree Frog *Litoria castanea* E EPBC	Absent	No	No
Southern Bell Frog / Growling Grass Frog *Litoria raniformis* E EPBC	Absent	No	No
Alpine Tree Frog *Litoria verreauxii alpina* V EPBC	Absent	No	No

Pink-tailed Worm-lizard *Aprasia parapulchella* E EPBC	Marginal	Yes. Several records south-west and west of study area.	Low, however, this species is assessed further within the SIS.
Striped Legless Lizard *Delma impar* V EPBC	Marginal	No	No.
Grassland Earless Dragon *Tympanocryptis pinguicolla* E EPBC	Absent	No	No
Swift Parrot *Lathamus discolour* E EPBC	Marginal	No	No
Superb Parrot *Polytelis swainsonii* V EPBC	Present	No	No
Regent Honeyeater *Anthochaera Phrygia* E EPBC	Present in Box-Gum Woodland	No	No
Spotted-tailed Quoll *Dasyurus maculatus* E EPBC	Absent	No	No
Species and Status	**Presence of habitat**	**Records in the Locality (10 km)**	**Possible Impact**
Koala *Phascolarctos cinereus* V EPBC	Present - secondary	Yes – only one north or study area. However, anecdotal evidence of recent sighting in neighbouring backyard to study area (pers. comm. A. Treweek)	Low, however, this species is assessed further within the SIS.
Brush-tailed Rock-wallaby *Petrogale penicillata* EPBC V	Absent	No	No
Grey-headed Flying-fox *Pteropus poliocephalus* V EPBC	Absent	No	No
Smoky Mouse *Pseudomys fumeus* E EPBC	Absent	No	No
Greater Long-eared Bat (now described as new species Corben's Long-eared Bat) *Nyctophilus corbeni* V EPBC	Marginal, but predominantly absent.	No	No
Australian Painted Snipe *Rostratula australis* V EPBC	Absent	No	No
Australasian Bittern *Botaurus poiciloptilus* E EPBC	Absent	No	No
Murray Cod *Maccullochella peelii* V EPBC	Marginal	No	No
Macquarie Perch *Macquaria australasica* E EPBC	Absent	No	No

Description

As determined by the preliminary evaluation above, the following critically endangered community and four threatened species were determined to be Commonwealth listed entities requiring further assessment within the SIS.

- **White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community** - An open woodland community sometimes occurring as a forest formation. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. This ecological community occurs in areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres.

- **Hoary Sunray** - Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Can occur in modified habitats such as semi-urban areas and roadsides. Highly dependent on the presence of bare ground for germination. In some areas, disturbance is required for successful establishment.

- **Pink-tailed Worm-lizard** - This species inhabits primary and secondary grassland, grassy woodland and woodland communities on well-drained slopes with rocky outcrops or partially embedded rocks and native grasses (predominantly Kangaroo Grass). The species shelters under small rocks (15–60 cm basal area) spending time in ant burrows of which it also feeds on.

- **Koala** - Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees.

- **Golden Sun Moth** - Ideal habitat is Natural Temperate Grassland and grassy Box-Gum Woodland in which ground cover is dominated by wallaby grasses *(Austrodanthonia* sp.). In the nearby ACT, the grasses include Silvertop Wallaby Grass and in NSW, *A. auriculata, A. carphoides, A. pilosa, A eriantha,* and *A setacea.* At least a 40 % cover of Wallaby Grass is optimal for the species. However, is known to occur in small, fragmented and disturbed grassland remnants where native species may not be dominant.

Nature and extent of likely impact

The assessment of the nature and extent of impact was completed based on literature review and a comprehensive field survey program. The field surveys included:

- Vegetation mapping and consideration of structural and floristic diversity
- Targeted flora surveys in areas of potential habitat
- Targeted fauna survey including:
    - Golden sun moth surveys in accordance with Commonwealth guidelines
    - Rock rolling during the appropriate seasonal window for the Pink tailed worm lizard
    - Koala surveys using vegetation mapping and the RGB-SAT technique *.

* Regarding koala surveys, it is noted that the current guidelines on the DOE Species Profile and Threats Database website are draft (Draft EPBC Act referral guidelines for the koala *Phascolarctos cinereus* in Queensland, New South Wales and the Australian Capital Territory). This draft guideline was not available at the time of the SIS assessment however, it suggests vegetation mapping and faecal pellet searches, for example the Spot Assessment Technique (SAT) developed by Phillips and Callaghan (2011) or the Regularised Grid-based Spot Assessment Technique (RGB-SAT) are appropriate. **ngh**environmental undertook the RGB-SAT assessment in accordance with these guidelines and also completed vegetation mapping. The RGB-SAT method is accepted both at the state and commonwealth level.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community

The proposal will result in the removal of up to 4 ha of the 14 ha local occurrence of this community leaving 10 ha remaining. The action would not fragment or increase the existing fragmentation of the community. The habitat to be removed is not considered critical to the survival of the community nor would the action destroy or modify abiotic factors necessary for the community's survival. A substantial change in the species composition of the

community is considered unlikely and with the implementation of ameliorative measures, the risks to the community from invasive species and pollutants are considered to be low. The action is unlikely to interfere with the recovery of the community outside of the area of direct impact and weed control measures are likely to be beneficial. However, as discussed within the TSC Act assessment of significance above, in the context of current and future development pressures, the high conservation significance of the area to be removed and considering that the proposal would remove approximately 30% of the local occurrence, **the impacts to the community as a result of the proposal are considered to be significant. (**Refer to results of Assessment of significance, below).

Hoary Sunray
The proposed action will result in the permanent removal of approximately 5,000 Hoary Sunray individuals, decreasing the size of the local population from an estimated 13,000 to 8,000 individuals. Approximately 19ha of suitable habitat for this species will be permanently removed however, not all of this habitat is ideal or currently being occupied by the species. Disturbance caused by the action may in fact create additional areas of habitat and opportunities for recruitment. The action is considered unlikely to fragment the local population or disrupt the breeding cycle and habitat to be impacted is not considered critical to the survival of the species. The species is locally common within the Queanbeyan area and occupies a broad range of habitats. **A significant impact to the Hoary Sunray as a result of the proposed action is considered unlikely.**

Pink-tailed Worm-lizard
The proposal would result in the permanent removal of 4 ha of low quality potential habitat for this species. The species is not known to occur within the study area and no evidence of the species was detected during targeted surveys within potential habitat. However, the species is known from the locality with most records south of the study area nearby Tralee or the Poplars, in which the species was identified in rock outcrops. Other records are noted west of Cooma Road nearby the Queanbeyan River on ridges now predominantly surrounded by residential land. Several other studies have failed to locate the species within the locality during targeted searches. The regional abundance of the species is unconfirmed and the distribution of the Pink-tailed Worm-Lizard is patchy, with records known within the Queanbeyan and Canberra areas as well as Cooma, Yass and Bathurst.
Given that no evidence of the species was detected during targeted surveys and the potential habitat within the study area lacks key habitat resources such as rock shelters and tussock forming grasses, **it is unlikely the proposal would result in a significant impact to this species.**

Koala
The proposal would result in the permanent removal of 20 ha of potential habitat. The species was not detected during surveys and the study area is not known to support a Koala population, but could potentially be used by young dispersing Koalas. Much of the area to be affected by the proposed works is currently subject to disturbance, reducing its value as habitat. Predation by domestic animals, ingress of weeds, clearing and construction are current disturbances associated with the areas close proximity to residential development.
Greater than 10 000 ha of similar woodland and forest habitat is available in the locality. Given the targeted surveys did not detect the species, the study area is not known to support a Koala population, the habitat does not support primary feed trees and the large extent of available habitat that will remain in the locality, **the proposal is not considered to result in a significant impact to this species.**

Golden Sun Moth
The proposal would result in the removal of 4 ha of marginal potential habitat in the southern parts of the study area. No Golden Sun Moths were observed during the field surveys, despite a targeted 4 day survey in areas of potential habitat, including areas dominated by wallaby grasses in small or extensive patches, and areas containing spear grasses and Redleg grass. Given that no evidence of the species was detected during surveys despite surveys being undertaken within the known flying season of this species, and the potential habitat within the study area is considered unsuitable or low quality, **it is considered that the proposal would not result in a significant impact to this species.**

Attachments 2 and 3 show the location of Matters of national environmental significance in the locality (overview) and in proximity to the study area (close up).

Significant Impact Guidelines
The Environment Protection and Biodiversity Conservation Act 1999 specifies factors to be taken into account in deciding whether a development is likely to significantly affect Endangered Ecological Communities. Specific to White Box-Yellow Box-Blakely's Red Gum grassy woodland and derived native grassland, an assessment of significance was undertaken to characterise the significance of the impact to White Box-Yellow Box-Blakely's Red Gum grassy woodland and derived native grassland (Critically Endangered Ecological Community) more specifically. The following assessment is sourced from the SIS.

a) Will the action reduce the extent of an ecological community?

The proposal is expected to reduce the extent of the local occurrence of the community by up to 4 ha. This would result in a decrease of the local extent from 14 ha to 10 ha.

b) Will the action fragment or increase fragmentation of an ecological community?

The existing local occurrence of the community is already isolated from other occurrences in the locality. The action will not increase the isolation or fragment the community.

c) Will the action adversely affect habitat critical to the survival of an ecological community?

The action will not affect habitat listed on the Register of Critical Habitat under the EPBC Act.

It is anticipated that the remaining 10 ha of the local occurrence of the community will be viable for the long term and approximately 187 ha of the community is known to occur within a 10km radius of the study area (mostly secured in Nature Reserves). The 4 ha of habitat to be removed by the action is not considered critical to the survival of an ecological community.

d) Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns?

Aside from the 4 ha of habitat to be permanently removed by the proposed action, there will be no impacts to soils within areas of the community outside of the subject site. There are unlikely to be any impacts to local hydrology that would impact on the community.

e) Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting?

There is potential for alteration to the species composition of the community through the introduction and or spread of weeds. Ameliorative measures have been described in this SIS to minimise this potential and it is considered unlikely that the threat to the community from weeds will increase. Weed species are already established at the site and proposed control measures are likely to result in a net reduction in weeds. No burning or flora and fauna harvesting is proposed within areas that are not directly impacted by the proposal. A decline or loss of functionally important species within the community is considered unlikely.

f) Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

i. Assisting invasive species, that are harmful to the listed ecological community to become established; or

ii. Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community?

i. Roads are a vector for the introduction and spread of invasive weed species. The establishment of a major road within close proximity to the community may assist invasive weed species to become established however, measures have been described in this SIS to monitor and control the establishment and spread of weeds. With the implementation of these measures it is considered unlikely that weed species will become established to the extent that they are harmful to the community.

ii. It is likely that herbicides will be used in the control of weed species within the community. The use of herbicides will be strictly controlled and only applied by qualified individuals who are trained in the identification of weed species and appropriate application of herbicides. It is considered unlikely that non target species within the community would be adversely affected by the use of herbicides. A spill response protocol will be in place to effectively manage spills should they occur.

   a. Roads can be a source of pollutants, particularly hydrocarbons, which could potentially adversely affect the community. The road has been designed with drainage structures that would direct runoff away from adjacent vegetation communities.

g) Will the action interfere with the recovery of an ecological community?

The local occurrence of the community exhibits evidence of natural overstorey regeneration. This process is occurring across the study area including areas outside of the subject site that would not be impacted. The action would not interfere with this process outside of the area of impact.

Weeds are established within the community and present a threat to its understorey diversity. As discussed above it is considered unlikely that the action would increase the threat from weed invasion and would potentially be beneficial in reducing the impacts from weeds thereby assisting in the recovery of the local occurrence of the community.

3.1 (e) Listed migratory species

As above, the Commonwealth EPBC Protected Matters Search (10km buffer search area) returned the following migratory species which were evaluated. The evaluation is a preliminary assessment to identify which species required further consideration within the SIS. No impact is considered likely for any of these species.

Description

Species and Status	Presence of habitat	Records in the Locality (10 km)	Possible Impact
Latham's Snipe *Gallinago hardwickii* M EPBC	Absent	No	No
White-bellied Sea Eagle *Haliaeetus leucogaster* M EPBC	Marginal > Along Queanbeyan River	No	No
White-throated Needletail *Hirundapus caudacutus* M EPBC	Present	No	No
Rainbow Bee-eater *Merops ornatus* M EPBC	Present	No	No
Black-faced Monarch *Monarcha melanopsis* M EPBC	Present	No	No
Satin Flycatcher *Myiagra cyanoleuca* M EPBC	Present	No	No
Rufous Fantail *Rhipidura rufifrons* M EPBC	Present	No	No
Great/White Egret *Ardea alba* M EPBC	Absent	No	No
Cattle Egret *Ardea ibis* M EPBC	Marginal	No	No

Nature and extent of likely impact
N.A.

3.1 (f) Commonwealth marine area

Description
No Commonwealth marine areas are relevant to the proposal

Nature and extent of likely impact
N.A.

3.1 (g) Commonwealth land

Description

The proposal is not on Commonwealth land and would not have impacts on Commonwealth land.

Nature and extent of likely impact
N.A.

3.1 (h) The Great Barrier Reef Marine Park

Description

The Great Barrier Reef Marine Park is not relevant to the proposal

Nature and extent of likely impact
N.A.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description
The proposal is not related to a coal seam gas development or large coal mining.

Nature and extent of likely impact
N.A.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	No	
	If yes, nature & extent of likely impact on the whole environment		
3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	No	
	If yes, nature & extent of likely impact on the whole environment		
3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	No	
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		
3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	No	
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))		
3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	No	
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))		

3.3 Other important features of the environment

3.3 (a) Flora and fauna

A Species Impact Statement has been completed to describe the biodiversity values of the subject site and surrounding study area. This study compiled information from existing studies of relevance to the site as well as undertaking a series of targeted and general flora and fauna surveys to inform the assessment. Hence, this extract below of the flora and fauna values of the area is considered to be well informed.

Fauna habitats and habitat elements

There are five broad habitat types present in the study area, and these are generally homogenous throughout the study area and include: 1) Dry Forest; 2) Woodland; 3) Shrubland; 4) Grassland; and 5) Riverine and/or drainage lines. Additionally, three important habitat features are present and include: hollow-bearing trees, termite mounds, and rock habitats.

Habitat quality in the study area is variable due to different soil types, disturbance histories (including type and intensity of land management) and ranges from poor to good quality. The northern half of the study area supports better quality habitat with approximately 7.6 ha of good quality habitat identified east of Severne Street. The southern end of the study area that is in close proximity to residential development is more disturbed resulting in predominantly poor-moderate habitat quality, with some patchy areas of good condition woodland habitat.

Habitat connectivity

Habitat connectivity exists north, east and south of the study area within both protected and private lands. There is no habitat connectivity to the west of the study area for the entire length of the proposed road due to residential development and existing dwellings. Strong connectivity is apparent in the northern section of the study area which links to a contiguous area of habitat that adjoins land zoned for Environment Conservation and Cuumbuen Nature Reserve. The south of the study area adjoins land that also connects to Mount Jerrabomberra.

Flora and fauna species

During surveys in the development footprint and adjacent study area and locality, the SIS identified 288 flora species including 29 trees, 40 shrubs, 2 ferns, 7 vines, 151 forbs, 44 grasses and 15 graminoids.

One-hundred and fourteen fauna species were recorded during the survey periods comprising 10 microbats, a further 12 mammals, 80 birds, six reptiles and six frogs. The species lists are provided as an attachment.

3.3 (b) Hydrology, including water flows

The proposal crosses the Queanbeyan River. The northern side of the river is covered by dense shrubland on both the river's edge and immediately upslope. The southern side of the river supports fringing vegetation of reeds, grasses and shrubs (including Pampas Grass, *Cortaderia* sp.). There is a low abundance of woody debris within the river and aquatic vegetation was not clearly visible during the site surveys.

An ephemeral drainage line also occurs generally within the northern section of the study area where it runs south towards Queanbeyan River. This drainage line intermittently fills with water after heavy rainfall events.

3.3 (c) Soil and vegetation characteristics

The northern half of the site between Ellerton Drive and a point about 400m north-east of Lonergan Drive occurs on relatively steep and dissected terrain with skeletal soils derived from Ordovician metasiltstone. The southern half is underlain by metamorphosed sedimentary rocks. The soils for the study area include lithosols and alluvial, residual and colluvial deposits. Small outcrops of bedrock are sparsely distributed across the site.

3.3 (d) Outstanding natural features

The Queanbeyan River provides limited aquatic habitat.

3.3 (e) Remnant native vegetation

Three native vegetation communities were identified within the study area.

1. Tablelands Dry Shrub/Tussock Grass Forest
2. Tablelands Acacia/Grass/Herb Dry Forest
3. Tableland Dry Grassy Woodland (Commonwealth listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community)

All three are considered depleted and poorly reserved, although only the Tableland Dry Grassy Woodland is listed (it is considered an Endangered Ecological Community under both NSW and Commonwealth criteria).

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The elevation of the site is 630 metres to 1000 metres above sea level. The landscape is dominated by moderate to high gradient slopes separated by incised drainage lines to the northeast and east.

3.3 (g) Current state of the environment

Native vegetation is dominant across the study area excluding the corridor between residential development south of the Queanbeyan River which is largely comprised of exotic grasses. The majority of the study area has been subject to varying levels of disturbance. Disturbance appears to be generally lower in the north of the study area and more intensive in the south. Despite the higher levels of disturbance in the south, the native vegetation in this area exhibits a high level of diversity.

Common weed species are widespread throughout the study area and ten noxious weeds listed for the Queanbeyan City Local Control Area were detected during the surveys. The site is also in close proximity to development and residential estates. Disturbance to the site also includes numerous vehicle and walking tracks across the site and minor rubbish dumping.

Refer to Section 1.3(c) for further vegetation characteristics.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

No Commonwealth Heritage Places or places of heritage values were identified in the study area.

3.3 (i) Indigenous heritage values

An archaeological heritage assessment was prepared for Queanbeyan City Council.

Eight Aboriginal heritage sites had been previously identified within 100 metres of the proposed centreline of the road corridor compromising of 7 open artefacts and an isolated find. During field work only 3 sites could be relocated, however an additional 6 sites were identified including 4 open artefacts scatters and two isolated finds.

Six sites were assessed as being of low scientific significance and having low conservation values on the grounds that these sites show the same range of raw materials and artefact classes as have been identified elsewhere in the region. The other six sites were identified as forming a single large open artefact scatter extending across a broad ridge crest. This site is assessed as being of low/medium scientific significance and having a moderate conservation value. The site shows the same range of raw materials and artefacts classes as have been identified elsewhere in the region, however its size is relatively unusual in the area.

The registered Aboriginal parties did not disclose any specific knowledge of traditional values/places within the current study area.

3.3 (j) Other important or unique values of the environment

Much of the land within the locality has been subject to urban or rural development however, reserves and State Forests also occur. Reserves within the locality include Queanbeyan Nature Reserve (NR), Mount Jerrabomberra NR, Cuumbuen NR, Stoney Creek NR, Wanna NR and the Stringybark Reserve. The locality includes Googong Dam, in the south, and the majority of Kowen State Forest (SF), in the north. Kowen SF is mostly comprised of pine plantation. Additionally, Fairbairn Pine Plantation occurs to the west (these latter areas do not contribute to the native vegetation within the locality).

3.3 (k) Tenure of the action area (eg freehold, leasehold)

Council owns approximately half of the land in the road corridor and has begun the process of acquiring the rest which is freehold. Lot numbers are provided in Section 1.6 of this referral.

3.3 (l) Existing land/marine uses of area

The site is adjacent to two residential estates. Excluding the residential areas, there are no specific land uses occurring within the study area. The woodland areas in the south have numerous vehicle and walking tracks which cross through them suggesting that the areas are currently being used for recreational purposes or for vehicle access to areas west of the study area. In the north, the dry forest is relatively undisturbed. There are two tracks which cross the study area from west to east, one which appears to be an access to a dwelling to the east of the study area and another which provides access to some water tanks east of the study area. There are also a number of narrow tracks which are likely the result of trail bike activities. Minor rubbish dumping was also observed in the vicinity of the existing Ellerton Drive.

3.3 (m) Any proposed land/marine uses of area

The study area is located entirely within the Queanbeyan LGA. To the south-west of the Queanbeyan River, the subject site is within land zoned SP2 Infrastructure (Roads). North of the river, the subject site crosses an area zoned E4 Environmental Living for approximately 700m, with the remainder within land zoned E2 Environmental Conservation until the intersection with the existing Ellerton Drive. The bulk of the subject site falls within land zoned as E2 Environmental Conservation.

Apart from the proposed road project, no other proposed land uses are known.

4 Measures to avoid or reduce impacts

Specific to the avoidance (where possible) and mitigation of identified impacts to Commonwealth listed entities (as noted in the far right column), the following safeguards are relevant. These have been sourced from the recommendations of the Species Impact Statement. Note, the measures include the requirement to offset box gum woodland CEEC.

Note the wording of the measures contains information as to the timing of the control, ie prior to construction. The controls are standard in nature (ie weed control, habitat replacement, protection of adjacent habitat) and are therefore expected to be effective in implementation. The wording has been developed to be both clear and auditable, as required to demonstrate their effective implementation.

Avoidance of impacts	• Where works impact upon the Box-Gum Woodland EEC, fauna habitat in good condition or groups of Hoary Sunray (or in close proximity to groups of plants outside of the subject site), all works would be confined within the final road formation unless it is absolutely necessary to utilise the 5 m buffer area.	All species
	• In general, vegetation clearing would be kept to the minimum required. Clearing would comply with QCC guidelines.	All species
	• Areas outside of the works area would be clearly demarcated with temporary fencing, flagging tape or similar. No works or movement of equipment or machinery would occur within these areas. Mitigation of Construction impacts	All species
	• Searches would be undertaken within rock habitats and large fallen logs for threatened reptiles, or any other vertebrate fauna. Any animals found would be relocated to nearby suitable habitat.	Pink Tail Worm Lizard
	• All large logs and rock habitats disturbed during the clearing process would be relocated to nearby habitat in public land, particularly within areas that would be utilised by fauna. The land immediate east and south-east of the subject site is most appropriate. Rocks and logs removed from the subject site may also be used to enhance the habitat value at the entrances of the fauna underpasses.	Pink Tail Worm Lizard

	• The control of noxious weeds within the subject site prior to the commencement of construction works. • The cleaning of dirt and vegetation from vehicles and equipment prior to accessing areas of native vegetation on the site and prior to leaving the site, when working in weedy areas particularly the area north of the Queanbeyan River and within the weedy gully within the dry forest community south of the end of the existing Ellerton Drive. • Ongoing monitoring and control of existing weeds and new introductions throughout the construction phase.	Box-Gum Woodland
	• Prior to the commencement of any construction activities, all workers entering the area will be required to undertake an environmental induction. The induction will highlight the conservation significance of vegetation and habitats and the measures required to avoid unwanted impacts to these areas. In particular, the location of the Box Gum Woodland EEC and the potential for fauna species to occupy hollows during felling would be highlighted. • The induction will be conducted by a qualified ecologist, landscape contractor or Site Manager, familiar with the activities to be undertaken as well as the ecological constraints of the site.	All species
Mitigation of impacts	• Weed management would be ongoing for the life of the road, included in QCC's routine weed control practices. • Vegetation within the study area adjacent to the road corridor would be included in all on going management. • Spill response protocols would be in place to allow for timely and effective containment of hazardous materials and remediation should a spill occur (e.g. herbicides used in weed control). • Adequate drainage would be provided along the road edges to prevent hydrocarbons from the road surface being washed in to adjacent vegetation during rainfall events.	All species
	• Fire management plan be developed in conjunction with the Rural Fire Service (RFS).	Box-Gum Woodland Hoary Sunray
	• Fauna exclusion fencing (at least 1.5 m high mesh) to prevent access to the road by fauna would be included as part of the design.	Koala Pink Tail Worm Lizard
	• Two fauna culvert underpasses will be included within the road corridor, but the feasibility of the engineering design will influence their specific placement and design. The locations of the culverts will target the good quality dry grass forest; one at the northern end just south of Taylor Place; and one north of the Queanbeyan River approximately east of Woodman Place. The provisions of natural habitat features including logs, ground timber, and rock piles. The entrances to the underpasses will also include vegetation enhancement and/or rehabilitation with appropriate plantings to improve the connectivity to adjacent habitats and promote movement through the culverts.	Koala Pink Tail Worm Lizard

	• Vegetation overhanging barriers that may encourage fauna crossing into the road reserve would be avoided and any plantings within close proximity to the road reserve would be carefully considered so that they do not attract fauna species.	Koala
	• Residual impacts to the affected species and communities will be mitigated through an offset developed by QCC in consultation with OEH.	All species
	• A monitoring program should be implemented to determine the effectiveness of mitigation measures.	All species

5 Conclusion on the likelihood of significant impacts

5.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
X	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

N.A.

5.3 Proposed action IS a controlled action

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
X	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

In the context of current and future development pressures, the removal of approximately 30% (4 ha of the 14 ha) of the local occurrence of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community, the impacts to this community as a result of the proposal are considered likely to be significant.

6 Environmental record of the responsible party

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?**	x	

	Queanbeyan Council is developing a culture of positive environmental outcomes and commits substantial resources to improving our local environment. New processes have been developed to assess environmental risk for construction and operational activities. Council has an Integrated Sustainability Action Plan for the next 10 years, allocating funds to implement actions from environmental strategies. This project builds on and links to many environmental initiatives in the community. For example it supports the implementation of Council's objectives under our Community Strategic Plan Theme 6 'Ensuring a Sustainable future' and our Sustainability Policy. It links to the achievement of actions under the Queanbeyan Community Climate Change Action Plan (developed with considerable input from the community) & other Council environmental education initiatives for the community, such as the Enviro Expo events & Waterwise program. Council's Sustainability Environment Advisory Committee (made up of Councillors & community representatives) is also overseeing implementation of actions to improve the sustainability of the Queanbeyan local environment. Council has recently been successful in Environmental Trust funding to implement the "Sustainable Googong" project. This project builds on the momentum, knowledge and resources created from the Sustaining Our Towns project which was run across the SE region from 2009-2012 and had a sustainable housing design component although was more focused on existing housing. The project also supports and promotes going beyond or broader than the Googong sustainability requirements (50% water & 40% energy consumption reduction compared to BASIX 40% and 25%). Googong development will have a water treatment and reuse plant delivering treated water back to the homes for use in toilet flushing and irrigation.		
6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** In 2012 Queanbeyan City Council pleaded guilty to a pollution of waters incident for a sewerage overflow event and were prosecuted by NSW EPA. This incident occurred on 4th and 5th November 2007. Untreated sewerage escaped into the Queanbeyan River following an electricity outage that caused the failure of sewer pumps. Council was fined $80,000 by the NSW Land and Environment Court.	x	
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework** QCC is not a corporation		NA
6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)** Stage 2 Edwin Land Parkway Jerrabomberra to Karabar, NSW EPBC 2009/5162	x	

7 Information sources and attachments

(For the information provided above)

7.1 References

1. Gabites Porter 2010, Queanbeyan's Transport Plan, the Googong and Tralee Traffic Study 2031. http://www.qcc.nsw.gov.au/Growing-Our-City/Community-Development/Future-Planning
2. nghenvironmental 2014, Species Impact Statement, Ellerton Drive Extension. This document will be made publically available in the near future. It is attached to this referral (provided as Attachment 4).
3. Cultural Heritage Management Australia 2012, Archaeological Assessment of the Proposed Ellerton Drive Extension, Queanbeyan. This document may be made publically available as part of the REF exhibition. It is attached to this referral (provided as Attachment 5).
4. Queanbeyan City Council 2013, Ellerton Drive Extension Community Consultation on Concept Plans and Preliminary Works. http://www.qcc.nsw.gov.au/Growing-Our-City/City-Infrastructure/Infrastructure-Projects/Ellerton-Drive-Extension

7.2 Reliability and date of information

The information in Section 3 has been sourced exclusively from the references provided above. The key sources have been the SIS and Archaeological Assessment. The sources are considered reliable; reliability is analysed for each source below:

The Googong and Tralee Traffic Study 2031.

- specialist report prepared for QCC in 2010
- prepared by a specialist with appropriate experience and qualifications (senior transportation engineer)
- developed by a working party consisting of QCC, RTA, developers and the consultant assisted with the development of the document
- the report was finalised after a peer review by a senior transport planner and senior transportation engineer
- the report methodology includes analysis against a computer model developed for Queanbeyan
- testing was undertaken for each option as part of the analysis

Species Impact Statement, Ellerton Drive Extension.

- specialist report prepared for QCC in 2014
- prepared by a specialist with appropriate experience and qualifications (senior ecologists)
- the report was finalised with input from NSW Office of Environment and Heritage and review by a Certified Environmental Practitioner
- the report clearly identifies the methodology and any limitations and uncertainties
- a precautionary approach is used to address limitations and uncertainties, specifically with regard to level of impact and mitigation strategies

Archaeological Assessment of the Proposed Ellerton Drive Extension.

- specialist report prepared for QCC in 2012
- prepared by a specialist with appropriate experience and qualifications (archaeologist)
- the report was carried out according to NSW Office of Environment and Heritage guidelines and with input from Aboriginal stakeholders
- the report clearly identifies the methodology and any limitations and uncertainties
- a precautionary approach is used to address limitations and uncertainties, specifically with regard to level of impact and mitigation strategies

Ellerton Drive Extension Community Consultation on Concept Plans and Preliminary Works.

- Internally prepared by QCC, 2013
- the report identifies the methodology used and key results in a transparent manner and is considered to be reliable
- the report is not an assessment, as such, uncertainty is not relevant to this study

7.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Figure 1, Section 1. Attachment 1. Shape files of study area and subject site.
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Attachment 2. Matters of national environmental significance, locality Attachment 3. Matters of national environmental significance, study area
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	Attachment 4. Species Impact Statement, Ellerton Drive Extension.
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	The Googong and Tralee Traffic Study 2031 - http://www.qcc.nsw.gov.au/Growing-Our-City/Community-Development/Future-Planning
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	✓	Attachment 5. Archaeological Assessment of the Proposed Ellerton Drive Extension Ellerton Drive Extension Community Consultation on Concept Plans and Preliminary Works - http://www.qcc.nsw.gov.au/Growing-Our-City/City-Infrastructure/Infrastructure-Projects/Ellerton-Drive-Extension

8 Contacts, signatures and declarations

Project title:

8.1 Person proposing to take action

Name	Ms Eli Ramsland
Title	Projects Engineer
Organisation	Queanbeyan City Council
ACN / ABN (if applicable)	12 842 195 133
Postal address	PO Box 90, Queanbeyan NSW 2620
Telephone	02 6285 6264
Email	council@qcc.nsw.gov.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence. I agree to be the proponent for this action. I acknowledge that I may be liable for fees related to my proposed action following the introduction of cost recovery under the EPBC Act.

Signature E. Ramsland Date 11 August 2014

8.2 Person preparing the referral information (if different from 8.1)

Name	Brooke Marshall
Title	Manager, nghenvironmental Snowy Mountains and South Coast
Organisation	trading name NGH Environmental Pty Ltd
ACN / ABN	ACN: 124 444 622. ABN: 31 124 444 622
Postal address	PO BOX 470 BEGA NSW 2550
Telephone	61 2 6492 8333
Email	ngh@nghenvironmental.com.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.

B Marshall 08/08/2014

REFERRAL CHECKLIST

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)

Appendix B

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* (1995/1996) guideline and the *Roads and Related Facilities EIS Guideline* (DUAP, 1996) as detailed in the addendum REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposed modification on the natural and built environment.

Factor	Impact
a. Any environmental impact on a community?	Short term, minor negative impacts associated with noise and traffic.
b. Any transformation of a locality?	No impact
c. Any environmental impact on the ecosystems of the locality?	No impact
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	No impact
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	No impact
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* 1974)?	No impact
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	No impact
h. Any long-term effects on the environment?	No impact
i. Any degradation of the quality of the environment?	No impact
j. Any risk to the safety of the environment?	No impact
k. Any reduction in the range of beneficial uses of the environment?	No impact
l. Any pollution of the environment?	No impact
m. Any environmental problems associated with the disposal of waste?	No impact
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	No impact
o. Any cumulative environmental effect with other existing or likely future activities?	Short term, minor negative impact.
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	No impact

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered for the proposed modification.

The project has been granted approval under the EPBC Act (EPBC 2014/7304 Approval Decision dated 10 January 2017, and a variation approval dated 22 December 2017. The conditions of the approval would still be met under the current proposal. An analysis of the proposed modification against the EPBC Act factors is shown below.

Factor	Consideration of the relative impact of the proposed modification compared to the determined project
Any impact on a World Heritage property?	N/A
Any impact on a National Heritage place?	N/A
Any impact on a wetland of international importance?	N/A
Any impact on a listed threatened species or communities?	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland occurs adjacent to the project footprint, but the community would not be impacted in any way as a result of the proposed modification. Conditions of the EPBC approval relating to Box-Gum Woodland would still be met under the current proposal. Hoary Sunray (*Leucochrysum albicans var. tricolor)* has previously been identified within the project footprint, but this species would not be impacted as a result of the proposed modification. Conditions of the Approval relating to Hoary Sunray would still be met under the current proposal. There will be no additional negative impact from the determined REF.
Any impacts on listed migratory species?	There will be no additional negative impact from the determined REF.
Any impact on a Commonwealth marine area?	N/A
Does the proposal involve a nuclear action (including uranium mining)?	N/A
Additionally, any impact (direct or indirect) on Commonwealth land?	N/A

Appendix C

Community notification letter

August 2018

Ellerton Drive extension – Notification of consultation

Proposed construction site access via Lonergan Drive, Greenleigh

Construction of the new bridge across the Queanbeyan River has started. Roads and Maritime Services (RMS) are consulting with residents impacted by our proposal to allow authorised construction workers and their private vehicles access to the bridge construction site via an existing gate at the end of Lonergan Drive, Greenleigh.

Why is this change proposed?

The purpose of providing the additional access point for bridge construction is to:

- Provide a safer access route for workers to the bridge construction site and to minimise the risk of light vehicles and heavy construction vehicles coming into contact with one another.
- Reduced disruption to construction activity as vehicles will no longer travel through the construction site to access the bridge site.

Control measures

To ensure that potential traffic and transportation impacts are minimised, the following mitigation measures would be implemented:

- The use of the Lonergan Drive access route will be limited to authorised light vehicles only, such as cars and utes, or a minibus to take staff to the site. No heavy vehicles or delivery vehicles will use Lonergan Drive to access the project site.
- Access will only be given to selected staff working on the bridge construction. This will be controlled by only allowing authorised staff to access the site via this point.
- The use of the Lonergan Drive access point will be restricted to the following hours:
    - 6:30am to 6:30pm, Monday to Friday
    - 7:30am to 1:30pm, Saturdays
- No access via Lonergan Drive will be permitted on Sundays or Public Holidays.
- Signage will be provided on the gate/fence at the site entry point to ensure that people can identify the site as a construction site and the project contact details are available.
- Environmental controls will be implemented to minimise mud/dirt tracking from the project site onto Lonergan Drive and other public roads.
- A Traffic Control Plan will be developed for this access point. This will identify any additional traffic controls requirements on Lonergan Drive to ensure the safety of the local community and that safe speeds are maintained.
- Vehicles would park inside the project site and will not be permitted to park on Lonergan Drive.

In order to ensure that we can safely meet the needs of local residents and to further assess the impacts of this proposal we are seeking feedback.

How will residents be impacted?

There would be a minor increase in traffic along Severne Street and Lonergan Drive while the access point is being used. Approximately 20 light vehicles would access the project site via Lonergan Drive per day.

Provide your feedback

An addendum Review of Environmental Factors (REF) has been prepared to assess environmental impacts, including impacts to the community that may be generated as a result of this proposed change for the use of the Lonergan Drive access point. A summary of the proposal is outlined above, the detailed REF addendum can be found on the QPRC website www.qprc.nsw.gov.au

If you have feedback relating to the REF addendum and proposed site access changes please contact our project team on 1800 116 337, or email ellertondrive@wbho.com.au by 29 August 2018.

Regards

Ryan Whiddon
Project Manager
Roads & Maritime Services