



Rawsonville Bridge Replacement

Review of Environmental Factors

Transport for NSW | October 2021

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Prepared by AECOM and Transport for NSW

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Signed:	
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Executive summary

The proposal

Transport for NSW (TfNSW) proposes to replace Rawsonville Bridge (B4645) crossing the Macquarie River at Rawsonville Bridge Road, Rawsonville in Central West NSW (the proposal). Key features of the proposal include:

- Replacing the existing timber truss bridge (B4645) with a new concrete Super T girder bridge
- Construction of the new bridge will occur adjacent to the existing bridge to minimise the length of roadworks and disruption to traffic using Rawsonville Bridge Road
- Bridge design including deck level and length specified to suit local hydrology
- Construction of road approaches to the new bridge
- Demolition of the existing timber truss bridge (B4645) on completion.

Construction is expected to commence in 2023 and would take around 18 months to complete.

Need for the proposal

Rawsonville Bridge was built in 1916 and is a heritage timber truss bridge spanning the Macquarie River, approximately 21 kilometres west of Dubbo. Rawsonville Bridge is a major crossing of the Macquarie River connecting the Mitchell Highway to the Dubbo-Burraway Road and the Newell Highway between the towns of Dubbo and Narromine. The current bridge has a 42.5 tonne load limit and is used primarily by light and heavy vehicles, including agricultural vehicles and local transport of agricultural machinery and supplies.

The bridge has a number of issues, including low load capacity, narrow deck width, damaged timber piers, timber decking requiring frequent inspection and replacement, high maintenance costs and other safety issues. Any maintenance requiring closure of the bridge involves a 45 kilometre detour to travel from one side of the bridge to the other.

Rawsonville Bridge was previously listed on the Roads and Maritime Services (RMS) S170 heritage register and is listed as a local heritage item on Dubbo Regional Council's Local Environmental Plan. In a review of the *Timber Truss Bridge Conservation Strategy* in 2019, Rawsonville Bridge was identified to be removed, as the structure could not be upgraded to service the future requirements of the road network. In alignment with the *Timber Truss Bridge Conservation Strategy* and under the NSW *Bridges for Bush* program, Rawsonville Bridge has been delisted from the RMS S170 heritage register and will be replaced with a new concrete bridge.

Proposal objectives and development criteria

The objectives of the proposal include:

- Provide a strengthened, widened, smoother surfaced, low maintenance cost bridge on an appropriate regional road alignment
- Provide a bridge that meets current structural and width standards (minimum two x 3.5 metre lanes with one metre shoulders)
- Provide a design road alignment with a 90 kilometre per hour design speed
- Provide similar flood immunity to the existing bridge with no adverse impact on the surrounding floodplain.

The criteria for the proposal include:

- Provide a single carriageway new bridge with a 3.5 metre lane in each direction and one metre shoulders

- The design loading is to be in accordance with Australian Standard 5100 Bridge Design
- The traffic loading is to be in accordance with Stationary and Moving (SM1600) and Heavy Load Platform (HLP400) standards
- The design is to be in accordance with all TfNSW Bridge Technical Directions (including requirements for waterproofing of bridge decks)
- The design traffic speed is to match the existing
- The design is to consider all bridge lifecycle costs and activities; including construction, inspection, maintenance, rehabilitation, renewal, replacement and decommission
- The new bridge approach is to result in the minimum impact to the environment and adjacent properties

Options considered

The options considered for the proposal include:

- Option 1: Do Nothing.
- Option 2: Replacement of the bridge on the existing alignment. This option would involve closing the existing bridge to traffic and constructing a new bridge on the same alignment, with a traffic detour in place during the construction period.
- Option 3: Replacement of the bridge downstream of the existing alignment, keeping the current bridge open to traffic during construction. This option would necessitate acquisition of property including a private residence, relocation of utilities including overhead powerlines, as well as increased environmental disturbance to account for limited access, existing vegetation and waterway span requiring three piers be placed in the waterway.
- Option 4: Replacement of the bridge upstream of the existing alignment, keeping the current bridge open to traffic during construction. This option would allow for easier construction access, reduced vegetation clearance and require two piers to be placed in the waterway.

Option 4 was selected as the preferred option as it best met all the proposal objectives and involves lower capital costs and reduced environmental and social impacts.

Statutory and planning framework

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

The proposal is for road infrastructure facilities and is to be carried out on behalf TfNSW and can therefore be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required.

Community and stakeholder consultation

TfNSW has consulted with the community and key stakeholders throughout the development of the proposal.

At each stage, TfNSW has engaged the community and stakeholders to increase public understanding of, and participation in, the development of the proposal. The proposal has benefited from the input of local knowledge provided through community engagement, which has helped identify issues, potential mitigation strategies and opportunities to improve proposal outcomes.

TfNSW consulted with Dubbo Regional Council, Heritage NSW, NSW Department of Primary Industries (Fisheries), Heritage NSW and the NSW Department of Natural Resources Access Regulator.

Consultation with the community and key stakeholders will continue during the public display of the Review of Environmental Factors (REF) and during construction of the proposal, including notification of temporary changes to traffic conditions and detours during the construction period.

Environmental impacts

Extensive specialist assessment, field assessments and desktop assessments have been undertaken to assess, manage and mitigate potential impacts of the proposal on the environment. The key areas of investigation include non-Aboriginal heritage; property, land use and socio-economic; biodiversity; landscape character and visual impacts; traffic and transport; and hydrology and flooding.

The main environmental impacts of the proposal are summarised below:

Non-Aboriginal heritage

A Statement of Heritage Impact (SOHI) was undertaken for the demolition of Rawsonville Bridge. Rawsonville Bridge has been assessed as having moderate local heritage values. The bridge was initially included on the *2012 Timber Truss Bridge Strategy* as a bridge that would be retained. However, the *Timber Truss Bridge Strategy* was reviewed and subsequently updated in 2019. Rawsonville Bridge was one of seven bridges identified to be removed as the existing structure could not be effectively upgraded to service future road network requirements. The historic and technical significance associated with the bridge is mostly associated with the main Dare truss spans and concrete piers. A heritage interpretation area is proposed in accordance with the TfNSW *Heritage Interpretation Strategy 2020*. This would display images of the existing bridge with explanatory text detailing construction and historical context. Recovery of the top chord splices and bottom chord metal elements with specific foundry marks is recommended.

Property, land use and socio-economic

Two parcels of private land totalling 0.558 hectares would be acquired by TfNSW to facilitate the new bridge and bridge approaches. This would consist of 0.243 hectares of agricultural land at 9R Rawsonville Bridge Road, Rawsonville and 0.315 hectares of agricultural land at 148 Narromine Road, Dubbo. Both parcels of land would be acquired in accordance with the Land Acquisition (Just Terms Compensation) Act.

Additional areas of agricultural land would be leased on a temporary basis for use as a construction compound at 148 Narromine Road and for other construction activities at 9R Rawsonville Bridge Road. All leased land would be reinstated upon completion. Impacts on local business residents and stakeholders would be managed by ongoing consultation and implementation of standard safeguards.

Biodiversity

Access to the Macquarie River to facilitate bridge construction and demolition would require removal of native riparian vegetation, including some mature trees with nest hollows. Works in the waterway would also potentially disturb 0.51 hectares of habitat within the Lower Darling River aquatic Endangered Ecological Community. Ecological survey of the proposal area identified 0.61 hectares of habitat suitable for three threatened bird species and two threatened bat species and 0.51 hectares of aquatic habitat suitable for three threatened fish species and two threatened fish populations. Tests of significance determined that given the safeguards proposed, the residual impacts to these threatened species, populations and communities would not be significant.

Landscape character and visual impacts

The existing Rawsonville Bridge is a landscape feature within the locality which would be removed by the proposal. The new bridge deck would be higher than the existing bridge, however the overall height of the top of the bridge barrier would be lower than the top of the existing timber truss spans. This would modernise the landscape character within the locality. However, the change would be consistent with the

evolving locality and is indicative for the evolving demands of the surrounding agricultural operations and growth of the region.

Traffic and transport

Rawsonville Bridge Road would remain open for the majority of construction, with two weekend closures occurring across the bridge construction and bridge demolition stages. This would require a 45 kilometre detour north of Dubbo via the Newell Highway and would increase travel times between the Mitchell Highway and Burroway Road (at Rawsonville Bridge Road) by about 30 minutes. Consultation with local stakeholders would be undertaken prior to bridge closures, and road users would be notified by variable message signs at both ends of Rawsonville Bridge Road. In addition, implementation of a Traffic Management Plan (TMP) would reduce traffic impacts during construction.

Surface water, ground water and soils

During construction, works would be required within and immediately adjacent to the waterway. These works would involve disturbance to the riverbed and riparian area, potentially generating sediment discharge into the waterway. Construction and demolition activities also pose a risk whereby pollutants could potentially enter the waterway impact on water quality. Implementation of an Erosion and Sediment Control Plan (ESCP), along with implementation of appropriate safeguards, would limit potential water quality impacts.

Justification and conclusion

The proposal is subject to assessment under Division 5.1 of the EP&A Act. This Review of Environment Factors (REF) has examined and considered all matters affecting or likely to affect the environment by reason of the proposed activity.

The proposal is considered to be consistent with Government strategic planning at Commonwealth, State and regional levels as it would lead to improved efficiency and safety of the road network. While there would be some environmental impacts as a consequence of the proposal, these impacts have been avoided or minimised wherever possible through design and site-specific safeguards (Chapter 6 and Section 7.2).

This REF has concluded the adverse impacts and risks of the proposal would be outweighed by the longer term benefits of providing improved structural standards, improved heavy vehicle and wide vehicle access for an important local and regional river crossing and improved safety for all road users. On balance, the proposal is considered to be justified.

This REF has also concluded the proposal is not likely to significantly affect the environment and, therefore, an environmental impact statement and assessment under Division 5.2 of the EP&A Act is not required. Furthermore, there would be no significant impacts to matters of national environmental significance or to the environment of Commonwealth land, and as such, the proposal was not referred to the Australian Government Department of the Environment and Energy.

Display of the review of environmental factors

This REF is on display for comment between Monday 15 November 2021 and Wednesday 22 December 2021. The documents can be accessed in the following ways:

Internet

The documents are available as pdf files on the TfNSW website at <https://roads-waterways.transport.nsw.gov.au/projects/rawsonville-bridge/index.html>

Printed copies

The documents can be viewed at the following locations:

- Dubbo Regional Library with the REF on display at an unstaffed display

Copies by request

Printed and electronic copies are available by contacting 1800 167 499.

How can I make a submission?

To make a submission about this proposal, please send your written comments to:

Writing: Rawsonville Bridge REF

PO Box 334

Parkes 2870

Email: western.projects@transport.nsw.gov.au

Submissions must be received by 5pm Wednesday 22 December 2021. Submissions will be managed in accordance with the Transport for NSW Privacy Statement which can be found here:

<https://www.rms.nsw.gov.au/about/access-to-information/my-privacy.html> or by contacting privacy@rms.nsw.gov.au for a copy.

What happens next?

TfNSW will collate and consider the submissions received during public display of the REF.

After this consideration, TfNSW will determine whether or not the proposal should proceed as proposed and will inform the community and stakeholders of this decision.

If the proposal is determined to proceed, TfNSW will continue to consult with the community and stakeholders prior to and during construction.

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1. Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. In introducing the proposal, the objectives and proposal development history are detailed, and the purpose of the report provided.

1.1 Proposal identification

Transport for NSW (TfNSW) proposes to replace Rawsonville Bridge crossing the Macquarie River at Rawsonville Bridge Road, Rawsonville in Central West NSW (the proposal). Rawsonville Bridge Road is a sub-arterial road, providing an important local link between the Mitchell Highway and Dubbo-Burroway Road, as well as access to agricultural properties around Rawsonville. Rawsonville Bridge is located within the Dubbo Regional Local Government Area (LGA) about 21 kilometres west of Dubbo (refer Figure 1-1).

Rawsonville Bridge (the bridge) was built in 1916 and is a 110-metre-long, heritage timber truss bridge. The bridge is narrow at 4.5 metres wide and only provides a single lane of travel. The current and future road network requirement exceeds the design capabilities of the bridge, which is beyond its expected serviceable and operational life. The bridge was identified as part of the Timber Truss Bridge Strategy (RMS, 2012) as locally significant and to be retained. Following a review of the strategy (RMS, 2019b), the bridge was one of seven bridges identified to be removed as the structure could not be upgraded to service the future requirements of the road network. A full replacement of the bridge is required due to the poor condition of the existing bridge and its high maintenance costs. The bridge is also too narrow to allow access by modern agricultural machinery on this route. Around 368 vehicles use the bridge per day, with heavy vehicles accounting for about 15 percent of all vehicles.

In May 2019, the NSW Government announced \$700,000 of funding to develop options for the bridge. The proposal is required to ensure that a replacement bridge over the Macquarie River meets current structural standards to make sure that Rawsonville Bridge Road can continue to provide important road links between the Mitchell Highway (HW7), the Dubbo-Burroway Road and the Newell Highway (HW17). The proposal also aims to meet the needs of the local community and agricultural traffic.

The proposal would involve construction of a new concrete Super T girder bridge immediately upstream from the existing Rawsonville Bridge. The approaches to the bridge would be realigned and tied in to the south with an upgraded intersection at Rawsonville Bridge Road. The new bridge would be wider than the existing structure, providing two lanes of traffic with one-meter shoulders. The existing bridge would be demolished following the opening of the new bridge.

Key features of the proposal include:

- Installation of temporary erosion and sediment control measures
- Vegetation and tree clearance upstream of the existing bridge to allow construction access and installation of bridge girders
- Preliminary earthworks on the new alignment and road approaches to the new bridge, with fill to be imported from either existing stockpile sites on the Mitchell Highway, or from local quarries
- Enlargement of the access on the northern bank and construction of a temporary access on the southern bank of the Macquarie River to accommodate crane and piling rig access and allow construction of the waterway piers
- Installation of temporary rock platforms and/or a temporary bridge to allow construction of the waterway piers. The central section of the Macquarie River waterway between Piers 1 and 2 would be maintained throughout construction to allow fish passage and river flow
- Removal of snags with relocation downstream where practicable

- Construction of temporary working platforms for piling rigs and mobile cranes pads to allow installation of the bridge piles and girders
- Construction of waterway piers in line with existing bridge piers
- Construction of reinforced concrete piers, headstocks and abutments and backfilling
- Installation of scour protection in front of abutments
- Construction of a new 115 metre bridge on an upstream alignment from the existing bridge in a four span configuration comprising 1200mm deep Super T girders with an in-situ concrete deck and parapets connected by stitch pours
- Construction of bridge deck and approach slabs
- Final roadworks, including stabilisation of subgrade, pavement construction, kerbs and gutters, spray seal surfacing, guardrail installation, signage, guardrails and line marking
- Construction of a heritage interpretation area at a suitable location near the new bridge
- Switching of traffic onto new bridge
- Removal of the existing road alignment
- Establish waterway and perimeter sediment and erosion controls for demolition of the existing truss bridge
- Vegetation and tree clearance downstream of the existing bridge to allow for demolition access
- Excavation of north and south riverbanks downstream from existing bridge to establish temporary access tracks into waterway
- Installation of temporary rock platforms and/or temporary bridge on new alignment for removal of the existing bridge piers. Establish traffic controls, including allowance for possible stop/go control or weekend bridge closures
- Removal of deck planks and approach spans
- Construction of temporary working platforms for a large mobile crane near both existing bridge abutments
- Removal of timber truss sections using large mobile crane
- Removal of existing bridge abutments and piled foundations to 0.5m below ground level
- The use of waterway temporary works including temporary cofferdams and scaffolding access from rock platforms to remove the existing concrete waterway piers
- Removal of waterway piers to 0.5m below existing riverbed level
- Disposal of demolition concrete at Whylandra Waste Disposal facility or other suitably licenced facilities
- Disposal of truss timber at a licenced waste facility or to be recycled
- Removal of crane platforms and reinstatement and revegetation of riverbank and access tracks
- Demobilisation from site including removal and reinstatement of compound sites and temporary erosion and sediment control measures

An overview of the proposal is provided in Figure 1-2. Chapter 3 describes the proposal in more detail.

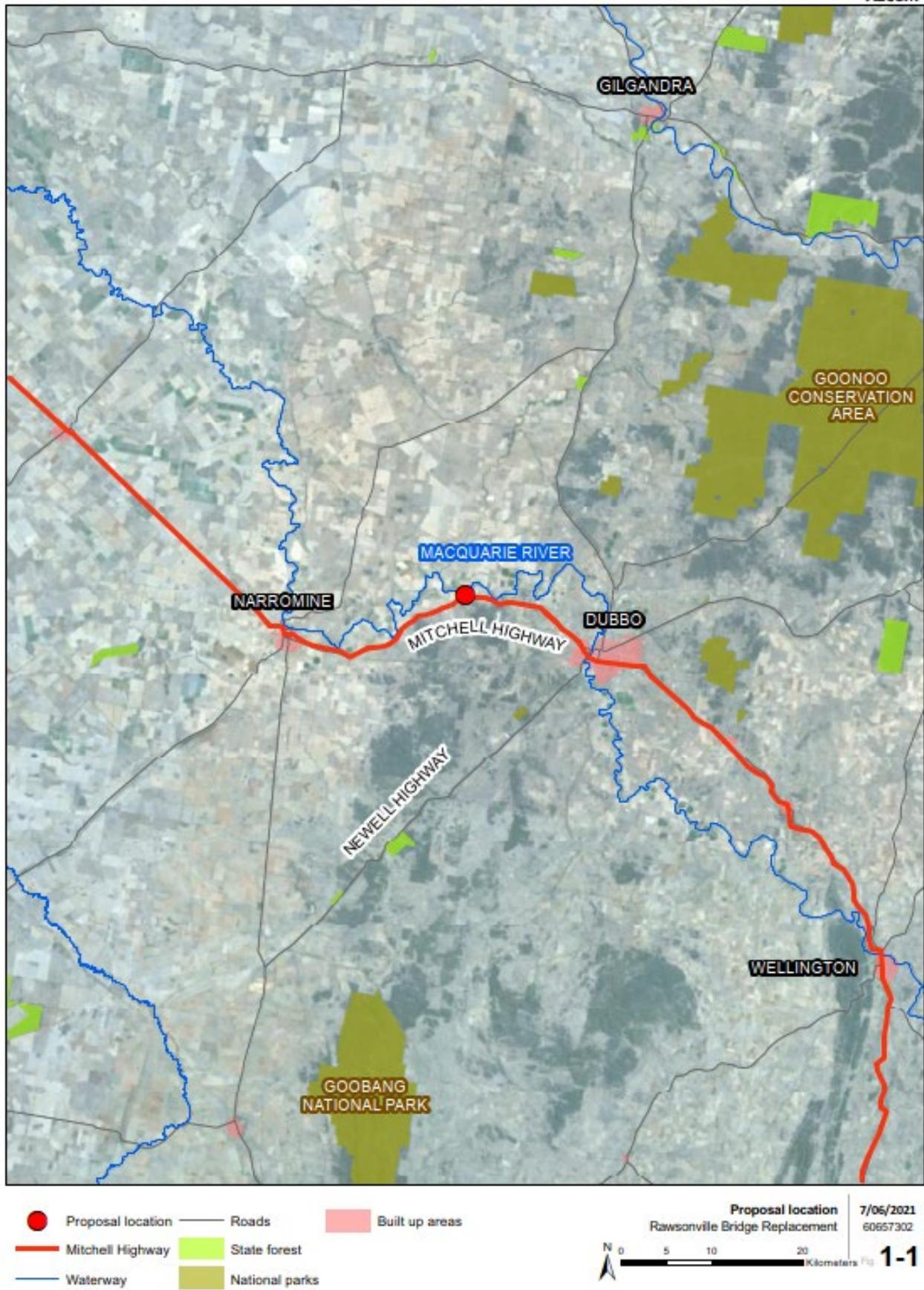


Figure 1-1: Location of the proposal

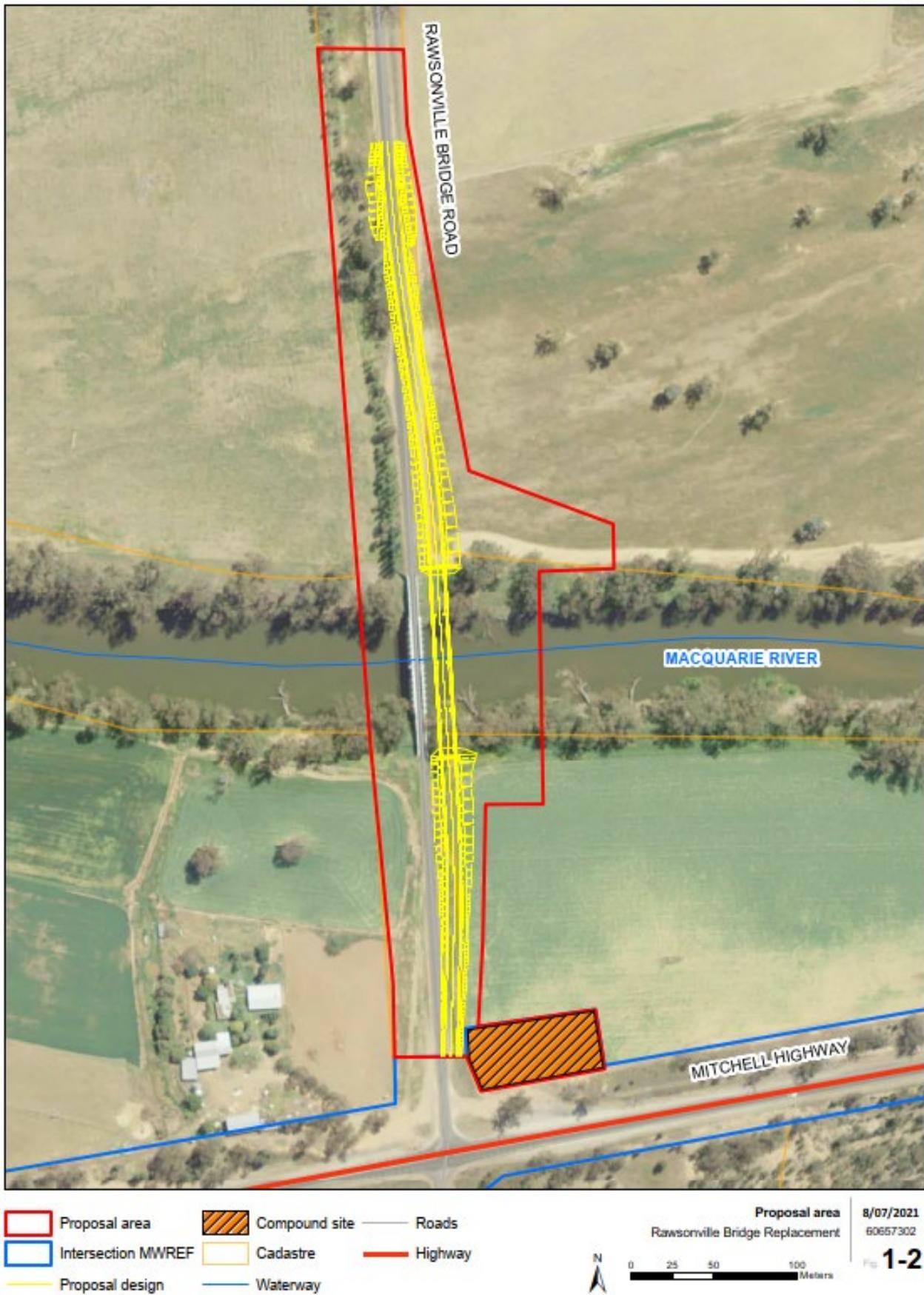


Figure 1-2: The proposal

1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by AECOM on behalf of TfNSW Region West. For the purposes of these works, TfNSW is the proponent and the determining authority under Division 5.1 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 mitigation and management measures to be implemented.

The description of the proposed work and assessment of associated environmental impacts has been undertaken in the context of clause 228 of the Environmental Planning and Assessment Regulation 2000, the factors in *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 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 REF helps to fulfil the requirements of:

- Section 5.5 of the EP&A Act including that TfNSW examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act
- The significance of any impact on threatened species as defined by the BC Act and/or FM 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 proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need, subject to the EPBC Act strategic assessment approval, to make a referral to the Australian Government Department of Agriculture, Water and the Environment for a decision by the Commonwealth 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 proposal

The proposal would address the following NSW and Australian strategic documents and plans.

- Timber Truss Bridge Conservation Strategy 2012 (RMS, 2012)
- Timber Truss Bridge Conservation Strategy Update 2019 (RMS, 2019b)
- Bridges for the Bush
- Future Transport Strategy 2056 (TfNSW, 2018)
- Regional NSW Services and Infrastructure Plan (TfNSW, 2018)
- NSW Freight and Ports Plan 2018-2023
- National Road Safety Strategy 2021 – 2030 (Office of Road Safety, 2021) - Draft
- NSW Infrastructure Strategy 2018-2038: Building Momentum
- Central West and Orana Regional Plan 2036

2.1.1 Timber Truss Bridge Conservation Strategy 2012

In 2010, RMS prepared the *Timber Truss Road Bridges - A Strategic Approach to Conservation* which outlined conservation and management assessment methodology for assessing 48 timber truss bridges managed by RMS. As a result of this assessment, the *Timber Truss Bridge Conservation Strategy* was published in 2012 which described the conservation suitability and management for these bridges. The strategy advised for 26 bridges to be retained, including Rawsonville Bridge, and 22 bridges to be replaced. The strategy outlined the recommendation that bridges which were to be removed should be replaced with modern concrete bridges. The strategy was developed to implement wider infrastructure upgrades improving road freight productivity across regional NSW associated with the *Bridges for the Bush* program.

2.1.2 Timber Truss Bridge Conservation Strategy Update 2019

Following the implementation of the *Timber Truss Bridge Conservation Strategy 2012*, seven bridges that were initially identified to be retained as part of the strategy were assessed as not able to be upgraded to service future road network and meet the needs of their communities. Rawsonville Bridge was identified as one of the bridges that would no longer be retained under the strategy. The update also identified eight additional timber truss bridges that would be included in the strategy in place of those which were to be removed.

2.1.3 Bridges for the Bush

The NSW Government in association with the Australian Government developed the *Bridges for the Bush* program in order to deliver improved road freight productivity by replacing and upgrading bridges in regional NSW. The *Timber Truss Bridge Conservation Strategy 2012* was implemented as part of this program to identify and manage timber truss bridges to be upgraded or replaced under the program. The delivery of the Rawsonville Bridge replacement project is encompassed in the Bridges for the Bush program.

2.1.4 Future Transport Strategy 2056

Future Transport Strategy 2056 is the NSW Government's vision for the next 40 years of transport in NSW. The purpose of the strategy is to guide integrated transport and land use planning across regional NSW and Greater Sydney.

A key priority and direction under the Future Transport Strategy relates to movement and place, balancing the efficient movement of people and goods with the liveability of places on the transport network. The proposed new bridge would provide reliable and safe transport to the local community and regional centres and improve freight movement on Rawsonville Bridge Road by facilitating access for heavier loads.

2.1.5 Regional NSW Services and Infrastructure Plan

The *Regional NSW Services and Infrastructure Plan* is a sub-plan of the *Future Transport Strategy 2056* which sets out the NSW Government's blueprint for transport in regional NSW. The plan has made a focus to improve connectivity between regional cities and centres as well as locally. The new bridge would comply with current design and safety standards, as well as ensuring that Rawsonville Bridge Road remains an open and viable roadway for traffic traversing the Macquarie River.

2.1.6 NSW Freight and Ports Plan 2018-2023

The *NSW Freight and Ports Plan 2018-2023* is a supporting plan to the *Future Transport Strategy 2056* and aligns with other key NSW Government plans, including the *State Infrastructure Strategy* and NSW Regional Plans. The direction of the plan is for government and industry to collaborate on clear initiatives and targets to make the NSW freight task more efficient and safer, so NSW can continue to move and grow. The proposal objectives are consistent with that of the NSW Freight and Ports Plan as the proposal is anticipated to improve the efficiency of Rawsonville Bridge Road by increasing the structural loading capacity of the bridge which would enable HML vehicles to use this connection. The safety of road users would also be improved by installing a new bridge that meets current safety standards with widened lanes and shoulders.

2.1.7 National Road Safety Strategy 2021-2030

The *National Road Safety Strategy 2021–2030* (Office of Road Safety, 2021) follows the *National Road Safety Strategy 2011-2020* and aims to reduce death and serious injury on Australian roads. A target of this strategy is to reduce per capita fatalities on roads by at least 50 percent and serious injury by 30 percent by 2030.

Safe roads is a key theme of this strategy with infrastructure planning and investment and regional road safety being priorities. The proposal would align with this theme by providing future focused infrastructure that reduces physical vulnerability of road users and installing a bridge that complies with current safety standards (*AS 5100 Bridge Design*).

2.1.8 NSW Infrastructure Strategy 2018-2038: Building Momentum

The *NSW Infrastructure Strategy 2018 – 2038: Building Momentum* (Infrastructure NSW, 2018) is a strategy to plan and fund the infrastructure that the NSW Government delivers. The plan identifies part of the infrastructure response to Regional NSW as supporting regional hubs in serving their surrounding regional populations and developing local freight and service networks. The proposal would align with this strategy by providing a new bridge that would improve local connectivity for freight, business and the local population.

2.1.9 Central West and Orana Regional Plan 2036

The *Central West and Orana Regional Plan 2036* is a 20-year blueprint for the future of the region. The vision for the plan is to create and lead a diverse regional economy in NSW. The plan has four main goals:

- The most diverse regional economy in NSW
- A stronger, healthier environment and diverse heritage
- Quality freight, transport and infrastructure networks
- Dynamic, vibrant and healthy communities.

The proposal would improve and secure the movement of vehicles on Rawsonville Bridge Road, replacing the existing ageing bridge with a low maintenance structure that caters for heavy vehicles including HML, while maintaining a crossing of the Macquarie River for the locality.

2.2 Limitations of existing infrastructure

2.2.1 Bridge infrastructure

The bridge is a Dare timber truss and was built over the Macquarie River in 1916. The bridge comprises of eight spans with seven piers, three of which are reinforced concrete and situated generally within the waterway. The deck is timber at 4.5 metres wide and carries one lane of traffic and is topped with bitumen. The deck scuppers at the timber kerbs drain water directly into Macquarie River.

The bridge superstructure consists of six timber girder approach spans at 9.14 metres each and two Dare truss spans at 28 metres each over the waterway, equalling a total bridge length of about 115 metres. The trusses comprise timber top chords, diagonals and principals while the truss verticals are iron tie rods. Timber stringers placed at 1.52 metre centres carry transverse 100-millimetre-thick planks and 50 millimetre thick longitudinal sheeting. The timber approach spans carry four girders spaced at 1.45 metre centres and decking consistent with the truss spans.

The approach spans are supported by four timber piers on the upper banks, one of which has been replaced by temporary steel propping. The two truss spans are supported by three reinforced concrete piers which occur either partially or completely in the waterway. The bridge abutments are constructed from precast concrete panels retained by steel H piles constructed in front of the original timber abutments. The concrete waterway piers comprise circular concrete columns with a central concrete blade wall. The timber piers consist of either three or four timber columns.

A recent Transport for New South Wales Inspection discovered damage to two of the timber piers. Pier 2 has experienced significant scouring potentially reducing the load capacity of the pier. The timber piles supporting Pier 7 have rotted and been removed. The pier is currently being supported by temporary steel propping. The current condition of the bridge can be seen in Figure 2-1.



Figure 2-1 Current condition of Rawsonville Bridge

2.2.2 Pedestrian and cyclist facilities

There are no pedestrian walkways on the existing bridge. However, a pedestrian refuge is located between the truss sections on the western side of the bridge.

There are no dedicated cyclist facilities on the bridge. Cyclists can use the existing traffic lanes.

2.3 Proposal objectives and development criteria

2.3.1 Proposal objectives

The objectives of the proposal are to:

- Provide a wider, stronger, low maintenance cost bridge appropriate to the current and future road use demands of Rawsonville Bridge Road
- Provide a bridge that meets current structural and width standards (minimum two x 3.5 metre lanes with one metre shoulders)
- Provide a design road alignment with a 90 kilometre per hour design speed to suit the existing road geometry and hydrology constraints.
- Provide similar flood immunity to the existing bridge with no adverse hydraulic impacts on the locality
- Minimise environmental disturbance in construction of the new bridge and removal of the existing bridge through requirement of minimal approach works and riparian vegetation removal

2.3.2 Development criteria

The development criteria for the proposal include:

- The new bridge is to be built adjacent to the existing bridge to minimise approach roadworks
- The new bridge is to provide a 2 lane 2 way carriageway with 3.5 metre lanes in each direction and one metre shoulders
- The deck level and bridge length to be set to suit flood modelling and hydrology requirements.
- The design loading is to be in accordance with Australian Standard 5100 Bridge Design
- The traffic loading is to be in accordance with Stationary Load (SM1600) and Heavy Load Platform (HLP400) standards
- The design is to be in accordance with all TfNSW Bridge Technical Directions (including requirements for waterproofing of bridge decks)
- The design traffic speed is to match existing.
- The design is to consider all bridge lifecycle costs and activities; including construction, inspection, maintenance, rehabilitation, renewal, replacement and decommission

2.3.3 Urban design objectives

Urban design objectives for the proposal include:

- Create a new bridge structure that is neat, with modern simple lines appropriate for its rural setting
- Design for low maintenance
- Establish a heritage interpretation area at a suitable location near the new bridge

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

TfNSW has investigated multiple options to upgrade the bridge which would address the existing structural and safety issues. This was supported by a Level 3 inspection carried out by the RMS Bridge Engineering Division in August 2019. The assessment identified key structural issues related to foundation stability of Pier 2 required urgent attention. Issues relating to under-sized girders in the approach spans, several components including girders, items within the truss spans and one pile being in poor condition was also recorded. The assessment concluded the bridge required substantial works in order to be load rated for ST42.5 or R22.5.

TfNSW commissioned a strategic concept replacement options report (Focus Bridge Engineering, 2019). This assessed the short, medium- and long-term repair and maintenance activities based on the durability assessment. A Value Management assessment carried out by TfNSW indicated that the full replacement of the bridge, as opposed to rehabilitation, is the more economically viable option.

Three design options involving full replacement of the bridge were considered against the proposal objectives. The “Do Nothing” option was also considered for the proposal. The options considered as part of the proposal are described below and an options analysis is provided in Section 2.4.3.

2.4.2 Identified options

Four options were considered as part of the bridge replacement proposal, including the “Do Nothing” option. These options include:

- Option 1: “Do Nothing”

- Option 2: Full replacement of the bridge on the existing alignment
- Option 3: Full replacement of the bridge on a downstream alignment
- Option 4: Full replacement of the bridge on an upstream alignment

The four options are described below and analysis of the options against the proposal objectives is provided in Section 2.3.1.

Option 1: “Do Nothing”

This option would involve retaining the existing bridge structure and performing routine and maintenance activities as required. The deteriorating condition, substandard strength, long-term durability issues and vehicle capacity limitations of the bridge would not be addressed by this option.

Option 1 would not generate environmental, heritage or traffic impacts. However, Option 1 would not address the needs or meet objectives of the proposal.

Option 2: Full replacement of the bridge on the existing alignment

This option would involve closing the existing bridge to traffic, removing the existing bridge and construction of a new bridge on the alignment of the existing bridge. Replacing the bridge on the existing alignment would require less vegetation removal from the riparian area on either side of Macquarie River and would not require additional works to tie the new bridge into the existing road network. Existing bridge removal and new bridge construction would require closure of Rawsonville Bridge Road at the bridge for up to 16 months to facilitate the works. This would require a 45 kilometre alternative route through to access the other side of the Macquarie River from Rawsonville Bridge Road

Option 2 was not considered viable due to the traffic impact on the road users of Rawsonville Bridge Road. This option would involve extensive disruption to local residents and businesses as well as through traffic travelling from the Mitchell Highway to Burroway Road.

Option 3: Full replacement of the bridge on a downstream alignment

This option would involve keeping the existing bridge open for traffic while constructing a new bridge on a downstream alignment. Following opening of the new bridge to traffic, the existing bridge would be removed. Works would involve construction of new bridge approaches downstream of the existing alignment. The new bridge approaches would require acquisition of private property, including a residential house and agricultural land. Utilities, including overhead powerlines and Telstra communication cables, would need to be relocated. Extensive clearance and establishment works within the riparian area of the Macquarie River would be required to facilitate access for construction. In addition, a third pier would be required to be located within the waterway due to the increased width of the river in this location.

Option 3 was not considered viable due to the extensive disturbance and tree removal within the riparian area of Macquarie River and the acquisition of a residential property and a large area of agricultural land. There were also significant additional project costs associated with the relocation of existing utilities.

Option 4: Full replacement of the bridge on an upstream alignment

This option would involve keeping the existing bridge open for traffic while constructing a new bridge on an upstream alignment. Following the commencement of traffic on the new bridge, the existing bridge would be removed. This would involve construction of new bridge approaches upstream of the existing alignment, requiring acquisition of sections of two lots of agricultural land to support the new bridge approaches. The upstream riparian area is considerably less vegetated than downstream due to past disturbance and is occupied by existing access tracks to the riparian area that would be utilised in construction. Additionally, the river span would require only two piers to be placed within the waterway.

Option 4 would involve reduced ground and vegetation disturbance and require a smaller area of agricultural land acquisition when compared to Option 3. The acquisition of residential property would not be required. Road users would experience significantly less traffic impacts compared to Option 2 and the works required for the new bridge approaches would be constructed on acquired agricultural land limiting additional potential environmental impact.

An analysis of the options is provided below in Section 2.4.3.

2.4.3 Analysis of options

A summary of options evaluation against the proposal objectives identified in Section 2.3.1 is provided below in Table 2-1.

Table 2-1 Analysis of the options against the proposal objectives

Proposal objectives	Options considered			
	Option 1: "Do Nothing"	Option 2: Full replacement of the bridge on the existing alignment	Option 3: Full replacement of the bridge on a downstream alignment	Option 4: Full replacement of the bridge on an upstream alignment
Provide a wider, stronger, low maintenance cost bridge appropriate to the current and future road use demands of Rawsonville Bridge Road	<p><input checked="" type="checkbox"/> Objective not met</p> <p>Option 1 does not involve the provision of a new bridge</p>	<p><input checked="" type="checkbox"/> Objective not met</p> <p>Whilst Option 2 would provide an upgraded bridge, the impacts to the current traffic demands of Rawsonville Bridge Road would be significant and for an extended period</p>	<p><input checked="" type="checkbox"/> Objective met</p> <p>Option 3 would provide an upgraded bridge without significantly impacting the current traffic demands for Rawsonville Bridge Road. The new bridge would also meet design parameters and cater for future road usage remand.</p>	<p><input checked="" type="checkbox"/> Objective met</p> <p>Option 4 would provide an upgraded bridge without significantly impacting the current traffic demands for Rawsonville Bridge Road. The new bridge would also meet design parameters and cater for future road usage remand.</p>
Provide a bridge that meets current structural and width standards	<p><input checked="" type="checkbox"/> Objective not met</p> <p>Option 1 does not involve the provision of a new bridge</p>	<p><input checked="" type="checkbox"/> Objective met</p> <p>The design of Option 2 would meet current structural and width standards.</p>	<p><input checked="" type="checkbox"/> Objective met</p> <p>The design of Option 3 would meet current structural and width standards.</p>	<p><input checked="" type="checkbox"/> Objective met</p> <p>The design of Option 4 would meet current structural and width standards.</p>

Proposal objectives	Options considered			
	Option 1: “Do Nothing”	Option 2: Full replacement of the bridge on the existing alignment	Option 3: Full replacement of the bridge on a downstream alignment	Option 4: Full replacement of the bridge on an upstream alignment
Provide a design road alignment with a 90 kilometre per hour design speed	<input checked="" type="checkbox"/> Objective not met Option 1 does not involve the provision of a new bridge	<input checked="" type="checkbox"/> Objective met The design of Option 2 would provide for a 90 kilometre per hour horizontal and vertical design speed.	<input checked="" type="checkbox"/> Objective met The design of Option 3 would provide for a 90 kilometre per hour horizontal and vertical design speed.	<input checked="" type="checkbox"/> Objective met The design of Option 4 would provide for a 90 kilometre per hour horizontal and vertical design speed.
Provide similar flood immunity to the existing bridge with no adverse impact on the locality	<input checked="" type="checkbox"/> Objective met Option 1 results in no change to flood immunity with no adverse impact on the locality	<input checked="" type="checkbox"/> Objective met The design of Option 2 would provide similar flood immunity to the existing bridge with no adverse impact on the locality	<input checked="" type="checkbox"/> Objective met The design of Option 3 would provide similar flood immunity to the existing bridge with no adverse impact on the locality	<input checked="" type="checkbox"/> Objective met The design of Option 4 would provide similar flood immunity to the existing bridge with no adverse impact on the locality
Minimise environmental disturbance	<input checked="" type="checkbox"/> Objective met Option 1 would require no environmental disturbance	<input checked="" type="checkbox"/> Objective not met Option 2 while not resulting in significant direct environmental disturbance, would require significant detour for road users for an extended period resulting in an adverse environmental impact.	<input checked="" type="checkbox"/> Objective not met Option 3 would require extensive works in the riparian area to establish access tracks for construction and significant property acquisition. Additionally, Option 3 may require three piers to be placed within the waterway.	<input checked="" type="checkbox"/> Objective met Option 4 would require some works within the riparian area involving removal of vegetation. However, these impacts are likely less significant than option 3 and would not result in significant traffic impact.

2.5 Preferred option

The “Do Nothing” option would not result in any construction related impacts; however, it would not meet any of the proposal objectives. Whilst Option 2 met some proposal objectives, it would have resulted in significant traffic impacts.

Option 3 would provide for an upgraded bridge and achieve most proposal objectives; however, the required property acquisition and utility relocations would have incurred higher capital costs and social impacts when compared to Option 4. Additionally, environmental impacts to the riparian area and waterway due to lack of riverbank access and wider waterway were considered likely to be significant. By constructing the bridge and approaches upstream of the existing bridge as identified within Option 4, the extent of the environmental and social disturbance of the works can be reduced, as well as the overall impact of the proposal.

Option 4 was selected as the preferred option as it best meets the proposal objectives, with lower capital costs and reduced environmental and social impacts.

3. Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

TfNSW proposes to replace the existing Rawsonville Bridge in Rawsonville. The bridge was built in 1916 and is a 110-metre-long, heritage timber truss bridge which provides a single lane of travel.

The Proposal has been developed as part of the Rawsonville Bridge Project which proposes to replace Rawsonville Bridge, realign the bridge approaches and remove the existing truss bridge on completion. TfNSW also propose to upgrade the nearby intersection of Rawsonville Bridge Road, North Minore Road and the Mitchell Highway under a separate road safety program (*Saving Lives on Country Roads*). The intersection upgrade has been subject to separate environmental assessment and will be built well in advance of the bridge.

The Proposal would involve construction of a new concrete Super T girder bridge immediately upstream from the existing bridge, realignment of the road approaches to the bridge including tie in work with the Mitchell Highway intersection and removal of the existing bridge. The new bridge would be wider than the existing structure and would provide two lanes of traffic with one metre shoulders.

The upgrade of the intersection between the Mitchell Highway and Rawsonville Bridge Road would be progressed separately under the *Saving Lives on Country Roads* Program. This intersection upgrade is aimed at improving road safety for traffic turning on and off the Highway.

The proposal location is shown in Figure 1-1 and proposal area in Figure 1-2.

Key features of the proposal include:

- Building a new concrete bridge immediately upstream from the existing bridge
- Building a new roadway and bridge approaches to connect the new bridge to Rawsonville Bridge Road
- Demolition of the existing bridge
- Installing temporary in-stream structures in the Macquarie River to facilitate construction of the new bridge and demolition of the existing bridge
- Trimming and clearing vegetation
- Building and modifying access tracks on the northern and southern banks of the Macquarie River
- Construction of temporary working platforms for piling equipment and cranes
- Acquiring land to accommodate the new roadway and bridge approaches
- Use of a temporary compound on the southern side of the Macquarie River at 148 Narromine Road, Dubbo
- Use of three existing stockpile sites, one in the road reserve on Rawsonville Bridge Road and two TfNSW stockpiles along the Mitchell Highway
- Potential closure of Rawsonville Bridge Road for two non-consecutive weekends
- Establish a heritage interpretation area at a suitable location near the new bridge.

A more detailed description of the proposed works can be found in Section 3.3.1.

3.2 Design

3.2.1 Design criteria

The design criteria considered the site constraints, such as topographical constraints, existing utilities, civil design standards, existing transport and public transport routes. The design criteria for the proposal are outlined in Table 3-1. The detailed design is attached in Appendix B with a typical cross section for the new bridge shown in Figure 3-1 and long section shown in Figure 3-2. Visualisations of the new bridge are shown in Figure 3-4 to Figure 3-5

Table 3-1 Design criteria for the proposal

Requirement	Design criteria
Civil	<ul style="list-style-type: none">• Design loading in accordance with Australian Standard (AS) 5100 Bridge Design• Traffic loading in accordance with Stationary Load 1600 (SM1600) and Heavy Load Platform (HLP400) standards• Design in accordance with TfNSW bridge design specifications• Deck level and bridge length to be set to suit hydrology requirements
Environmental	<ul style="list-style-type: none">• Placement adjacent to existing bridge to minimise approach works and associated environmental impacts
Design speed	<ul style="list-style-type: none">• 90 km/h
Lane width	<ul style="list-style-type: none">• Two lane single carriageway• 3.5 m lanes• 1.0 m clear shoulders
Economic	<ul style="list-style-type: none">• Design to consider all asset lifecycle costs and activities

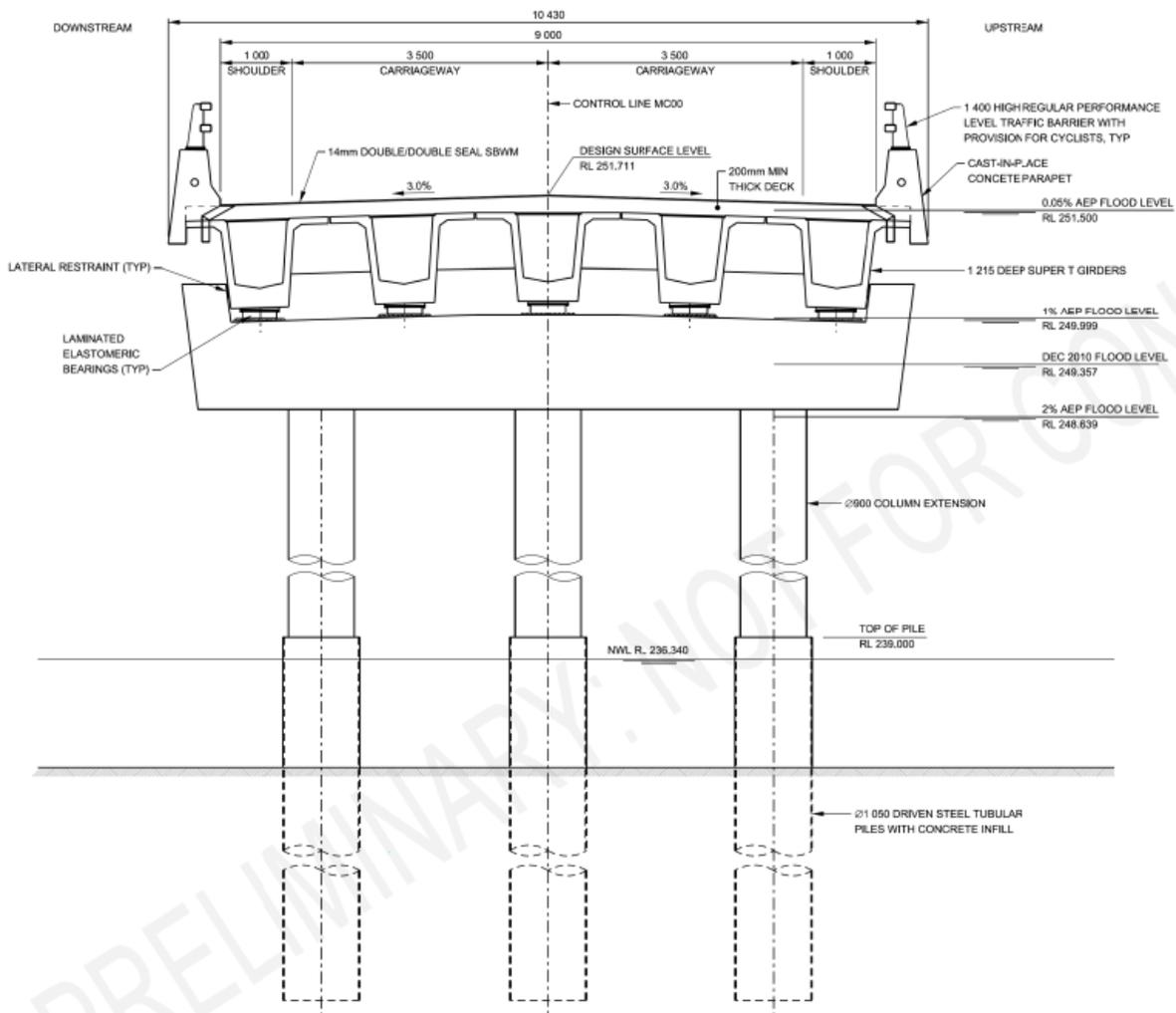


Figure 3-1 Typical cross section of the new bridge design (Concept design)

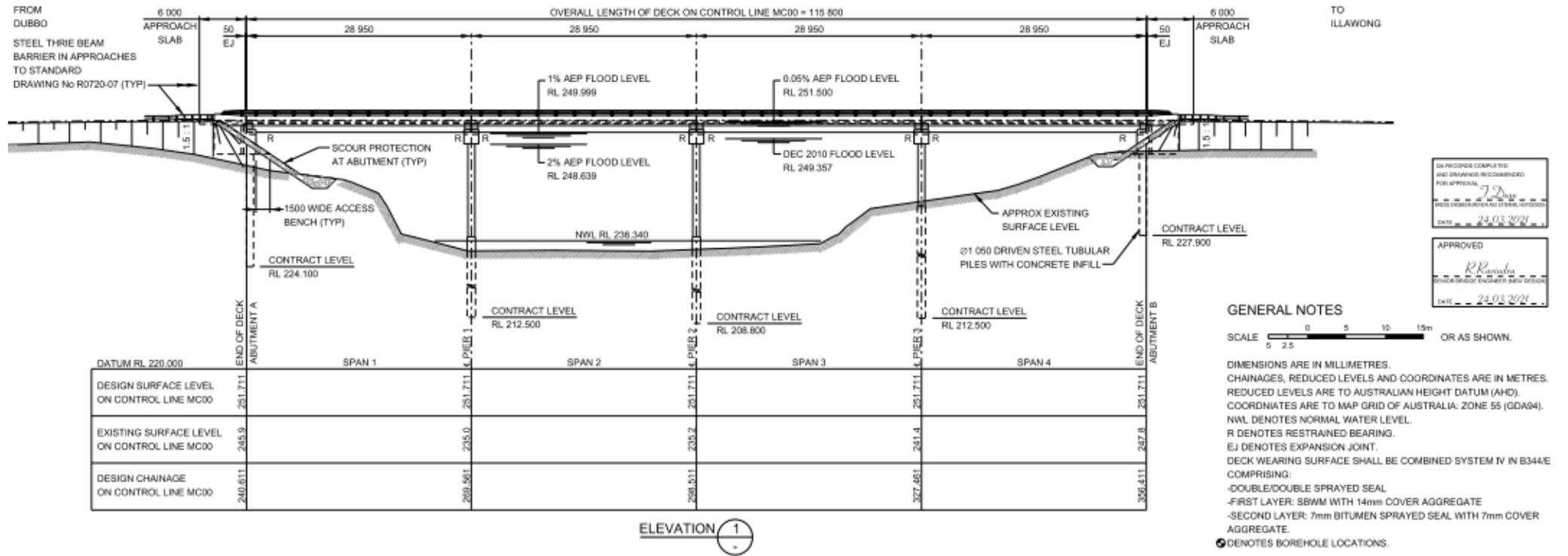


Figure 3-2 Typical long section of the new bridge (TfNSW Concept design)



Figure 3-3 Visualisation of the new bridge viewing south east



Figure 3-4 Visualisation of the new bridge viewing south west



Figure 3-5 Visualisation of the new bridge viewing south

3.2.2 Engineering constraints

A number of engineering constraints were identified during the development of the concept design, including the construction and operational phases of the proposal. The main constraints associated with the proposal include:

- Floodplain, flood levels and hydraulic performance of the bridge during major flood events
- Site geology and selection of suitable foundation types for the new bridge
- Staging of construction to keep the existing bridge open throughout construction
- Keeping private land acquisition to a minimum
- Constructability within the Macquarie River and waterway working
- Managing girder weights and associated craneage
- Tie in points to the proposed new bridge approaches
- Utilities on and adjacent to the existing bridge which would be required to be relocated

3.2.3 Major design features

Major design features of the proposal are the new bridge across the Macquarie River, the new bridge approaches and the demolition of the existing bridge.

New bridge

The new bridge would be located immediately upstream of the existing bridge and would be 115.8 metres long arranged in four span configuration (refer to Figure 3-2). The new bridge would be wider than the existing bridge at 10.43 metres, providing two 3.5 metre travel lanes with one metre shoulders. The bridge piers would be situated in line with the piers of the existing bridge, requiring two sets of piers to be constructed within the waterway. Girder installation may require temporary closure of the existing bridge over one weekend.

Bridge approaches

The construction of the new bridge upstream of the existing bridge requires realignment of the road approaches along Rawsonville Bridge Road to service the bridge. The southern approach would tie in with the Rawsonville Bridge Road / Mitchell Highway intersection and the northern approach would tie in with the existing alignment approximately 250 metres north of the new bridge. The proposed design of the new approaches are shown in Figure 3-6 and Figure 3-7. The design also involves raising the road level by 1.2 metres and installation of a pipe culvert structure in floodway 2 located to the north of the new bridge. This would improve road user safety as the existing road geometry allows water to pond in the floodway during minor rainfall events.

Existing bridge demolition

Following construction and opening of the new bridge, the existing bridge would be demolished. Demolition would require vegetation clearance, earthworks, construction of temporary working platforms and access tracks and establishment of temporary works within the waterway. Removal of timber truss sections may require temporary closure of the new bridge over one weekend. Following demolition, the existing roadway would be ripped and reshaped and a heritage interpretation area would be established in a suitable location near the new bridge.

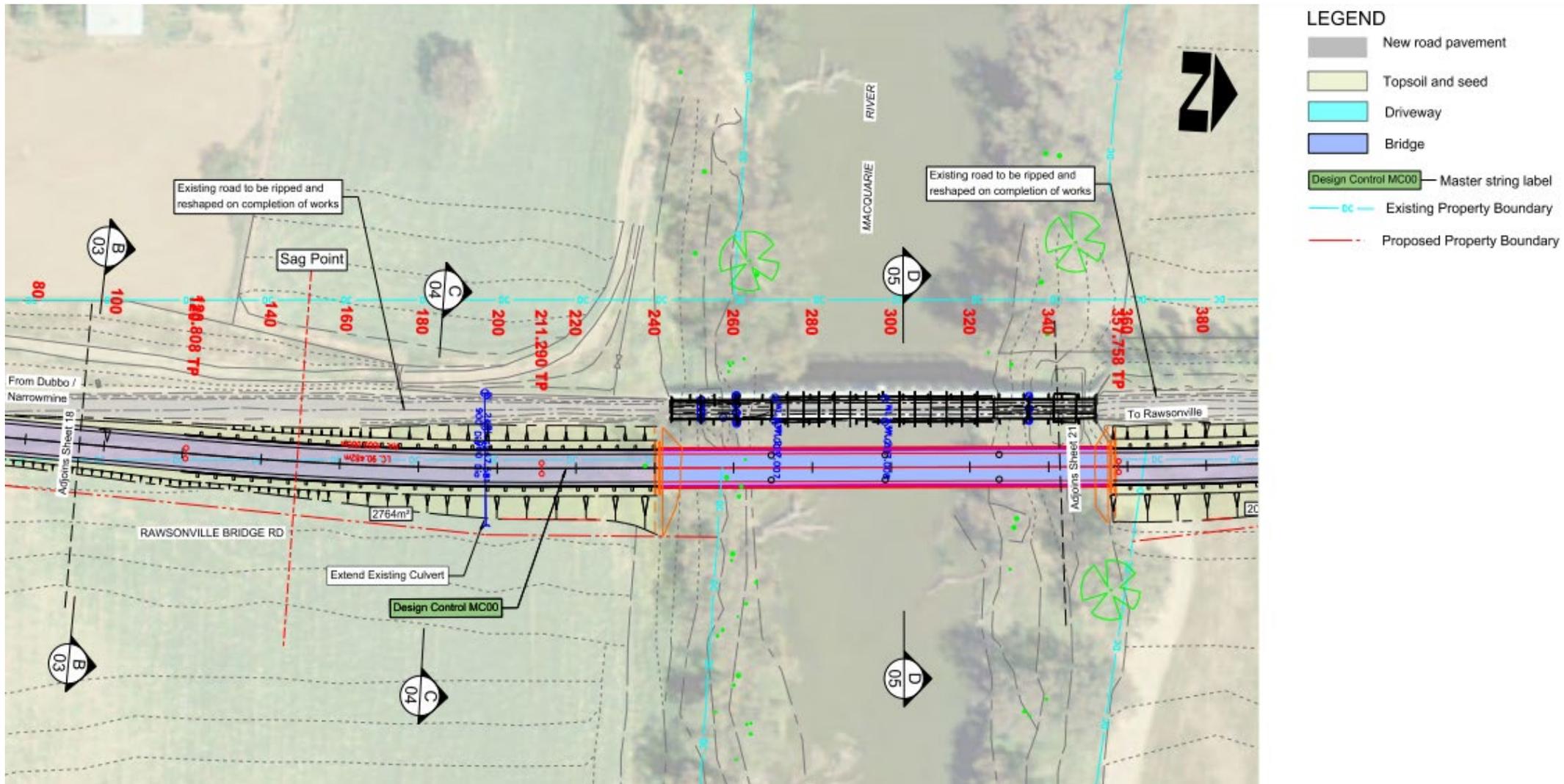


Figure 3-6 New bridge southern approach. Source: CCHD (final design)

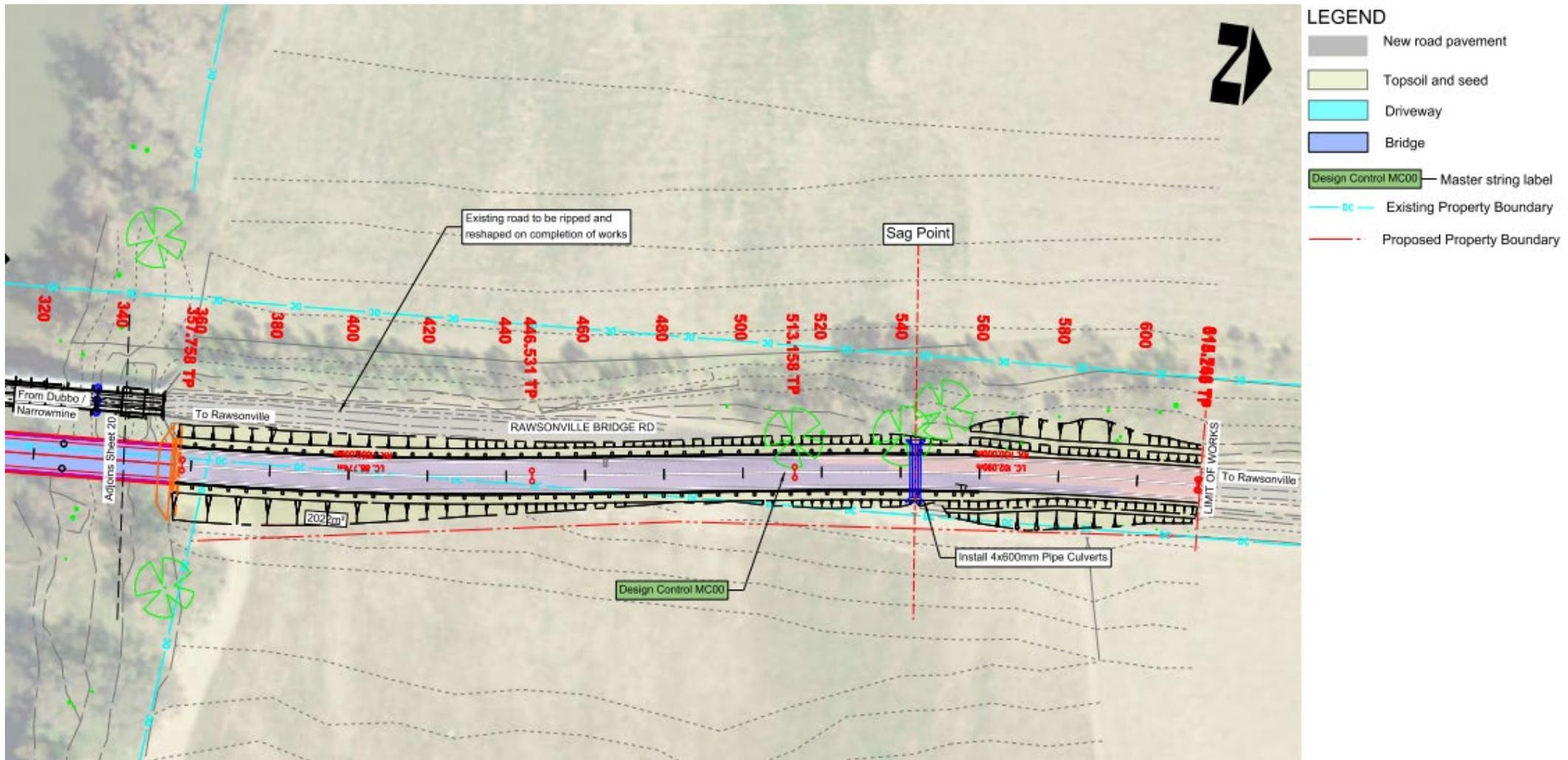


Figure 3-7 New bridge northern approach. Source: CCHD (final design)

3.3 Construction activities

Construction activities would be guided by a Construction Environmental Management Plan (CEMP) that would be prepared in accordance with the requirements of the TfNSW Specification G36 Environmental Protection (Management System). Work would be located within the work area specified within the CEMP and completed to incorporate all safeguards as described in this REF and any other relevant TfNSW environmental specifications.

As part of the proposal, a Traffic Management Plan (TMP) and Erosion and Sediment Control Plan (ESCP) would be implemented and referred to for all stages of construction and demolition works.

3.3.1 Work methodology

The proposal would involve the following work methodology and staging:

Stage 1 Advance Works – Tree Clearance

Relocation of utilities, including a Telstra cable from the existing bridge, would be undertaken prior to commencement of works under a separate Step 2 Environmental Approval. As such, it is not assessed further as part of this REF. The required utility relocation work is described in Section 3.5.

Prior to establishing works, environmental controls would be implemented as per the ESCP, with traffic on the existing bridge and road alignment maintained and managed as outlined in the TMP. Tree clearing would be carried out up to six metres from the toe of earthworks batters to allow construction access and to form table drains on the road approaches to the new bridge. Additional tree clearance along the Macquarie River would also take place on the downstream banks to facilitate demolition works and particularly the upstream side of the new bridge which would be used for craneage and waterway access as well as construction of the northern approach roadworks. Tree clearance would involve around 2.61 hectares of trees and vegetation from the proposal area.

Foliage and branches would be chipped, and the wood chip stockpiled for re-use on site. Larger debris would be disposed of at Whylandra Waste Disposal Facility located about 15 kilometres east of the proposal area.

Impacts of clearance are detailed in the Biodiversity Assessment report (Appendix C) and discussed in Section 6.3.

Stage 2 Preliminary Earthworks

Installation of preliminary earthworks on the north and south approaches to the bridge would be carried out to accommodate the new road alignment. The earthworks would be constructed offline from the existing Rawsonville Bridge Road alignment to formation level of the pavement (approximately 0.5 metres below finished road level). The remaining road construction would be undertaken in Stage 4.

Temporary working platforms would be constructed on the bank on either side of the river to allow the construction of the new bridge. Erosion and sediment controls would be installed around work areas to prevent sediment from entering the river. Individual trees may be cleared, and branches trimmed on the east and west banks of the river to allow for safe machinery access and operations during the construction.

An existing temporary construction compound in the south western corner of the eastern paddock at 148 Narromine Road would be used for the proposal. The compound would include temporary site offices, amenities, car parking, secured storage shed and a small stockpile area. It would be surrounded by a secured person proof fence. Existing temporary stockpile sites would be used and are located in the road reserve along Rawsonville Bridge Road and the Mitchell Highway (refer to Section 3.4). The sites are

gravelled and earthworks fill would be imported to site from TfNSW and Dubbo Regional Council local stockpiles as well as local council and commercial natural gravel quarries, see 3.3.6.

Stage 3 Bridge Construction

Prior to commencing works associated with the bridge construction, waterway and perimeter sediment controls would be established to protect the waterway from impacts related to construction. River snags would be removed from the proposal area and relocated downstream where practicable. Where this is not possible, snags would be removed from site and disposed of at an appropriate licenced waste facility.

Temporary access tracks to the upstream side of the bridge would be established involving excavation of the north and south banks of the Macquarie River. An existing access track on the north upstream riverbank would be enlarged to accommodate mobile cranes and delivery of super T girders. Excavated material would be stockpiled on site for use in final reinstatement of the site.

Installation of a temporary bridge and/or temporary rock platforms would be required to allow construction of waterway piers including piling access, columns and headstocks. A temporary bridge would extend to both riverbanks. A temporary rock platform would extend out to or adjacent to Piers 1 and 2 to allow construction. The central section of the Macquarie River between Piers 1 and 2 would be maintained for fish passage throughout construction. Exposed sections of the riverbanks would be protected by geotextile material or gravel, where practicable, to minimise sediment transport into the river. A silt curtain, or similar, would be installed around the rock platform to protect water quality.

The waterway and abutment piles would be constructed using driven steel tubular casing with reinforced concrete infills. The piles would be driven between 19 metres and 30 metres below the existing surface level by a hydraulic impact hammer and pile driving rig. This may require construction of temporary working platforms at the two abutment locations and also adjacent to the three bridge piers. Reinforced concrete piers, headstocks and abutments would be constructed in situ with backfilling behind abutments using granular fill or stabilised sand. Rock would be installed in front of bridge abutments to provide scour protection.

Installation of Super T girders in Spans 1, 2, 3 and 4 would be undertaken by large craneage located on either bank of the river or from a temporary platform or bridge within the waterway. Working platforms for craneage would be installed at the top of the riverbank and/or behind the bridge abutments and/or within accessible locations within the waterway. Following installation of Super T girders, deck slabs and parapets would be constructed in situ and approach slabs constructed behind bridge abutments. Steel traffic rail would then be installed on top of parapets.

Rock platforms and temporary bridges within the waterway would be removed following construction. Rock would be taken to a TfNSW stockpile site for reuse or recycling. Temporary bridges would be kept for reuse. Vegetation on the riverbanks would be reinstated through application of a hydro-mulch mix with seeds of local native species consistent with the existing plant communities.

Stage 4 Final Roadworks Construction

The final roadwork earthworks would involve shaping of batter slopes to final design profile, construction of table drains and stormwater drainage, including a culvert on the northern approach. Batter slopes and exposed earthworks would then be rehabilitated and revegetated. The final roadworks would involve tie-ins with the upgraded intersection at Rawsonville Bridge Road and the Mitchell Highway to the south and Rawsonville Bridge Road to the north.

The final roadworks to the bridge approaches would include:

- Placing final select material layers for approach roadworks and intersection
- Installation of concrete kerb on the northern approach to the bridge

- Placing pavement layers, trim and apply bituminous primer seal. Pavement gravel to be sourced from local quarries in Dubbo, where possible
- Installation of guardrail on approaches to bridge
- Installation of bituminous final seal on bridge and road approaches
- Installation of signs and line marking
- Switching traffic to new bridge
- Ripping and reshaping existing road surface
- Establishing heritage interpretation area in a suitable location near the new bridge
- Reinstating batters with stripped topsoil and roadside rehabilitation seed mix

Upon completion of final roadworks and tie-ins, the new bridge and roadway would be opened. The changeover of traffic on Rawsonville Bridge Road would then take place from the existing bridge and alignment to the new bridge and alignment. The management of this change over would be as outlined in the TMP. Traffic along the new alignment would then be managed as per the TMP for the duration of the demolition of the existing bridge.

Stage 5 Bridge Demolition

Prior to commencing works associated with bridge demolition, waterway and perimeter sediment controls would be installed. As mentioned above, tree clearance on downstream riverbanks would be required to accommodate access for large mobile cranes. The northern side of the Macquarie River may also require excavation and widening to accommodate the establishment of cranes. Temporary crane platforms would be constructed at the top of the downstream riverbanks and behind the existing bridge abutments, which may require temporary filling. Removal of the existing bridge decking and trusses would include:

- Removal of timber deck planks to allow removal of the approach span girders and to reduce the weight of the waterway truss spans
- Removal of the timber approach spans on either side of the waterway
- Removal of timber truss sections using temporary works and a mobile crane, possibly requiring flat-bed trucks parked on the new bridge to facilitate removal during a road closure
- Removal of abutments and cutting the existing piles to 0.5 metres below existing ground level

Following removal of deck and trusses, excavation of the north and south banks of the Macquarie River would be required to provide temporary access tracks into the waterway downstream. Excavated material would be stockpiled on site for use in final reinstatement of the site. A temporary bridge and/or temporary rock platforms would be installed in the waterway to allow removal of existing concrete waterway piers. As with the new bridge construction, a central section of the Macquarie River would be maintained for fish passage throughout demolition and similar erosion and sedimentation control measures on land and in the river would be employed.

The existing concrete piers would be removed using a combination of saw cutting techniques and a hydraulic breaker mounted on a 32 tonne excavator. Existing piers would be removed to 0.5 metres below existing riverbed level. Temporary cofferdams may be required in the waterway to remove the base of Piers 1 and 2 below the waterway. The foundation of Pier 3 would be excavated and removed from the northern riverbank. Pier removal may also require scaffold access from a temporary rock platform or bridge.

Following pier removal, crane working platforms, temporary fill, rock platforms and temporary bridges and access tracks would be removed. Riverbanks would then be reinstated using prior excavated material and revegetated. Truss timber would be disposed of at a licensed waste facility or recycled if economically viable. Demolition concrete would be trucked to and crushed at Whylandra Waste Disposal facility.

The temporary compound site and stockpile site on Rawsonville Bridge Road would be demobilised. The area of the compound site would be rehabilitated as per agreement with the landowner. The stockpile site would be rehabilitated as per TfNSW guidelines.

Perimeter sediment control measures and traffic control would be removed, and all equipment would be demobilised from site.

3.3.2 Construction workforce

Stage	Workforce required
1. Advance Works – Tree Clearance and Utility	<ul style="list-style-type: none"> Tree clearance – up to four construction workers with traffic control
2. Preliminary Earthworks	<ul style="list-style-type: none"> Ten to twelve construction workers
3. Bridge Construction	<ul style="list-style-type: none"> Temporary bridge and rock platforms – up to eight construction workers Waterway and abutment piles – up to eight construction workers Construction of concrete piers – up to eight construction workers Super T girder installation – up to eight construction workers Construction of deck slabs, approach slabs and parapets – ten to sixteen construction workers
4. Final Roadworks Construction	<ul style="list-style-type: none"> Ten to twelve construction workers
5. Bridge Demolition	<ul style="list-style-type: none"> Ten to sixteen construction workers

3.3.3 Construction hours and duration

The anticipated construction duration for the proposal is expected to be 16 months, with works commencing in 2023.

The works would generally be carried out during TfNSW standard working hours, which are:

- Monday to Friday: 7:00 am to 6:00 pm
- Saturday: 8:00 am to 1:00 pm
- Sunday and public holidays: no work

It is anticipated that up to two weekend bridge closures may be required across the construction and demolition stages of the proposal. These closures are expected to commence at 7am on a Saturday morning with the bridge re-opening to traffic at 5am on the following Monday morning. These would occur on non-consecutive weekends to allow installation of girders on the new bridge during construction and removal of the timber truss sections of the existing bridge during demolition. The management of traffic during these closures, including detours, would be described the TMP.

3.3.4 Plant and equipment

The plant and equipment required for each of the proposed stages of construction are listed in Table 3-2.

Table 3-2 Proposed plant and equipment for each stage of the proposal

Stage	Proposed Equipment	
1. Advance Works – Tree Clearance and Utility	<ul style="list-style-type: none"> • Bobcat with broom attachment • Up to 20 tonne excavator • Excavator with auger attachment • Medium rigid trucks • Trench rollers • Small trucks 	<ul style="list-style-type: none"> • Wood chipper • Boom lift • Chainsaws • Light vehicles • 20 tonne mobile crane •
2. Preliminary Earthworks	<ul style="list-style-type: none"> • 32 tonne excavator • Heavy rigid trucks • 16-21 tonne padfoot, smooth drum and rubber tyre rollers • 300-500 HP soil stabiliser 	<ul style="list-style-type: none"> • 12" Grader • Heavy rigid watercart • 3+ tonne front end loader • Stabilising agent spreader truck
3. Bridge Construction	<ul style="list-style-type: none"> • Transport equipment • Cranes (50-800 tonne) • Portable welding equipment • 32 tonne excavator • Heavy rigid tip trucks • Grinders • Concrete vibrator x 3 • Motorised vibration screed • Water pump standard 2" • Air powered scabblers • Crane or rig mounted hydraulic impact hammer 5-9 tonne • Water pump flex drive 2" • Crawler crane 25-100 tonne 	<ul style="list-style-type: none"> • Semi-trucks • Metal and timber cut off saw • Electric hand saw • Hammer drill • Other electric hand held power tools • Concrete pump • Concrete agitator trucks • Air compressor • Excavator 12-20 tonne • Heavy haulage equipment • Pile driving rig 50-80 tonne • Crane mounted hydraulic vibrating hammer 6 - 9tonne
4. Final Roadworks Construction	<ul style="list-style-type: none"> • Heavy rigid or semi-trailer tippers • 20-30 tonne excavator • Rigid trucks • Heavy rigid watercart x 2 • 16-21 tonne rubber tyre roller/padfoot roller/ smooth drum roller • 300-500 HP soil stabiliser • Aggregate trucks • 12' Grader 	<ul style="list-style-type: none"> • Stabilising agent spreader truck • Franna crane • Concrete trucks • Concrete vibrators and front end loader • Bitumen truck • Tractor with broom attachment • Rubber tyre rollers x 2

Stage	Proposed Equipment	
5. Bridge Demolition	<ul style="list-style-type: none"> • Excavator 12-20t • Concrete road saw • Concrete wall saw • Water pump flex drive x 2 • Water pump standard 2" • Air powered hand jack hammer 75-90 pound size 	<ul style="list-style-type: none"> • Hydraulic breaker (excavator mounted) • Demolition saw hand held • Cranes (50-800 tonne) • Oxy cutting equipment • Tippers • Heavy haulage trucks

3.3.5 Earthworks

The construction of the new bridge, bridge approaches and realignment of Rawsonville Bridge Road to accommodate the new bridge would require moderate earthworks as described in Section 3.3.1. These works would include:

- Preliminary earthworks for bridge approaches, raising the ground and construction of abutments
- Excavation and widening of access tracks to access the riverbanks immediately upstream and downstream of existing bridge
- Excavation of the riverbanks to accommodate works in the waterway immediately upstream and downstream of existing bridge
- Excavation and fill to accommodate crane pads supporting up to an 800 tonne crane on the riverbanks and adjacent to the abutments
- Earthworks to accommodate the new alignment of Rawsonville Bridge Road from Rawsonville Bridge Road / Mitchell Highway intersection to the existing alignment about 250 metres north of the new bridge
- Raising the road level by approximately 1.3 metres and installation of a pipe culvert structure in floodway 2 located to the north of the new bridge.

Quantities of fill material required for earthworks are about 2,000m³ for the bridge approach embankments which would be potentially sourced from local TfNSW and Dubbo Regional Council stockpiles as well as a commercial quarry in Dubbo as outlined in Section 3.3.6. The anticipated material quantity required has been considered and three stockpile sites have been proposed to adequately and safely accommodate this material, see Section 3.4.

Material excavated from riverbanks would be stockpiled on site and reinstated to the excavation area following demobilisation of waterway works.

3.3.6 Source and quantity of materials

The source and quantity of materials would consider the requirements of the *NSW Sustainable Design Guidelines – Version 3.0*. Materials for preliminary earthworks and final roadworks construction would be sourced by Dubbo Regional Council as it would be conducting these works (refer to Section 5 regarding consultation with Dubbo Regional Council). However, where known, the material sources have been listed below.

Key materials to be imported into the site include:

- Preliminary earthworks fill material – potentially imported from a number of sources including:
 - Aspen Road Stockpile Site– Dubbo Regional Council, Aspen Road – Unused fill material for Council project made available for the proposal

- Burraway Pit – Dubbo Regional Council, Burraway Road – Overburden and natural gravel pit
- Brummangen Bridge Stockpile Site – TfNSW, Mitchell Highway (10 kilometres west) – large quantities of ENM (excavated natural material) which can be re-used within the road corridor
- Dubbo Sands – Commercial quarry, Rawsonville Road – Potential to purchase fill and overburden material if required
- Reinforcing steel and steel casing – sourced from manufacturers in Australia
- Road aggregate – would likely be sourced from local commercial quarries in Dubbo
- Clean rock – required for temporary construction pads and other in stream works would likely be sourced from local commercial quarries in Dubbo
- In situ concrete – would likely be sourced from local batching plants in Dubbo
- Pavement Gravel – would likely be sourced from local commercial quarries in Dubbo.

The proposal would require water for activities, such as the compaction of earthworks and pavement layers, and for dust suppression. Water needed for the works would be obtained from a Dubbo Regional Council standard pipe at Dubbo Airport.

3.3.7 Traffic management and access

Rawsonville Bridge Road would remain open through construction and a lane of traffic maintained across the Macquarie River, with the exception of two potential closures during girder installation and existing bridge demolition. Traffic movement at the proposal site would be managed through a Traffic Management Plan (TMP). Access for watercraft would continue through construction as the central section of the Macquarie River would remain open. Short closures of the waterway would take place during girder installation and demolition activities where required.

Construction vehicles would access the proposal area via Rawsonville Bridge Road at both the northern and southern approach. From Rawsonville Bridge Road, access to the bridge construction site, riverbank and proposed new alignment would be made via access tracks which would be constructed from Rawsonville Bridge Road to the northern and southern riverbanks of the Macquarie River. Existing access tracks are present on the northern and southern approaches on the upstream side of the existing bridge and would be modified to accommodate construction plant, transport of bridge segments and access to the lower sections of the riverbanks. New access tracks would be created in the riparian area on the downstream side of the existing bridge to accommodate demolition works.

Compound access would be via an existing gate located on the Mitchell Highway. This gate would be accessible from both the Mitchell Highway and Rawsonville Bridge Road through a cleared area on the north eastern corner of the Rawsonville Bridge Road / Mitchell Highway intersection. Access to the stockpile sites are varied but generally would be accessed from the adjacent road through the road reserve as shown in Figure 3-8.

3.4 Ancillary facilities

An existing compound site is located in the south western corner of the eastern paddock at 148 Narromine Road, Dubbo, which is privately owned and used for agricultural production. The compound extends 80 metres from the western fence line and 50 metres from the southern fence line. Access is via a gate on the southern fence from both Rawsonville Bridge Road and via existing access tracks within the road reserve of the Mitchell Highway. The area is entirely bare ground and has been used for agricultural activities for an extended period. The area is relatively flat and located about 150 metres south of the Macquarie River.

The area would be established as a compound site for the Rawsonville Bridge Road Intersection works prior to the proposal and would not require establishment works. This site would also be used as a stockpile site.

Use of this property would be under a lease agreement between TfNSW and the landholder. The remainder of the agricultural field would continue to be available to the landowner for agricultural use during the operation of the compound. The compound would be demobilised, reinstated and returned to the landholder on completion of the project.

The compound site would include:

- Site office and amenities
- Light and heavy vehicle parking, including machinery storage
- Fuel and chemical storage.

Three existing stockpile sites are proposed to accommodate material for the proposal. The proposed compound site would also house a small stockpile area for small quantities of materials. No establishment works would be required for the stockpile sites. The details and locations of the stockpile sites are as follows:

- Stockpile 1 would be located about 300 metres north of the proposal area adjacent to 9L Rawsonville Bridge Road, Rawsonville within the road corridor. The stockpile site would be accessed via Rawsonville Bridge Road through an existing track in the road reserve. It has an area of 4,600 square metres. This stockpile would be established using gravel and rehabilitated upon completion of the proposal with no tree clearance required.
- Stockpile 2 would be located about 2.9 kilometres east of the proposal area on the Mitchell Highway, adjacent to 120 Narromine Road, Dubbo. This is an existing TfNSW stockpile site and is about 1,800 square metres with access through the road reserve from Rawsonville Bridge Road or the Mitchell Highway. No tree clearance is required.
- Stockpile 3 would be located about 1.3 kilometres south west of the proposal area on the Mitchell Highway, adjacent to 1R The Falls Road, Dubbo. This is an existing TfNSW stockpile site and is about 3,800 square metres with access from The Falls Road directly from the roadway. No tree clearance is required.

Ancillary facilities are shown below in Figure 3-8.

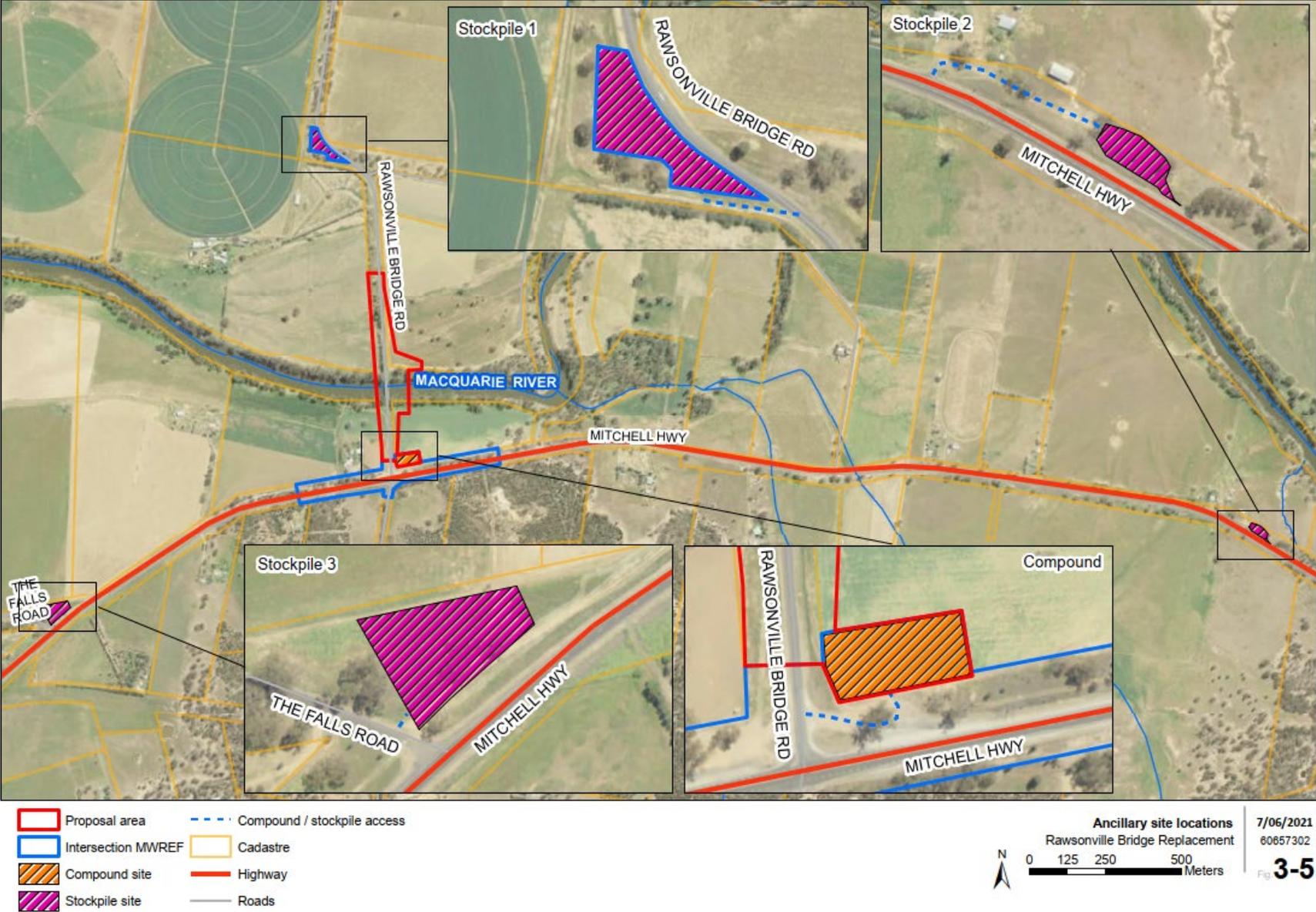


Figure 3-8 Ancillary site locations

3.5 Public utility adjustment

The utility relocation would be undertaken prior to Stage 1 – Advance works by TfNSW under separate environmental and works approvals. However, the relocation of utilities is associated with the proposal as part of the larger Rawsonville Bridge Replacement Project and as such, has been described below, although these works would not be assessed as part of this proposal.

A utility investigation was undertaken and completed on 29 March 2021. This investigation identified various utilities located within the vicinity of the proposal area including copper and optical fibre communication lines, high pressure gas mains, overhead power, private water supply and irrigation main. Conflicts between the proposal and utility location were assessed and have been addressed with the following actions:

- Optical fibre (Infraco/Telstra) – Relocation required from existing bridge structure to an under-bore of the Macquarie River downstream from the existing bridge
- Optical fibre and copper communication lines (Infraco/Telstra) – Relocation required on northern bridge approach between CH480 to CH615 on Rawsonville Bridge Road.

3.6 Property acquisition

Three areas of private land are required for the proposal. Two sections of land immediately north and south of the Macquarie River are required to accommodate the bridge approach and road alignment. The proposed new alignment intersects with sections of private land currently used for agricultural activities and zoned as RU4 Primary Production under the Dubbo Local Environmental Plan (LEP) 2011. These sections of private land would be acquired from the landowner to support the new road formation. A section of the south western corner of the private property at 148 Narromine Road, Dubbo would be leased to accommodate the temporary construction compound site. Details of the proposed property acquisition are outlined in Table 3-3 and locations shown in Figure 3-9 and Figure 3-10.

All property acquisition and lease agreements would be undertaken by TfNSW.

Table 3-3: Proposed property acquisition and lease agreements

Area ID	Description	Total area	Acquisition/lease agreement	Current owner	Lot and DP	Land use zone (LEP)
01	Southern bridge approach	0.315ha	Partial acquisition	Private property	Lot 29 DP258845	RU4
02	Northern bridge approach	0.243ha	Partial acquisition	Private property	Lot 3 DP809731	RU4
03	Construction access	0.103ha	Lease	Private property	Lot 3 DP809731	RU4

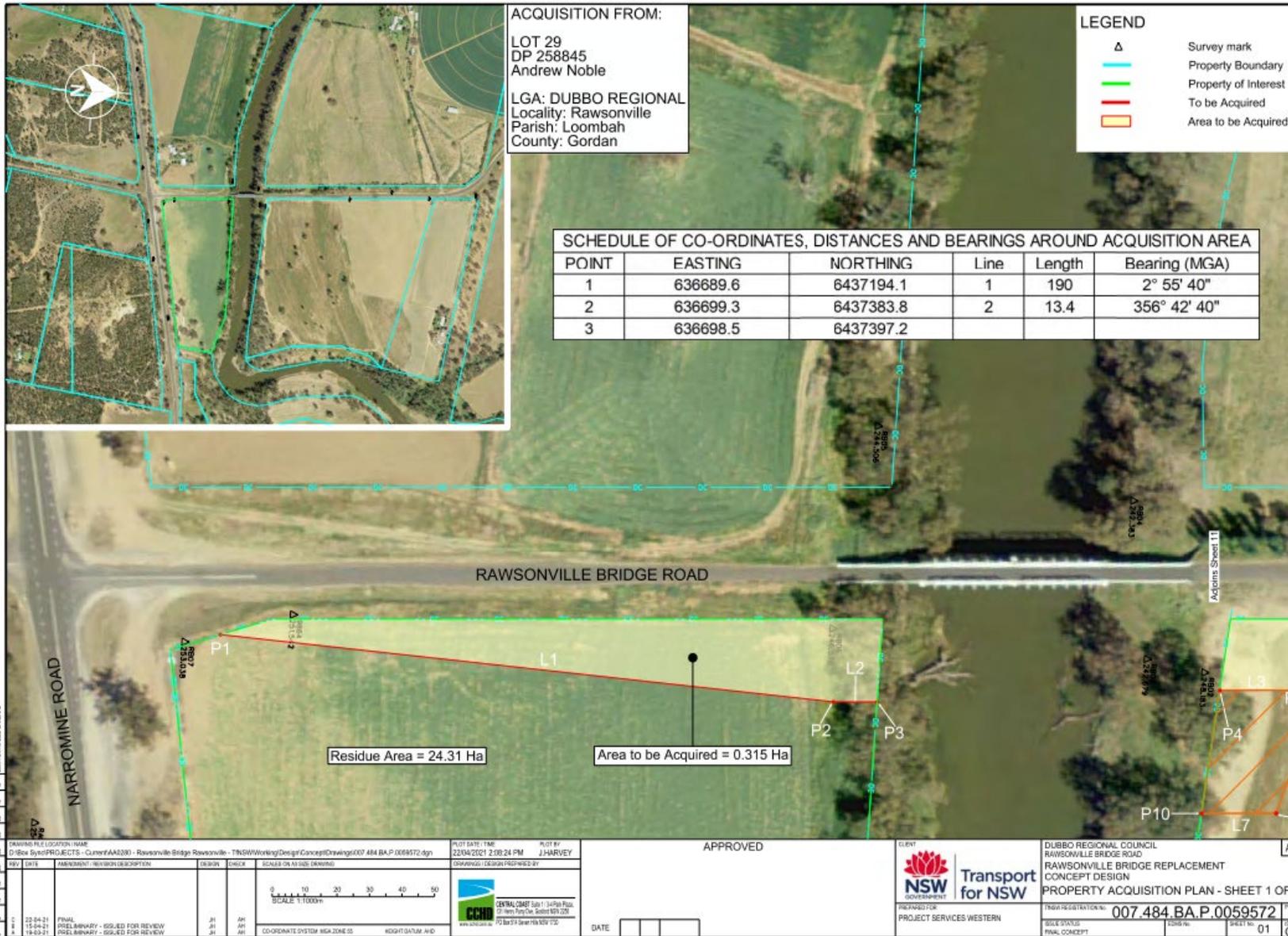


Figure 3-9 Property acquisition (1 of 2)

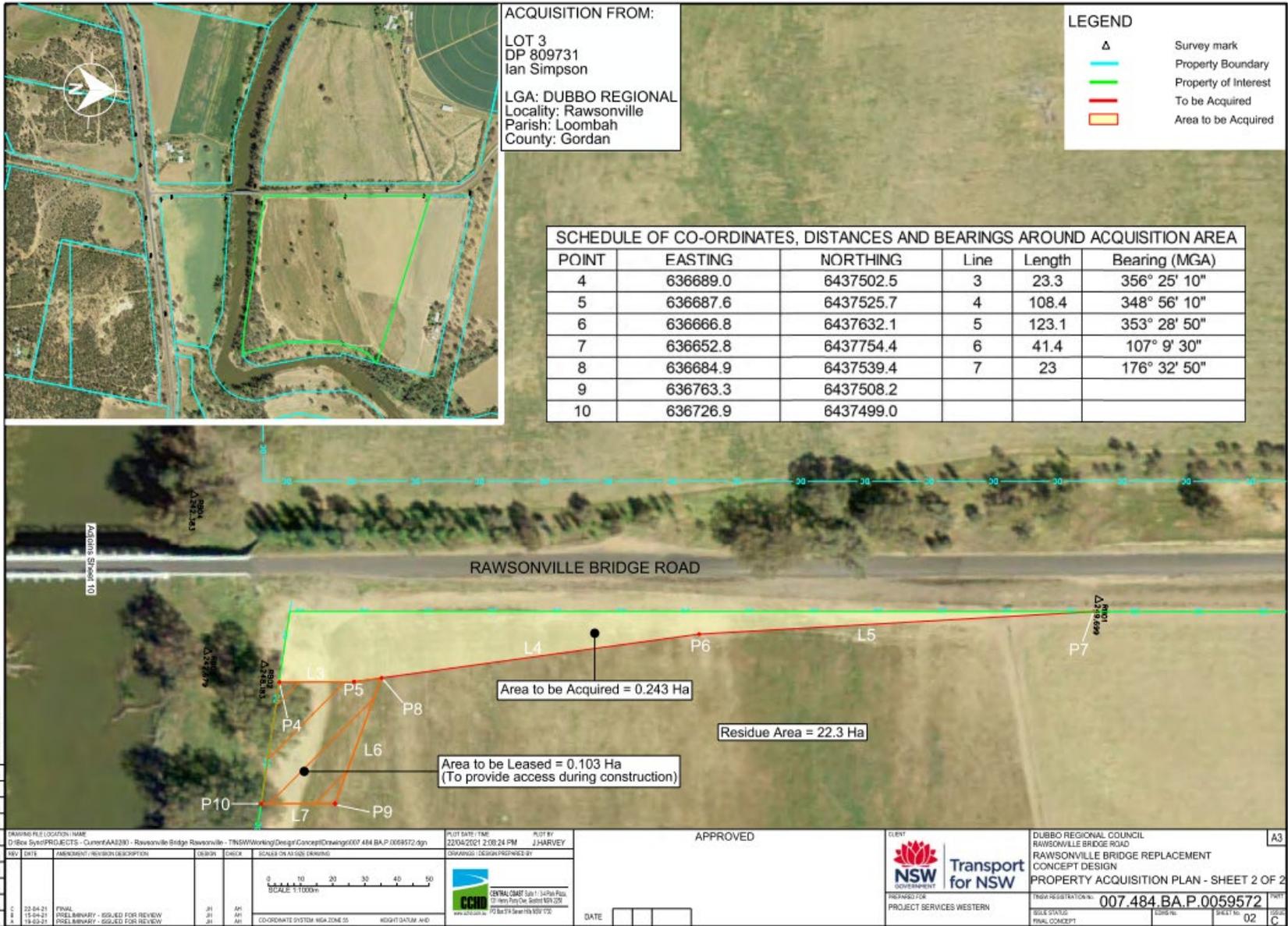


Figure 3-10 Property acquisition (2 of 2)

4. Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the provisions of relevant state environmental planning policies, local environmental plans and other legislation.

4.1 Environmental Planning and Assessment Act 1979

The NSW EP&A Act and its associated regulations provide the framework for assessing environmental impacts and determining planning approvals for developments and activities in NSW. The EP&A Act also establishes State Environmental Planning Policies (SEPPs) and LEPs which may include provisions relevant to the proposal.

This REF has been prepared under Division 5.1 of the EP&A Act and describes the level of impact that the proposed activity may have. It aims to address TfNSW's duty with respect to considering the environmental impact of the proposed activity under Section 5.5 of the EP&A Act and clause 228 of the Environmental Planning and Assessment Regulation 2000.

4.1.1 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.

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

As the proposal is for a road infrastructure facility and is to be carried out on behalf of TfNSW, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not require development consent or approval under State Environmental Planning Policy (Coastal Management) 2018, State Environmental Planning Policy (State and Regional Development) 2011 or State Environmental Planning Policy (State Significant Precincts) 2005.

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

4.1.2 Local Environmental Plans

Dubbo Local Environmental Plan 2011

The proposal is located within the Dubbo Regional LGA and therefore the Dubbo LEP 2011 applies to the proposal.

Under the Dubbo LEP 2011, the proposal is located within the existing road corridor and adjacent agricultural land and is zoned RU1 Primary Production, RU4 Primary Production Small Lots and W2 Recreational Waterways. The proposed ancillary facilities including temporary construction compound site, lay down area and stockpile area are located on land zoned as SP2 Infrastructure and RU1 Primary

Production. The ancillary facilities would only be used for the duration of the construction period and land would be returned to its original condition at completion of the proposal works.

The objectives of both SP2 Infrastructure, RU1 Primary Industry, RU4 Primary Production Small Lots and W2 Recreational Waterways are detailed in Table 4-1 with a comparison of the proposal’s consistency with zoning objectives.

Table 4-1 Comparison of the proposal consistency with zoning objectives of Dubbo LEP 2011

Zoning and objectives	Proposal consistency with objectives
<p>RU1 Primary Production</p> <ul style="list-style-type: none"> • To encourage sustainable primary industry production by maintaining and enhancing the natural resource base • To encourage diversity in primary industry enterprises and systems appropriate for the area • To minimise the fragmentation and alienation of resource land • To minimise conflict between land uses within this zone and land uses within adjoining zones • To enable function centres, restaurants or cafes and appropriate forms of tourist and visitor accommodation to be developed in conjunction with the agricultural uses. 	<p>The proposal is consistent with the objectives of RU1 as the new bridge would improve access for HML vehicles and agricultural machinery crossing the Macquarie River and connectivity of primary industry activities within Rawsonville to the region via the Mitchell Highway.</p> <p>Additionally, the temporary stockpile site would only be used during the construction period of the proposal and would therefore not fragment resource land in the long-term.</p>
<p>RU4 Primary Production Small Lots:</p> <ul style="list-style-type: none"> • To enable sustainable primary industry and other compatible land uses. • To encourage and promote diversity and employment opportunities in relation to primary industry enterprises, particularly those that require smaller lots or that are more intensive in nature. • To minimise conflict between land uses within this zone and land uses within adjoining zones. • To encourage intensive plant agriculture activities which meet sustainable natural resource management principles. • To ensure land with high potential agricultural productivity is protected from inappropriate use and is conserved for intensive plant agriculture activities. • To enable function centres, restaurants and appropriate forms of tourist and visitor accommodation to be developed in conjunction with agricultural uses. 	<p>The proposal is consistent with the objectives of RU4 as the new bridge would improve access for HML vehicles and agricultural machinery crossing the Macquarie River and connectivity of primary industry activities within Rawsonville to the region via the Mitchell Highway.</p> <p>Additionally, the temporary construction compound site would only be used during the construction period of the proposal and would therefore not fragment resource land in the long-term.</p>

Zoning and objectives	Proposal consistency with objectives
<p>SP2 Infrastructure:</p> <ul style="list-style-type: none"> • To provide for infrastructure and related uses • To prevent development that is not compatible with or that may detract from the provision of infrastructure. 	<p>The proposal is consistent with the objectives of SP2 as the stockpile sites would support the construction of new infrastructure.</p>
<p>W2 Recreational Waterway:</p> <ul style="list-style-type: none"> • To protect the ecological, scenic and recreation values of recreational waterways. • To allow for water-based recreation and related uses. • To provide for sustainable fishing industries and recreational fishing. 	<p>The proposal is consistent with the objectives of W2 in the replacement of ageing infrastructure that is no longer fit for purpose with a low maintenance structure would reduce the long term ecological impact of the roadway on the Macquarie River.</p>

As outlined in Section 4.1.1, clause 94 of the ISEPP permits TfNSW, as a public authority, to carry out development for the purpose of a road and/or road infrastructure facilities on any land without consent. As a result, consent from Dubbo Regional Council is not required for the proposal.

The land zoning of the proposal and surrounding area is shown in Figure 4-1.

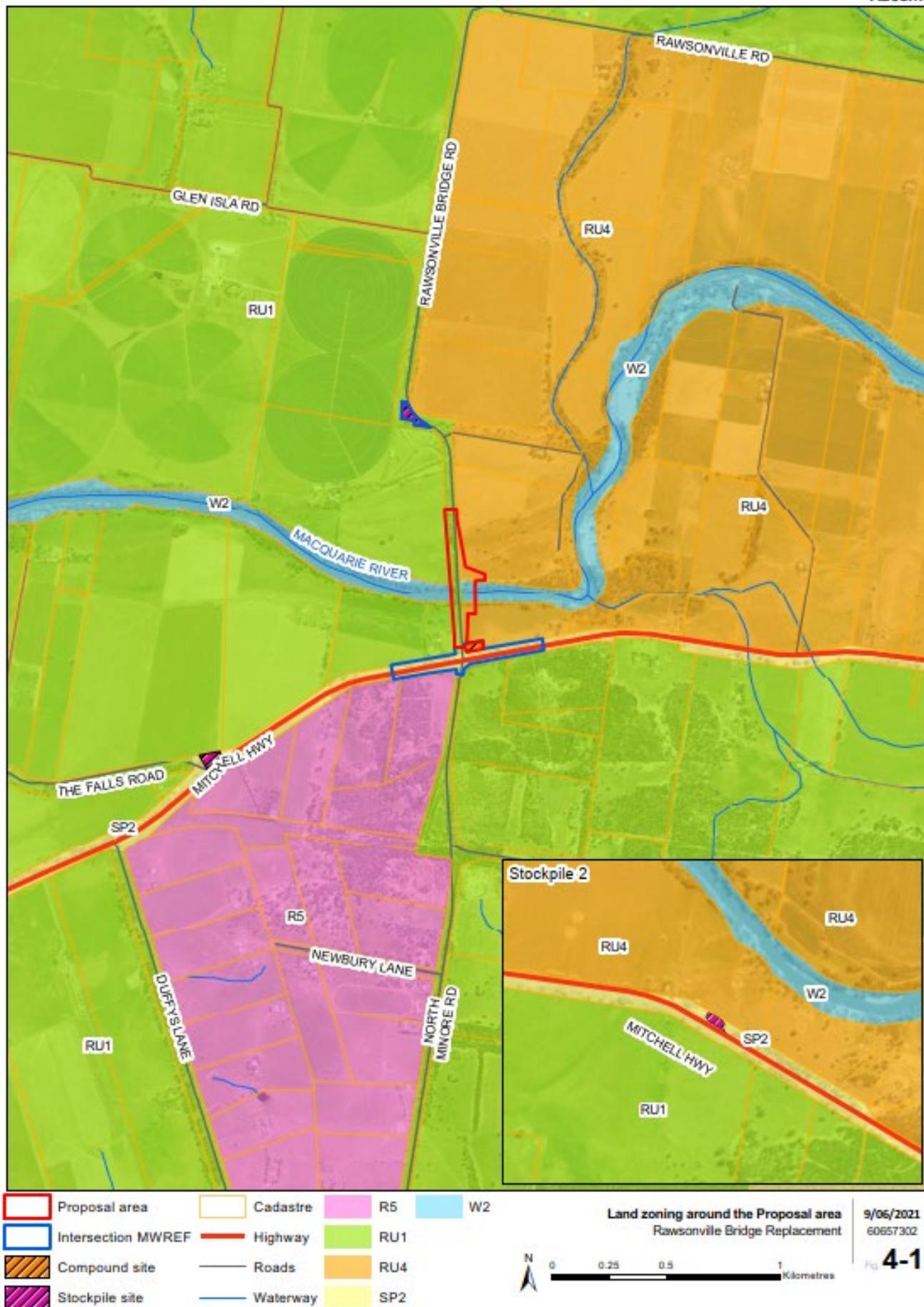


Figure 4-1 Land zoning surrounding the proposal

4.2 Other relevant NSW legislation

4.2.1 Biodiversity Conservation Act 2016

The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community consistent with the principles of ecologically sustainable development.

Under the BC Act, it is an offence to harm animals and plants; damage areas of outstanding biodiversity value and damage habitat of threatened species or ecological communities. Under Part 2, Division 2 of the Act, it is a defence if the harm or damage was necessary for the carrying out of a Division 5.1 EP&A Act activity undertaken in compliance with the determination, or undertaken consistent with a State significant infrastructure approval under Division 5.2 of the EP&A Act.

The BC Act establishes a test to establish whether a proposal or activity is “likely to significantly affect threatened species.” If an activity under Division 5.1 is likely to significantly affect threatened species, a Species Impact Assessment must be prepared.

A Biodiversity Assessment Report was prepared by AECOM (2021) which involved relevant database searches and a detailed field survey conducted in June 2021. The findings of this report are discussed in Section 6.3 and address the impact of the proposal on biodiversity. The report can be found in Appendix C.

Significance assessments carried out indicated that there would be no significant impacts to any threatened species, populations or communities, and that a species impact statement is not required for the proposal.

4.2.2 Biosecurity Act 2015

The *Biosecurity Act 2015* (Biosecurity Act) covers all biosecurity risks, including pest animals, plant diseases and noxious weeds. The Biosecurity Act provides the regulatory controls and powers to manage noxious weeds in NSW and introduces the legally enforceable concept of a General Biosecurity Duty. This means that any person dealing with plant matter must take measures to prevent, minimise or eliminate the biosecurity risk (as far as reasonably practicable).

The proposal is located within the Central West Local Land Services (LLS) region of NSW. The Central West Regional Strategic Weed Management Plan (2017-2022) provides the framework for weed management within this region.

During construction of the proposal, disturbed areas, such as those in which earthworks are to be carried out, would be particularly susceptible to weed establishment. Mitigation measures to control weeds during construction of the proposal are detailed in Section 6.3.

4.2.3 Contaminated Lands Management Act 1997

The object of the *Contaminated Lands Management Act 1997* (CLM Act) is to establish a process for investigating and remediating land where required. The CLM Act allows the NSW Environment Protection Authority (EPA) to declare land as significantly contaminated land. The EPA may order a public authority to carry out actions or prepare a plan of management for significantly contaminated land.

A search was undertaken of the NSW EPA’s contaminated land register on 21 June 2021. No NSW EPA contaminated land records have been identified within the proposal area or the immediate surrounds.

4.2.4 Fisheries Management Act 1994

The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The FM Act includes provisions for threatened fish and marine

vegetation and associated threatening processes and is administered by the NSW Department of Primary Industries (DPI).

The FM Act applies to all waters within the limits of the State, except where Commonwealth legislation applies. Part 7A Division 4 of the FM Act prohibits, without a licence, activities that damage habitats or harm threatened species, populations or ecological communities. Activities which may require a permit under the FM Act include, but are not limited to, dredging works, reclamation work and works that would block fish passage.

Under clause 198A Definitions, the construction of temporary in stream structures during construction may be considered as reclamation being:

(a) using any material (such as sand, soil, silt, gravel, concrete, oyster shells, tyres, timber or rocks) to fill in or reclaim water land, or

(b) depositing any such material on water land for the purpose of constructing anything over water land (such as a bridge)

Under clause 199 of the Act, a public authority must provide the Minister with 21 days written notice of the proposal.

Clause 219 of the FM Act makes it an offence to obstruct fish passage without a permit issued under clause 200 of the Act. In-stream structures, such as rock platforms or sheet piling, may obstruct fish passage subject to the extent of works.

A review of the DPI (Fisheries) Fisheries Spatial Data Portal was undertaken by AECOM as part of the Biodiversity Assessment Report (see Appendix C). Macquarie River in the vicinity of the proposal is mapped as 'Key Fish Habitat'. The results are discussed further in Section 6.3. A species impact statement under the FM Act is not considered to be required for the proposal.

A consultation letter was sent to DPI (Fisheries) on 5 March 2021 with invitation to comment regarding the proposal. A response was received on 11 March 2021 and is discussed in Section 5.5.

4.2.5 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides for the sustainable and integrated management of the State's water for the benefit of both present and future generations. The Act controls the extraction and use of water and any activity that is in or near water sources in NSW. It provides for the implementation of water sharing plans that establish rules for sharing a water resource while taking into account the environmental need of the resource.

Section 56 of the WM Act establishes access licences for the take of water within a particular water management area. Under Schedule 4 Part 1 (2) of the Water Management (General) Regulation 2018, TfNSW as a roads authority is exempt from the need to obtain an access licence in relation to water required for road construction and road maintenance.

Sections 89 to 91 of the WM Act establish three types of approvals that a proponent may be required to be obtain. These are water use approvals, water management work approvals (including water supply work approvals, drainage work approvals and flood work approvals) and activity approvals (including controlled activity approvals and aquifer interference approvals). Due to the proximity of the proposal to Macquarie River and the nature of the bridge construction work, construction activities would be undertaken in and adjoining the watercourse.

"Controlled activities" include the erection of a building or carrying out of a work, removal of material or vegetation, the deposition of material, and the carrying out of an activity that affects the quantity or flow of water in a water source. Typically a controlled activity, approval would be required under Section 91E(1) of the WM Act to allow for construction within 40 metres of a watercourse. However, clause 41 of the Water

Management (General) Regulation 2018, exempts public authorities, such as TfNSW and local councils from Section 91E(1) of the WM Act in relation to all controlled activities that they carry out in, on or under waterfront land. This allows TfNSW to carry out controlled activities on waterfront land. Despite not requiring controlled activity approvals, WaterNSW guidelines for controlled activities have been considered in this assessment.

Under the NSW Aquifer Interference Policy, the proposal is exempt from requiring an aquifer interference approval. Section 3.3 of the policy states that excavations for building pads, trenches and pipelines (intersecting the water table) would be considered as having a minimal impact on water-dependent assets if a water access licence is not required. Therefore, the proposal would be defined as a minimal impact aquifer interference activity given that a water access licence is not required.

A search was undertaken of licensed groundwater and surface water bores in or adjacent to the proposal. The results of these searches are discussed in Section 6.6.

4.2.6 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation of buildings, work, relics and places that are of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the State. Matters protected under the Act include items subject to an Interim Heritage Order and items listed on the State Heritage Register, the heritage schedules of local council LEPs, and the heritage and conservation registers established under Section 170 of the Act by State government agencies (Section 170 Registers). The Act also provides for the protection of archaeological 'relics', being any deposit, object or material evidence that relates to the non-Aboriginal settlement of NSW and is of State or local heritage significance.

The bridge was previously listed on the TfNSW s170 Heritage register, therefore a Statement of Heritage Impact (SoHI) was prepared and consultation undertaken with Heritage NSW in accordance with ISEPP. The SoHI is provided in Appendix D and further discussed in Section 6.1

TfNSW lodged a delisting package with Heritage NSW to allow demolition of the bridge. Correspondence from the Heritage NSW of DPC (22 February 2021) confirmed the notification meets the requirement of Section 170a(1)(c) of the Heritage Act and that the proposed mitigation measures identified within the SoHI are considered appropriate (refer Appendix D). The bridge was delisted in February 2021 (refer to Appendix E).

4.2.7 National Parks and Wildlife Act 1974

The NP&W Act governs the establishment, preservation and management of national parks, historic sites and certain other areas, and the protection of certain fauna, native plants and Aboriginal relics.

Section 86 of the NP&W Act identifies offences relating to Aboriginal objects, including disturbing land to discover an artefact. Section 87(1) of the NP&W Act requires a permit to be obtained to remove any artefacts, while Section 90(2) requires consent from the Minister for Planning and Public Spaces to knowingly destroy, deface or damage a relic or Aboriginal place.

TfNSW has completed an Aboriginal stakeholder cultural heritage survey report in accordance with the Stage 2 Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI). The PACHCI is the TfNSW due diligence process to avoid damaging Aboriginal objects.

The proposal is not anticipated to impact on any known sites, item or objects of Aboriginal heritage significance.

4.2.8 Protection of the Environment and Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) aims to protect, restore and enhance the environments of NSW and reduce potential risks to human health and the environment.

The management of environmental impacts in relation to air, noise and water quality fall under the provisions of the POEO Act. The POEO Act identifies a number of pollution offences, including offences relating to:

- Wilful or negligent disposal of waste in a manner that is likely to harm the environment
- Wilful or negligent causing of a substance to leak, spill or otherwise escape in a manner that harms or is likely to harm the environment
- The pollution of water.

Under the provisions of the POEO Act, TfNSW is required to notify the EPA if a 'pollution incident' occurs that causes or threatens 'material harm' to the environment.

Environmental Protection Licences (EPL) are issued under Section 122 of the POEO Act for various scheduled development and activities. The proposal does not involve undertaking any scheduled activities as listed under Schedule 1 of the POEO Act, therefore an EPL is not required.

4.2.9 Roads Act 1993

The *Roads Act 1993* (Roads Act) regulates the carrying out of certain activities on public roads, provides classification of roads and establishes procedures for opening and closing public roads.

Under Section 138 of the Roads Act, it is an offence on a public road to erect a structure or carry out a work; dig up or disturb the surface; remove or interfere with a structure, work or tree; pump water into a road from adjoining land; and connect a road to a classified road without consent.

As the proposal would involve work on Rawsonville Bridge Road, consent from TfNSW in the form of a Road Occupancy Licence and Speed Zone Authorisation under the Roads Act is required.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act, a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and Chapter 6 of this REF.

A referral is not required for proposed road activities that may affect nationally listed threatened species, endangered ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015.

Findings – matters of national environmental significance

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

Findings – nationally listed biodiversity matters (where the strategic assessment applies)

The assessment of the proposal's impact on nationally listed threatened species, endangered ecological communities and migratory species found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Chapter 6 of the REF describes the safeguards and management measures to be applied.

4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of road infrastructure facilities and is being carried out by or on behalf of a public authority. Under clause 94 of ISEPP the Proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Division 5.1 of the EP&A Act.

Transport for NSW is the determining authority for the Proposal. This REF fulfils TfNSW's obligation under section 5.5 of the EP&A Act including to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

5. Consultation

This chapter provides an overview of the community and stakeholder consultation undertaken to date and the proposed future consultation for the proposal.

5.1 Consultation strategy

TfNSW has consulted with the community and relevant stakeholders throughout the development of the proposal to increase public understanding of, and participation in, the development of the proposal. The proposal has benefited from the input of local knowledge provided through community engagement, which has helped identify issues, potential mitigation strategies and opportunities to improve proposal outcomes.

The consultation strategy has included:

- Ongoing consultation with Dubbo Regional Council
- Targeted consultation and presentations with key stakeholders
- ISEPP consultation with key agencies.

Further consultation would continue through the lifetime of the proposal through engagement with potentially affected stakeholders and the broader community. The outcomes of the consultation already carried out by TfNSW are provided below.

5.2 Community involvement

TfNSW has consulted with various members of the community through the lifetime of the proposal. This has been undertaken through direct contact with identified potentially affected stakeholders and the broader community.

Direct consultation with Burrabadine Bush Fire Brigade, Little Big Dairy and Rawsonville Pony Club undertaken between 2020 and 2021 has resulted in support for the proposal with no issues raised. A community drop-in session was held on 26 February 2021 which identified an issue with nuisance water ponding in Floodway 2 in the current northern bridge approach. TfNSW responded to this by modifying the northern approach design to raise the road by 1.2 metres and installing a culvert in Floodway 2. All other feedback at this drop-in session was broadly in support of the proposal. Consultation with the landholder at 148 Narromine Road, Dubbo has been extensive regarding impacts to property and agricultural and business operations, with feedback regarding the proposal being positive.

Community consultation would continue through the development and construction phases of the proposal.

5.3 Aboriginal community involvement

Involvement of the Aboriginal community in TfNSW proposals is carried out following the provisions of the TfNSW PACHCI (Roads and Maritime, 2011) procedure. When used, the PACHCI procedure provides for consistent and effective consultation with Aboriginal stakeholders where a TfNSW activity may impact upon Aboriginal heritage values. A summary of the stages and assessment involved with the PACHCI procedure is available in Table 5-1 below.

The PACHCI procedure is generally consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water, 2010).

A Stage 2 PACHCI assessment was conducted for the proposal and involved a site survey at the proposal area, which included Aboriginal representatives from the Dubbo Local Aboriginal Land Council (LALC)

participating in the survey on 11 May 2021. The findings of the site survey of the proposal area are discussed further in Section 6.10.2.

No specific issues have been raised through consultation with the Aboriginal community.

Table 5-1: Summary of TfNSW Procedure for Aboriginal Cultural Heritage Consultation and Investigation

Stage	Description
Stage 1	Initial TfNSW assessment
Stage 2	Site survey and further assessment
Stage 3	Formal consultation and preparation of a cultural heritage assessment report
Stage 4	Implement environmental impact assessment recommendations

5.4 ISEPP consultation

Dubbo Regional Council has been consulted regarding the proposal as per the requirements of clause 13, 14 and 15 of the ISEPP. An ISEPP consultation letter was issued to Dubbo Regional Council on 5 March 2021. A preliminary response was received on 26 March 2021 with Dubbo Regional Council indicating that it had identified a concern regarding the proposal, namely the heritage listing of Rawsonville Bridge under the Dubbo LEP 2011. Further consultation was undertaken with Dubbo Regional Council on 20 July 2021 requesting that the bridge would be delisted from the Dubbo LEP prior to commencement of works.

State Emergency Services (SES) have been consulted as per requirements of clause 15AA of the ISEPP. TfNSW wrote to SES in accordance with the provisions of ISEPP. A response was received from SES on 19 April 2021 with SES indicating that the works would have minimal risk to their operations.

Appendix F contains an ISEPP consultation checklist that documents how ISEPP consultation requirements have been considered. The consultation letters and responses are also provided in Appendix F.

Table 5-2: Issues raised through ISEPP consultation

Agency	Issue raised	Response/where addressed in REF
Dubbo Regional Council	<ul style="list-style-type: none"> Rawsonville Bridge Heritage listing in Dubbo LEP 	Section 6.1
SES	<ul style="list-style-type: none"> N/A 	N/A

5.5 Government agency and stakeholder involvement

Various government agencies and stakeholders have been consulted about the proposal (see Table 5-3), including:

- NSW DPI – Fisheries
- NSW Natural Resources Access Regulator (NRAR)
- Dubbo Regional Council
- Heritage NSW.

Issues raised as a result of consultation with these agencies and stakeholders are outlined below in Table 5-4.

Table 5-3 Agency consultation

Agency	Date and type
NSW DPI - Fisheries	<ul style="list-style-type: none"> 5 March 2021 consult letter sent 11 March 2021 response received
NSW NRAR	<ul style="list-style-type: none"> 16 March 2021 consult letter sent 28 April 2021 response received
Dubbo Regional Council	<ul style="list-style-type: none"> 6 September 2019 Rawsonville Bridge Project start-up meeting 9 February 2021 Rawsonville Bridge Project progress meeting 5 March 2021 s170 delisting notification sent 20 July 2021 LEP heritage delist request sent
Heritage NSW	<ul style="list-style-type: none"> 15 January 2021 consult letter sent 22 February 2021 S170 delisting approval received

Table 5-4 Issues raised through stakeholder consultation

Agency	Issue raised	Response/where addressed in REF
NSW DPI - Fisheries	Blockages to fish passage within the Macquarie River	Central section between Piers 1 and 2 would remain open through construction (Section 6.3 and 6.6)
	Maintenance or improvement to the cross-sectional area of a waterway	Safeguards in Section 6.6
	Damage to riparian vegetation	A revegetation strategy would be implemented to mitigate riparian vegetation impacts (Section 6.3)
	Bank stabilisation and rehabilitation	A revegetation strategy would be implemented to rehabilitate the banks (Section 6.3)
	Removal, realignment of snags	Snags would be avoided and where required would be repositioned downstream where practicable (Section 6.3)

Agency	Issue raised	Response/where addressed in REF
	Threatened species, populations, and ecological communities	A Biodiversity Assessment was conducted and discussed in Section 6.3
NSW NRAR	Details of the proposed works, location and timing. This is to include works required for construction, operation and decommissioning. A location plan and an indicative site plan showing the proposed works is required. Photos of the sites also need to be included	Proposal details are provided Section 3.3
	Conceptual design plan of infrastructure proposed, including cross-section and long section and indicative measurements to understand the relative scale of works. This would need to include any coffer dams, temporary in-channel works, in addition to the permanent works	Proposal designs are provided in Section 3.2
	Quantify volumes of surface water and groundwater proposed to be taken by the activity from each water source as defined by the relevant Water Sharing Plan. Also include any water disposal, treatment requirements, water storage and water return to facilitate construction and decommissioning	Water for construction will be sourced from a Dubbo Regional Council standard pipe at Dubbo Airport. No additional surface or groundwater abstractions would be required. Safeguards for water quality are provided in Section 6.6
	Confirm the potential for aquifer interception. Where an aquifer is to be intercepted, an impact assessment will be required to meet the requirements of the NSW Aquifer Interference Policy or justification where this is not deemed necessary	Assessment of aquifer interception is provided in Section 6.6
	Assessment of impacts on surface and groundwater sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, flooding and groundwater dependent ecosystems. Include measures proposed to reduce and mitigate impacts. This is to address construction and any operational impacts. Impacts on bed, bank and floodplain stability due to any construction and operational changes to local hydraulic and hydrologic conditions will need to be assessed	No surface or groundwater would be taken associated with the proposal. Water for construction will be sourced from a Dubbo Regional Council standard pipe at Dubbo Airport. Impacts to water quality, resources and biodiversity are detailed in Section 6.3, Section 6.6 and Section 6.7
	Separation of clean and dirty water, and development of sediment and erosion control measures in accordance with industry standards.	Sediment and erosion controls are detailed in Section 6.6

Agency	Issue raised	Response/where addressed in REF
	Plan in the event river flows may inundate or have the potential to remove construction related infrastructure	A Flood Contingency Management Plan is to be prepared for the work site (Section 6.7)
	As works are proposed within waterfront land (i.e. in or within 40m of a watercourse) design and management of the proposed works will need to meet the requirements of the Guidelines for Controlled Activities on Waterfront Land	Clause 41 of the Water Management (General) Regulation 2018 exempts public authorities from Section 91E(1) of the WM Act (Section 4.2)
Dubbo Regional Council	Rawsonville bridge is listed in DLEP 2011 Item 251 as a local heritage item. The demolition of a heritage item requires development consent as per DLEP 2011.	Subsequent consultation has been engaged with Dubbo Regional Council regarding delisting of Rawsonville Bridge from the Dubbo LEP 2011 (Section 5.5 and Section 6.1)
Heritage NSW	Undertake archival, photogrammetry and digital recording	Safeguards in Section 6.1
	Prepare a heritage interpretation plan in accordance with the TfNSW Heritage Interpretation Strategy 2020	A heritage interpretation area would be constructed in a suitable location near the bridge in accordance with the TfNSW Heritage Interpretation Strategy 2020 (Section 6.1)

5.6 Ongoing or future consultation

TfNSW will continue to inform residents and stakeholders of the ongoing development of the proposal. This would be carried out using methods such as the distribution of community updates, emails to the stakeholder database, social media posts and updates on the project website.

5.6.1 Consultation during construction phase

Construction is anticipated to commence in 2023, with the proposal to be operational in late 2024. TfNSW would inform the community of the construction period dates, prior to commencement and would continue to inform the community throughout construction. Notices would be provided via letter box drops. Media announcements and variable message signs would be deployed to advise motorists of closures and other changes to traffic conditions.

If the proposal proceeds, a Community and Stakeholder Engagement Plan will be developed and implemented during construction phase of the proposal. The Plan would describe in more detail the community consultation objectives, stakeholders, strategies, activities and evaluation for the proposal.

Targeted consultation during both the pre-construction and construction phases of the proposal would be carried out with:

- Dubbo Regional Council
- State Emergency Services (SES) and emergency services in Dubbo and surrounds on the timing of the works and detour route operations
- Crown Land regarding notification of works within Crown Waterway
- The landowner at 148 Narromine Road, Dubbo on construction staging and use of leased land
- Heavy vehicle operations that may be impacted by the changed traffic conditions and bridge closures during the construction period
- Businesses, agricultural operations and stakeholders in the locality, including Little Big Dairy, and those located on Rawsonville Bridge Road.

5.6.2 Public display of the REF

This REF would be on display for comment from 4 - 29 October 2021. The REF would be available to view on the project website and at the following locations:

- **Dubbo City Council Offices** with the REF on display at an unstaffed display
- **Dubbo Regional Library** with the REF on display at an unstaffed display.

TfNSW would invite feedback on the proposal with written and email submissions open until 5pm Friday 29 October 2021. Following the public display period, a Response to Submissions Report would be prepared to respond to comments received and would be made available on the TfNSW project website.

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:

- Potential impacts on matters of national environmental significance under the EPBC Act
- The factors specified in the guidelines *Is an EIS required?* (DUAP 1995/1996) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000 and the *Roads and Related Facilities EIS Guideline (DUAP 1996)*. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix A.

Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

6.1 Non-Aboriginal heritage

A SoHI was prepared by Focus Bridge Engineering (FBE) in December 2020. A copy of the report is provided in Appendix D with a summary of the findings provided below.

6.1.1 Methodology

Searches of statutory and non-statutory local, State and Commonwealth registers were undertaken as part of the SoHI in 2020 (Appendix D).

The results of the database searches are provided in Table 6-1.

Table 6-1 Statutory and non-statutory listings

Heritage Listing	Status
Australian Heritage Database	Not Listed
Australia's National Heritage List	Not Listed
State Heritage Inventory (LGOV)	Not Listed
Heritage Act – State Heritage Register	Not Listed
Heritage Act – s.170 NSW State agency heritage register	4300182
Dubbo LEP 2011	1251

Rawsonville Bridge has since been delisted from the TfNSW s170 Heritage Register and the Dubbo LEP (see section 5.4).

6.1.2 Existing environment

The area known as Rawsonville was originally inhabited by the Wiradjuri Aboriginal peoples. Early European exploration into the Dubbo area occurred with John Oxley arriving in the area in 1818. This was followed by the first temporary occupation permits being issued in 1824. A squatter, Robert, Venour Dulhunty, took a legal licence to the property 14 miles from Dubbo at the junction of Mitchell Creek and Talbragar River and called it Barbical. By the 1870's a number of families had settled in the area and Belarbigal district school opened in 1876. At this time the primary industry of the area was wool production. Following a visit by then Governor of NSW Henry Rawson in 1903, the name of the village was changed to Rawsonville.

A public petition to the Minister for Works for a bridge to cross the Macquarie River and connect the villages of Belarbigal and Minore was made in September 1901. The petition which was published in the *Dubbo Liberal and Macquarie Advocate* describes the 10 mile route to cross the river between the two villages restricting access to the newly connected Minore railway siding from Belarbigal and the subsequent limitations of produce transport to Dubbo as primary reasoning for the petition. The bridge construction by the NSW Public Works Department commenced in April 1914 and was completed in December 1915.

The bridge was initially included on the 2012 Timber Truss Bridge Strategy as a bridge that would be retained. However, following review of operability, technical rarity, technical and non-technical representativeness, community sentiment and financial viability, the bridge was recommended to be removed. Additionally, Cooreei Bridge was recommended to replace Rawsonville Bridge on the list of retained bridges due to it being a superior example of a 91' Dare truss bridge.

The significance of the bridge is attributed to its representation of the Dare truss design and shift in construction preference to concrete as evidenced by the concrete piers. Although the bridge was a significant infrastructure project for the time and was vital for local transport of produce to the Minore rail siding, the village of Minore and the railway siding it was built to service no longer exist. The Bridge was determined to be significant at a local level on the basis of technical and historic significance.

Two other heritage items, Dickygundi Inn and Minore Falls, are located within the vicinity of the proposal and listed as heritage items under the Dubbo LEP 2011. The Dickygundi Inn is located about 550 metres south east of the proposal area on the Mitchell Highway with Minore Falls located about 350 metres east of the proposal area as shown in Figure 6-1. It is unlikely that the proposal would impact either of these heritage items.



Figure 6-1 Non-aboriginal heritage items near the proposal area

6.1.3 Potential impacts

Construction

The bridge has been delisted from the TfNSW s170 Heritage Register and State Heritage Inventory which allows demolition of the existing structure.

The potential impacts of the proposal on the bridge are discussed in the SoHI prepared by FBE (Appendix D), with a summary of the findings provided below. The SoHI is supported by Heritage NSW as detailed in a letter provided in Appendix F.

A summary of the heritage significance is provided in Section 6.1.4.

Table 6-2 Summary of heritage significance (Source: FBE)

Bridge Component	Significance grading
Abutment A and B	Intrusive
Approach spans 1 to 3 and 6 to 9	Moderate
Main Dare truss spans	High
Approach span piers (timber)	Low
Main span piers (concrete)	High
Overall significance	Moderate

The bridge was assessed as being of moderate overall significance at a local level.

The abutments are considered intrusive, damaging the heritage significance of the bridge. The approach span piers are considered of low significance and consist of original and replacement piers with concrete sill beams and steel brackets installed in Piers 1 and 6. The approach Spans 1 to 3 and 6 to 9 are considered of moderate significance with several girders being replaced. The main Dare truss spans and associated main span piers are considered of high significance with the truss members appearing intact and in original form. The main truss piers are a rare early example of concrete bridge piers.

The historic and technical significance associated with the bridge is mostly associated with the main Dare truss spans and concrete piers. The high cost of maintenance of the bridge and inability to accommodate the current and predicted future traffic capacity of the roadway have rendered retention of the bridge unfeasible, including these significant elements. As a result, the bridge would be demolished.

A heritage interpretation area is proposed as discussed in Section 3.3.1. The proposed heritage interpretation area would be in accordance with the TfNSW Heritage Interpretation Strategy 2020 and include display of images of the existing bridge (see Section 6.1.4).

Operation

The proposal involves demolishing and replacing the existing bridge with a modern concrete bridge. The new bridge would be built immediately upstream of the existing bridge which continues the use of this crossing as a significant road route. The new bridge would have a load capacity and traffic barriers meeting

current safety standards which would enable the bridge to continue as a significant connection for local agricultural businesses and the community by supporting HML vehicles.

6.1.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage	<p>The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered</p> <p>Work will only re-commence once the requirements of that Procedure have been satisfied</p>	Contractor	Detailed design / pre-construction
Non-Aboriginal heritage	<p>A Photographic Archival Recording will be implemented prior to works commencing on the bridge</p> <p>Any images taken will be placed on the TfNSW bridge files and may be utilised in any heritage resource for future researchers</p> <p>Copies will also be provided to the State Library of NSW as a heritage resource for future researchers</p> <p>The archival photographic recording should include a detailed recording of the Dare truss span and in particular the foundry marks in the top chord splice plates and bottom chords, metal shoes, braces and hanger rods, along with main timber truss elements and connections</p> <p>Attention should also be given to the concrete piers and in particular the decorative capitals</p> <p>The bridge should also be recorded digitally using photogrammetry and laser scanning techniques</p>	TfNSW Project Manager	Pre-construction
Non-Aboriginal heritage	<p>TfNSW should develop and implement a bridge specific heritage interpretation plan in accordance with the TfNSW Heritage Interpretation Strategy 2020, the local community and Dubbo Regional Council's requirements</p> <p>The heritage interpretation plan should include provision for the retention and reuse of the rare top chord splices and bottom chord metal elements with the</p>	TfNSW Project Manager	Pre-construction

	<p>FRODINGHAM IRON & STEEL CO LTD ENGLAND foundry marks</p> <p>Further research on the design, metallurgy, origin, chronology and history of foundry marks should be undertaken by TfNSW</p>		
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Other safeguards and management measures that would address non-Aboriginal heritage impacts are identified in Section 6.4.3.

6.2 Property, land use and socio-economic

6.2.1 Methodology

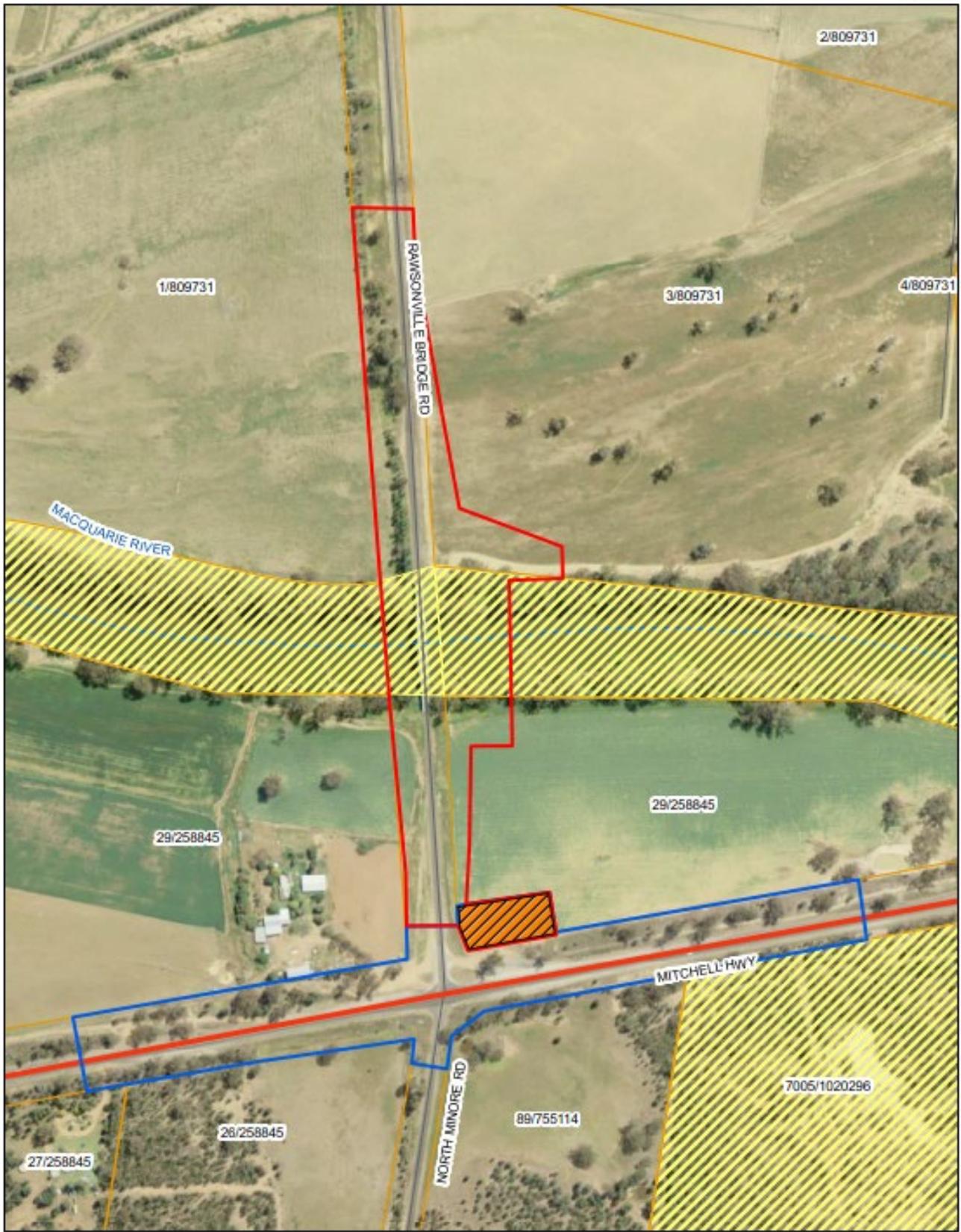
The proposal is located within the Dubbo Regional LGA in central-western NSW. The land use surrounding the proposal area was determined by reviewing the Dubbo LEP 2011 together with satellite imagery and site inspection on 20 April 2021. Socio-economic data for the suburbs of Dubbo and Rawsonville was collected from the Bureau of Statistics census database (BoS 2020a, 2020b).

6.2.2 Existing environment

Property and land use

The proposal area is predominantly surrounded by agricultural properties, both broad acre and small lots, and rural residential living. There are also several recreation and historic areas in the local region including campgrounds, historic sites and reserves. Dubbo, located about 21 kilometres west of the proposal area, is a rural service town providing the region with a range of employment, industry, retail and services. Dubbo is also a tourism hub for the region and hosts an airport, regional rail and bus interchange.

Land within the road reserve and to the west of Rawsonville Bridge Road is zoned as RU1 Primary Production while land to the east of the road reserve is zoned as RU4 Primary Production – Small Lots. All land surrounding the proposal area is currently used for agricultural activities including cropping and grazing, with a section of 148 Narromine Road (DP 29/258845), to the south west of the proposal area being a workshop and staging area for a private business. Between the freehold lots on either side of the waterway and riparian area along the Macquarie River is Crown land (Crown waterway). The property boundaries around the proposal area are shown in Figure 6-2 while land zoning is shown in Figure 4-1.



- | | | |
|--|--|--|
|  Compound site |  Intersection MWREF |  Highway |
|  Stockpile site |  Crown Land |  Roads |
|  Proposal area |  Cadastre |  Waterway |

Property boundaries around the proposal area
 Rawsonville Bridge Replacement
 6/07/2021
 60657302
 Fig. **6-2**

N
 0 50 100 200 Meters

Figure 6-2 Property boundaries around the proposal area

Socio-economic

As mentioned above, the proposal area is surrounded by agricultural properties which comprise various business types and operations including:

- Noble's Ag Contracting – agricultural operations contractor and cropping
- 9R Rawsonville Bridge Road – cropping / grazing

The proposal area occurs over two suburbs, Rawsonville and Dubbo, which are separated by the Macquarie River. According to the 2016 census from the Australian Bureau of Statistics (ABS), the population in the suburb of Rawsonville was 50 people in 2016, of which 27 were employed. Over half (52 percent) worked in Agriculture, Forestry and Fishing and 26 percent were employed in Professional, Scientific and Technical Services. The population of Dubbo was 38,943 in 2016 with 18,102 currently employed. The primary occupation in Dubbo was Hospitals (except Psychiatric Hospitals) at 4.8 percent of people employed with primary education and other social assistance services accounting for 2.7 percent and 2.5 percent of employment respectively.

Of people living in Rawsonville, 74 percent travelled to work in Dubbo by car.

6.2.3 Potential impacts

Construction

Private land would be acquired to facilitate the new bridge and bridge approaches. This would consist of about 0.243 hectares of the southern agricultural field at 9R Rawsonville Bridge Road, Rawsonville and about 0.315 hectares of the eastern agricultural field at 148 Narromine Road, Dubbo. Both parcels of land would be acquired in accordance with the Land Acquisition (Just Terms Compensation) Act. Additionally, a section of 9R Rawsonville Bridge Road, Rawsonville would be leased during the construction phase of the proposal to facilitate works. A section of the south western corner of the eastern agricultural field at 148 Narromine Road leased prior to the proposal would be used as a temporary compound area. Areas of leased property would be rehabilitated as agreed between the landowner and TfNSW during the demobilisation of works. The location and extent of property to be acquired are shown in Appendix H.

Construction activities taking place within the Crown waterway would require the procurement of a short term occupancy licence / letter of consent for the construction activities and duration of the works.

There is potential that traffic queues during the altered traffic conditions during construction of the bridge approaches and bridge may result in temporary obstructions to light and heavy vehicle access for residents of the surrounding areas accessing local places of work, particularly agriculture properties or services during peak times. As discussed above, most employed people in Rawsonville drive a vehicle to their place of employment with about half of these people working in Agriculture, Forestry and Fishing, which may involve commuting across Rawsonville Bridge. This would also impact residents of Dubbo, especially those residing on the southern side of the Macquarie River, accessing places of work on the northern side of the river.

Given the low density of businesses in the area due to agricultural operations and low density of housing in the area, impacts would likely be restricted to those residing in the immediate surrounds of the bridge accessing the other side of the river. Traffic and access impacts are discussed in Section 6.5.3, and mitigation measures are provided to manage these impacts, such as the use of stop/go controllers and flagmen to control traffic queues on both approaches to the bridge.

There would be reduced access to the eastern agricultural field of 148 Narromine Road given location of the proposed construction compound site due to use of the current access for compound access and the proposal removing the western paddock access (refer to Section 3.4). During the proposal, the remainder of the field would be usable and would be accessible by the landowner.

The property at 9R Rawsonville Bridge Road, Rawsonville would remain accessible by the landowner. However, access points from the southern boundary adjacent to the Macquarie River and south west to Rawsonville Bridge Road would be removed as they are within the area to be acquired by TfNSW. Access to the southern field from the north and east would remain unchanged, this is the direction to the house and workshop area on the property. Normal agricultural operations would not be impacted on the remainder of the property during the proposal construction or operation.

Local residents and business would be impacted during the weekend bridge closures as they would have to use the vehicle detour outlined in Section 6.5.3. The detour would add about 30 minutes to travel time to road users travelling between the intersection of Rawsonville Bridge Road and the Mitchell Highway and Rawsonville Bridge Road and Burroway Road. Full road closures are only expected to be for two non-consecutive weekends from 7am on a Saturday morning with the bridge re-opening to traffic at 5am the following Monday. Bridge closures would be advertised using variable message signs along the Mitchell Highway and Rawsonville Bridge Road and consultation with key stakeholders, including local business, at least 14 days prior to closures.

Operation

Once operational, the upgraded bridge would provide access to wide vehicles, including agricultural machinery, facilitating connectivity between agricultural properties on either side of the Macquarie River. This would significantly improve accessibility for these vehicles, which would otherwise require a 45 kilometre detour through Dubbo, benefiting the local agricultural businesses. Additionally, the safety improvements afforded by the new bridge allowing two lanes of travel and improved visibility of the bridge approaches would benefit the local residents.

The new bridge is designed to require minimal ongoing maintenance, which would be a significant improvement on the existing bridge. Additionally, the higher deck level and raised roadway at the floodway in the northern approach to the new bridge would improve accessibility during high rainfall and flood events.

6.2.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
General notification	<p>All businesses, residential properties and other key stakeholders (e.g. local councils and agricultural properties) affected by the activity will be notified at least five working days prior to commencement of the activity. The notification will include:</p> <ul style="list-style-type: none"> • details of the project • construction period and construction hours • contact information for project management staff • complaint and incident reporting and how to obtain further information 	TfNSW Project Manager & Contractor	Pre-construction

Other safeguards and management measures that would address property and land use and socio-economic impacts are identified in Section 6.4.3 and 6.5.4.

6.3 Biodiversity

A Biodiversity Assessment was conducted by AECOM in June 2021. A summary of the assessment is provided below and the full Biodiversity Assessment Report (2021) is attached in Appendix C. The Biodiversity Assessment included desktop research, detailed field surveys in April 2021.

For the purposes of the Biodiversity Assessment, a study area was established that took into account the land that is likely to be impacted upon by the construction of the proposal and the operational footprint of the proposal. The study area also includes the extent of works for the Rawsonville Bridge Road Intersection MWREF as this was incorporated into the same Biodiversity Assessment Report to assess biodiversity impacts cumulatively and economise work. The areas assessed for impacts relating to the proposal are only those related to the bridge replacement and not the intersection upgrade which was assessed in a separate MWREF. The study area is shown in Figure 6-3.

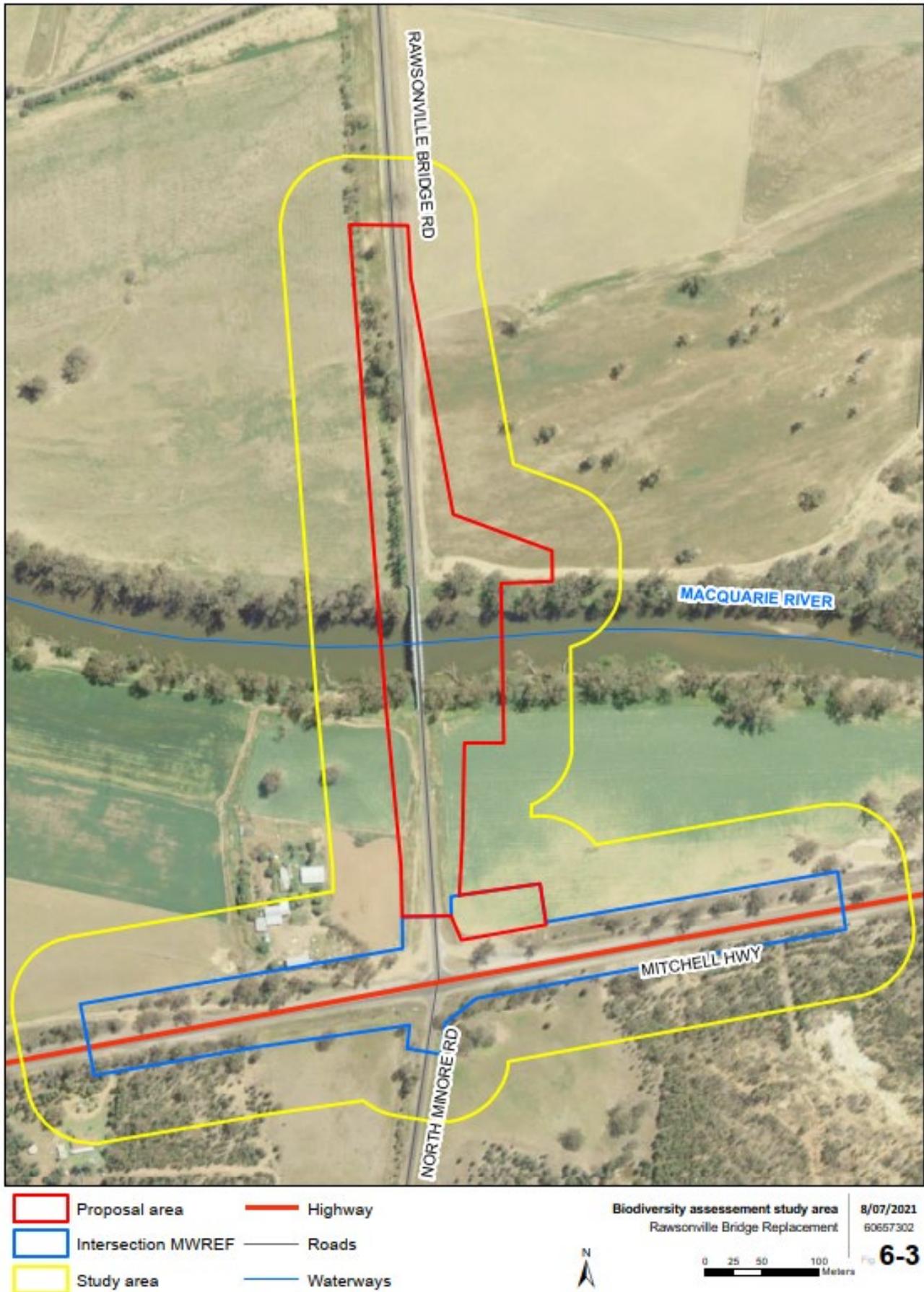


Figure 6-3 Biodiversity assessment study area

6.3.1 Methodology

Desktop review

Database searches were conducted to collect and review information on the presence or likelihood of the occurrence of:

- Threatened and protected terrestrial and aquatic flora and fauna species and their habitat
- Endangered populations
- Threatened ecological communities
- Important habitat for migratory species and critical habitats.

All searches shown in Table 6-3 were conducted 17 May 2021.

Table 6-3 Databases searched as part of the desktop review

Database searched	Extent
NSW Environment, Energy and Science (EES), BioNet Wildlife Atlas	<ul style="list-style-type: none"> • 10 km x 10 km area centred on the bridge
NSW EES, Vegetation Types Database and Threatened Species Profile Database	<ul style="list-style-type: none"> • Study area
EPBC Act Protected Matters Search Tool	<ul style="list-style-type: none"> • 5km radius of proposal area
NSW SEED Vegetation Information System (VIS) database	<ul style="list-style-type: none"> • Study area
Bureau of Meteorology (BoM) Atlas of Groundwater Dependent Ecosystems (GDE)	<ul style="list-style-type: none"> • Study area
NSW Department of Primary Industries (DPI) – Fisheries, database for aquatic Threatened Ecological Communities (TEC)s	<ul style="list-style-type: none"> • Study area
NSW DPI – Fisheries, Fish communities and threatened species distribution	<ul style="list-style-type: none"> • Study area
NSW DPI – Fisheries, Key Fish Habitat	<ul style="list-style-type: none"> • Study area

Habitat Assessment

Following the desktop review, a habitat assessment was completed to assess the likelihood of each identified threatened species, population or community occurring in the study area. Species were considered likely to occur where:

- The geographic distribution of the species is known or predicted to include the subregion in which the development site is located, and
- The development site contains habitat features or components associated with the species, or
- Past surveys undertaken at the development site indicate that the species is present.

The habitat assessment highlighted species to be targeted during surveys and was updated after the surveys were completed and habitat components were identified in the study area.

Field assessment

A field assessment occurred on Tuesday 20th and Wednesday 21st April 2021. The field surveys consisted of the following activities:

An extensive site walk over was conducted where vegetation was identified and mapped, and native vegetation was identified by formation, class and type and corresponding TEC where possible. The EES Vegetation Information System Classification Database was then used to indicate where a Plant Community Type (PCT) may be associated with a TEC. The assessment identified, described and mapped each of the identified PCTs and their condition classes.

Additionally, opportunistic fauna sightings were undertaken during the site walk as well as assessment of fauna habitat present within the proposal area. No targeted flora surveys or aquatic assessments were undertaken.

6.3.2 Existing environment

The broader area around the proposal area is generally converted to agriculture. This is mainly comprised of cropping and grazing, with substantial areas along the river subject to irrigation. These areas also include farmhouses, sheds and other infrastructure, such as grain storage. The proposal area is located within, and adjacent to, the riparian zone of the Macquarie River. The northern riparian area is stepped with a short drop off to the lower bank while the southern side is steep and moderately incised by the river.

Land to the south of the bridge up to the Mitchell Highway consists of fenced paddocks which are currently utilised for agricultural purposes. The private land adjacent to the Mitchell Highway road reserve consists of cleared agricultural areas including access tracks and areas of vegetation ranging from isolated trees to dense stands. The land to the south of the highway is predominantly vegetated.

Land north of the river consists of large fenced paddocks which are used for agricultural purposes. The road reserve in this location is cleared on the eastern side and sparsely vegetated along the western side. An access track exists on the upper bank of the north western side of the existing bridge which allows vehicle access to the lower bank area and existing temporary pier foundation.

Flora and threatened flora

The proposal area is 4.96 hectares and consists of 0.61 hectares of PCT native vegetation, 0.51 hectares of waterway and 2.00 hectares of non-PCT native and non-native vegetation. No threatened flora records were returned from BioNet searches and nine flora species were returned by the PMST search within a 5km radius of the proposal area. No threatened flora species were identified during the site survey.

Plant Community Types

Two Plant Community Types (PCTs) were identified in the study area, being:

- PCT 36: River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
- PCT 78: River Red Gum riparian tall woodland/open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion.

Table 6-4 Plant community types and within the proposal area

Plant Community Type	Community name	Potential Threatened Ecological Community (TEC)	Total within the Proposal area (hectares)
PCT 36	River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	<i>BC Act: Artesian springs ecological community in the Great Artesian Basin</i> <i>EPBC Act: The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin</i>	0.44
PCT 78	River Red Gum riparian tall woodland/open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	No associated TEC	0.17
-	Non-PCT vegetation	-	2.00
Total vegetated area			2.61
-	Roads / agricultural land / bare ground	-	2.35
Total area			4.96

Groundwater dependent ecosystems

The vegetation occurring in the riparian zone, which encompasses PCT 36 and PCT 78, and some non-PCT vegetation to the north west of the existing bridge are mapped as high potential GDE. Other non-PCT vegetated areas within the proposal area are unclassified.

Fauna and threatened fauna

BioNet searches identified one threatened fauna species record within the proposal area, being the Superb Parrot (*Polytelis swainsonii*). No threatened fauna species were recorded during the site survey. Suitable potential habitat for several threatened species was identified within the proposal area. These include:

- Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*) – wide-ranging species found across northern and eastern Australia
- Little Pied Bat (*Chalinolobus picatus*) - dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) – open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – dry, open eucalypt forests and woodlands
- Superb Parrot (*Polytelis swainsonii*) – mature woodland with abundant nest hollows.

Fauna habitat

Koala habitat

The Koala habitat assessment tool provided in the EPBC Act Referral Guidelines for the vulnerable Koala (DoE 2014) was used to determine the sensitivity, value and quality of habitat within the study area and whether it contains habitat critical to the survival of the Koala. The assessment determined that the study area does not support habitat critical to the survival of the Koala.

Woodlands

River Red Gum Open Woodland occurs throughout the riparian area of the Macquarie River and collectively occupies 0.61 hectares of the proposal area. These woodland communities provide habitat for a wide range of terrestrial fauna, including birds, microbats, macropods, reptiles, rodents and small marsupials. The quality of this habitat, historic and ongoing disturbance reduces the potential for sensitive species to use this habitat type.

One River Red Gum (*Eucalyptus camaldulensis*) containing four tree hollows was recorded in the study area within the riparian area.

Hollow-bearing trees offer potential nesting and roosting habitat to locally occurring threatened species including listed parrots and owls. Tree hollows are a highly limited resource within the largely treeless landscape surrounding the proposal area, and consequently they are of high conservation value for biodiversity.

Rawsonville Bridge

The bridge was inspected to identify the presence of microbats. This included identifying microbats that may roost within the bridge superstructure during the day, or any evidence of microbat presence. No microbats, or potential presence of microbats were identified in the bridge and most cracks and crevices in the bridge were too large for microbats to occupy.

Aquatic biodiversity and habitat

The Macquarie River is classified as a Type 1 – Highly sensitive, Class 2 waterway and is listed by the NSW DPI Fisheries as “Poor” freshwater fish community status. The river is mapped as ‘Key Fish Habitat’ under the FM Act and is also within the Aquatic Ecological Community of the Natural Drainage System of the Lowland Darling River which is listed as an endangered ecological community.

No threatened species of fish were recorded as no targeted surveys were undertaken. However, a protected matters search indicates the potential for the river in this location to be habitat for Trout Cod, Murray Cod and Macquarie Perch. Additionally, DPI threatened fish maps indicate the potential for the Eel Tailed Catfish (*Tandanus tandanus*), Silver Perch (*Bidyanus bidyanus*), Olive Perchlet (*Ambassis agassizii*) and Trout Cod (*Maccullochella macquariensis*) to be present.

Environmentally Sensitive Areas

The riparian area of the Macquarie River is identified as having High biodiversity value under the Dubbo LEP 2011 Biodiversity Values map and is also identified as vulnerable regulated land under the NSW DPIE Transitional Native Vegetation Regulation Map.

6.3.3 Potential impacts

Construction

Threatened species and communities

The proposal would impact upon 0.51 hectares of the Lower Darling River EEC. A Test of Significance (ToS) was carried out for the EEC's in accordance with the FM Act and the ToS concluded there would be no significant impact to the EEC as a result of the proposal (see Appendix C).

Tests of Significance (ToS) have been prepared for eight threatened species and two threatened populations which had identified potential habitat within the proposal area in accordance with the s7.3 of the BC Act, s220ZZA of the FM Act and Significant impact guidelines 1.1 – MNES associated with the EPBC Act (Appendix C). These ToS concluded the proposal would not have a significant impact on these species as the proposal is unlikely to place a local occurrence of any of these species at risk of extinction.

Removal of vegetation

A total of 0.61 hectares of PCT vegetation and 2.00 hectares of Non-PCT vegetation would be cleared. Within the habitat to be removed, 54 native trees would be affected. One hollow-bearing tree within the proposal area is located within the riparian area north east of the existing bridge and would need to be removed to create a safe workspace for construction machinery and demolition works for the existing bridge. Due to the limited clearing of native vegetation communities, an offset strategy is not required for the proposal. Areas of cleared native vegetation would be revegetated using a hydro-mulch and seed mixture.

Removal of fauna habitat

The majority of the trees present within the area appear to have regrown since the site was historically logged and are not mature enough to contain significant hollows. Several trees do remain within the proposed clearing area along the river that are seemingly remnants and have several hollows. Four of these hollow bearing trees would be removed while one along the northern bridge approach would be trimmed. It is highly likely that these trees would provide breeding and/or nesting habitat for a range of birds, bats and/or mammals.

The removal of vegetation along the northern bridge approach would result in fragmentation of that habitat. This would remove a 250 m corridor of mixed native and non-native vegetation between the riparian area of the northern bank of the river and the remaining roadside vegetation on the north west of Rawsonville Bridge Road. Given the limited area of this habitat and presence of other varied habitat types within the vicinity of the proposed clearance area, the impacts of this loss of habitat is not considered likely to result in a significant impact upon any threatened fauna species.

Within the riparian area it would be necessary to remove approximately 0.61 ha of vegetation on both sides of the river. This includes several large mature *E. camaldulensis*, one of which contains four hollows. No hollows were observed on the other individuals.

There is limited habitat present on the southern approach as it is predominantly disturbed native and non-native grasses and removal of this vegetation would not likely result in a significant impact to fauna.

Aquatic impacts

There are two existing piers that would need to be removed from the waterway and two waterway piers (comprising 3 pile/column connections) to be installed for the new bridge. Prior to commencement of work, snags would be removed from the waterway within the works area, which would impact the aquatic habitat of the river. A temporary bridge and/or rock platform may be required in the waterway to facilitate construction of the new bridge. The temporary in-stream structure would extend from the bank to the closest waterway pier as to not create a barrier to fish passage. Rock platforms would occupy up to 400m²

in the waterway and impact the riverbed habitat where they are placed. Due to the area and duration of proposed rock platforms, it is anticipated that impacts would not be significant. All temporary in stream structures including rock platforms and temporary bridges would be removed on completion of construction.

Removal of the existing piers may require the use of temporary cofferdams and a temporary rock platform or bridge within the waterway. This would pose risk of increased sediment input into the Macquarie River and disruption of the riverbed impacting aquatic habitat. These potential impacts would be managed through the use of the standard soil and water safeguards outlined in section 6.6.4. As such, this impact is not expected to be significant.

Two sets of three piles would be driven between 19m and 30m below the existing surface level occupying about 3m² for each pier. The noise generated from piling into the riverbed has the potential to result in temporary or permanent disturbance for fish or even mortality for those in close proximity. In order to manage this risk it is proposed that all piling commence with a 'soft start' approach, which involves initial low energy strikes with increasing intensity building to the required operational strike energy, as to provide an opportunity for fish to disperse.

Construction activities, such as the use of the in-stream structures and works on the banks of Macquarie River, would result in potential alteration and/or degradation of aquatic habitats located in the proposal area. Impacts would most likely arise from surface water runoff containing sediments from cleared and disturbed areas which could adversely affect water quality in Macquarie River. Erosion and sediment controls, as outlined in Section 6.6.4, would be used to avoid sediments entering watercourses and running offsite.

Additional potential impacts to the aquatic environment include spills or leaks of road construction materials, including fuels, lubricants and hydraulic oils from construction plant and equipment. The potential impacts to watercourses and management measures to reduce impacts to the aquatic environment are further discussed in Section 6.6.4 and Section 6.9.4.

Spread of weeds

Disturbed areas, such as those in which earthworks are to be carried out, would be particularly susceptible to weed establishment. Management measures would be required to minimise the risk of introduction and spread of weeds.

Operation

During operation, there would be slightly more shading into the river and riparian area as the new bridge would cast a larger shadow compared to the existing bridge due to the wider 10.43 metre deck. Given the extent of the river and existing shading, the potential impacts resulting from changes in shading from introduction of the new bridge, removal of the old bridge and vegetation management, are expected to be negligible.

No other impacts to biodiversity associated with operation of the proposal have been identified.

Conclusion on significance of impacts

The proposal is not likely to significantly impact threatened species or ecological communities or their habitats, within the meaning of the *BC Act 2016* or *FM Act 1994*. As such, a Species Impact Statement or Biodiversity Development Assessment Report is not required.

The proposal is not likely to significantly impact threatened species, ecological communities or migratory species, within the meaning of the *EPBC Act 1999*.

6.3.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Biodiversity	<p>A CEMP would be prepared in accordance with TfNSW <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). It will include, but not be limited to:</p> <ul style="list-style-type: none"> plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas requirements set out in the Landscape Guideline (RTA, 2008) pre-clearing survey requirements procedures for unexpected threatened species finds and fauna handling procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management (DPI Fisheries, 2013) protocols to manage weeds and pathogens 	Contractor	Detailed design / pre-construction
Aquatic impacts	The extent/width of rock platforms should maintain maximum waterway area, as practicable, under Span 2 (between Piers 1 and 2) during construction so as to maintain open and for continuous fish passage at all times. No part of the river should be placed within pipes.	Contractor	Construction
Aquatic impacts	Replace/add snags into the waterway post-construction where practicable so as to replicate the pre-construction condition	Contractor	Post-construction
Aquatic impacts	Aquatic habitat shall be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) and Section 3.3.2 Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (DPI 2013)	Contractor	Construction
Vegetation removal	All vegetation removal would be limited to the minimum extent necessary to construct the bridge, approaches and intersection	Contractor	Construction
Vegetation removal	Prior to the commencement of any works, a physical clearing boundary is to be demarcated and implemented. The demarcation of the exclusion zone will be in accordance with <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 2: exclusion zones</i> (RTA 2011). Clearing would not occur outside of the road reserve	Contractor	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
Vegetation removal	A CEMP would be developed in accordance with <i>Guide 4 (clearing of vegetation)</i> of the TfNSW <i>Biodiversity Guidelines</i> (RTA 2011). This will include best practice methods for the removal of woody vegetation and non-woody vegetation	Contractor	Construction
Vegetation removal	As mature trees with a DBH >40 cm diameter are proposed to be cleared, an ecologist must be onsite to undertake a pre-clearance survey prior to and whilst the tree/s are being removed (see <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 1 Pre-clearing Process</i> and <i>Guide 4 Clearing of vegetation and removal of bushrock</i> (RTA 2011))	Contractor	Construction
Vegetation removal	Within the riparian area, the sections of felled trees including hollows should be placed on the ground to provide habitat for ground-dwelling fauna, where practicable	Contractor	Construction
Vegetation removal	<p>Areas of cleared vegetation would be rehabilitated progressively through final construction activities. This would include:</p> <ul style="list-style-type: none"> • Riparian area: Re-instatement of stripped topsoil and planting of tube stock which is representative of the PCT which occupied that area, including a mix of canopy, mid storey and ground species. This would be restricted from the existing vegetation to the maintenance corridor of the new bridge, allowing for clear access ways where required. • Batter areas: Re-instatement of stripped topsoil and supplemented with roadside rehabilitation seed mix where required. • Roadside and stockpile: Re-instatement of stripped topsoil, where available, and application of roadside rehabilitation seed mix where required. • Compound: The compound would be rehabilitated as agreed with landholder. 	TfNSW Project Manager Contractor	Construction Post- construction
Protection of native flora	If unexpected threatened flora species are discovered, stop works immediately and follow the <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 1 (Pre-clearing process)</i> (RTA 2011)	Contractor	Construction
Protection of native fauna	Construction of the new bridge should include the rehabilitation of the approaches of the existing bridge and other ancillary areas. This should include removal of the existing pavement and tilling to allow the regeneration of native	TfNSW Project Manager	Post- construction

Impact	Environmental safeguards	Responsibility	Timing
	plants and should be maintained through the road corridor maintenance programs in place with Dubbo Regional Council and TfNSW		
Protection of native fauna	Prior to the felling of any hollow-bearing trees for construction, compensatory nest boxes, or equivalent alternative compensatory habitat, such as lopped hollows, should be installed within the local area (up to 1 km from the proposal area). The nest boxes should be targeted at woodland birds, parrots, bats and arboreal mammals according to the proportion of hollows removed that are likely to be used by these types of fauna. The ratio of nest boxes installed to tree hollows removed should be at least 2:1. The condition of all alternative compensatory habitat should be monitored.	TfNSW Project Manager	Pre- construction
Protection of native fauna	If unexpected threatened flora species are discovered, stop works immediately and follow the <i>Biodiversity Guidelines – Protecting and Protection of native fauna Managing Biodiversity on RTA Projects: Guide 1 Protection of native fauna (Pre-clearing process)</i> (RTA 2011)	Contractor	Construction
Protection of native fauna	WIRES should be consulted if any injured fauna are encountered	Contractor	Construction
Protection of native fauna	If it is perceived that significant impacts are occurring to aquatic environments within the vicinity of the work area (e.g. spill of any chemicals), works at that location should cease and TfNSW environment branch should be contacted for further advice	Contractor	Construction
Protection of native fauna	To minimise the risk of injury or mortality to fauna and their young the following measures are recommended: <ul style="list-style-type: none"> All clearing is to follow the RTA biodiversity guidelines with respect to the pre-clearing process, including the capture and relocation (by licenced wildlife carers or ecologists) of fauna that have the potential to be disturbed as a result of clearing activities Vegetation removal is to be undertaken as per guide 4 of the RTA biodiversity guidelines, including the implementation of staged clearing 	Contractor	Construction
Protection of native fauna	Routine corridor maintenance should be carried out to manage mid-storey vegetation on road batters to reduce congregation of wildlife and improve sight lines for motorists during the operational phase	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Protection of native fauna	A targeted microbat survey would be undertaken on the existing bridge prior to commencement of the bridge demolition works. If microbats bats are found to be occupying the bridge structure, works would stop and a licenced fauna ecologist would be engaged to remove and relocate the microbats	Contractor / TfNSW Project Manager	Pre- demolition
Weeds and disease	Control the movement of vehicles, machinery and workers so as to minimise the potential for spread of weeds within and outside the proposal area	Contractor	Construction
Weeds and disease	All vehicles would be inspected and, if necessary, cleaned before their first entry to the proposal area to minimise spread of weeds	Contractor	Construction
Weeds and disease	A Construction Environmental Management Plan including weed management measures should be implemented with appropriate hygiene protocols to reduce the likelihood of new weed or disease infestations within the proposal area. This would be delivered through the road corridor maintenance programs in place with Dubbo Regional Council and TfNSW	TfNSW Project Manager	Post- construction

Other safeguards and management measures that would address biodiversity impacts are identified in Section 6.6.4.

6.4 Landscape character and visual impacts

6.4.1 Existing environment

Landscape character

The character of the landscape surrounding the proposal area is comprised predominantly of agricultural production with scattered rural residences and native vegetation. The Macquarie River and associated vegetated riparian is a prominent feature of the landscape. Other vegetation occurs south of the Mitchell Highway, in roadside reserves and around rural residences. The Mitchell Highway is also prominent in the landscape with light and heavy vehicles regularly travelling through the area.

The land immediately north and south of the bridge has been historically used for agricultural production, which is ongoing. Structures surrounding the bridge include agricultural workshops and rural residences. While Rawsonville Bridge is prominent in the waterway, it is not overt within the landscape and is less conspicuous than the prominent riparian vegetation and overall agricultural setting.

Visual catchment

The visual catchment of the proposal is defined by the area within which the construction and operation of the proposal is visible. This is influenced by landscape position, obstructions such as vegetation and spatial arrangement of the landscape. There are four rural residences that would likely be within sight of the proposal area, with 148 Narromine Road, Dubbo being immediately adjacent to the proposal area. Rawsonville Bridge is situated 250 metres north of the Mitchell highway and mainly restricted to view from directly north or south along Rawsonville Bridge Road and the Mitchell Highway. The bridge is fleetingly visible when travelling along the Mitchell Highway and largely obscured from view in the surrounding landscape due to its placement amid the riparian vegetation of the Macquarie River. The bridge approach areas are more visible within the surrounds but do not encompass any notable landscape feature.

Views of the existing bridge and the proposal area are shown in Figure 6-4, Figure 6-5 and Figure 6-6.



Figure 6-4 Rawsonville Bridge and the Macquarie River as viewed north west from the Mitchell Highway



Figure 6-5 Rawsonville Bridge as viewed south from Rawsonville Bridge Road



Figure 6-6 Rawsonville Bridge as viewed north from Rawsonville Bridge Road

6.4.2 Potential impacts

Construction

The proposals occurrence within a largely modified agricultural landscape is consistent with developing agricultural operations and associated freight and heavy vehicle movement. While elements of the proposal, such as the use of cranes, traffic control and construction activities, would stand out in the landscape, the proposal is indicative of increased productivity of the area and the requirement of greater access for movement of equipment and freight. Operation of heavy agricultural machinery and movement of heavy vehicles associated with agriculture is common place in the landscape. Although the presence of the construction would be in contrast with the rural character of the residential properties, river and native vegetation, this would be minimal in the wider context of the locality and therefore the impact to landscape character would be low.

Elements of construction works would be visible to receivers travelling on the Mitchell Highway and residents in the immediate vicinity of the proposal area. However, given the restricted visual catchment of the proposal area and receivers being largely restricted to road users passing on the Mitchell Highway and a small number of rural residences, it is anticipated that visual impact would be low.

The proposal occurs directly adjacent to 148 Narromine Road, Dubbo and including part of the property. Given the close proximity of these works and the extent at which the proposal area occupies the western viewpoint from the residence at this property, the magnitude of the impact to this receiver has been assessed as moderate.

Landscape character and visual impacts associated with construction are anticipated to be low and are summarised in

Table 6-5.

Table 6-5 Landscape character and visual impacts - construction

Viewpoint	Magnitude	Sensitivity	Rating
Rural residence at 148 Narromine Road, Dubbo	Moderate	Low	Moderate-Low
Rural residences north of the proposal area	Low	Low	Low
Passing motorists on the Mitchell Highway	Low	Low	Low

Operation

As detailed above, the new concrete bridge would be indicative of increasing productivity and development of agricultural operations in the locality and consistent with the overall character of the area. The design of the new bridge is consistent with key components of the Bridge Aesthetics Design Guideline (TfNSW, 2019) including bridge symmetry, horizontal form, parapet shape and bridge barrier details, while remaining compliant with design constraints such as hydraulics and constructability. The impact to the native vegetation aspects of the landscape would be mitigated through the revegetation and rehabilitation of the riparian area and in the context of the landscape would be negligible. The visual impact of the operation of the new bridge and approaches would be largely consistent with the current roadway. Although the new concrete bridge is wider and with a higher deck level, the new bridge would not sit higher than the trusses of the existing bridge and would be largely obscured from sight similar to the existing bridge. Visualisations of the new bridge are shown in Figure 3-4 to Figure 3-5.

The landscape character and visual impact of the operational phase of the proposal are both anticipated to be negligible and are detailed in Table 6-6.

Table 6-6 Landscape character and visual impacts - operation

Viewpoint	Magnitude	Sensitivity	Rating
Rural residence at 148 Narromine Road, Dubbo	Negligible	Low	Negligible
Rural residences north of the proposal area	Negligible	Low	Negligible
Passing motorists on the Mitchell Highway	Negligible	Low	Negligible

Although the removal of the bridge would contribute to the loss of historic character of the locality, the replacement of dated and deteriorating infrastructure with a bridge which is built for current and future demands of the roadway would introduce a new landscape character consistent with the evolving demands of the surrounding area. This would be complimented with the proposed heritage interpretation area in order to retain some aspect of the heritage character of the existing bridge, see Section 6.1.

6.4.3 Safeguards and management measures

No additional landscape character and visual impact environmental safeguards and management measures are proposed. Other safeguards and management measures that would address landscape character and visual impacts are identified in sections 6.1.4 and 6.3.4.

6.5 Traffic and transport

6.5.1 Methodology

Traffic counts were supplied by TfSNW and undertaken for northbound and southbound traffic over Rawsonville Bridge over 14 days commencing on 15 June 2020. This count showed the number of vehicles ranging between vehicle types hourly over the 24 hour period for each day.

6.5.2 Existing environment

The bridge has a single lane which is used for both northbound and southbound traffic which links the Mitchell Highway and Dubbo to Rawsonville and Burroway Road. The bridge currently has a posted speed of 60km/h and no dedicated pedestrian or bicycle paths. The bridge is not a gazetted B-Double route and is restrictive for wide vehicles due to the 4.5 metre deck width. The average daily traffic volumes over the bridge are about 368 vehicles with about 13 percent of northbound traffic and 8 percent of southbound traffic being heavy vehicles (see Table 6-7).

Table 6-7 Traffic count daily averages on Rawsonville Bridge

Traffic	Count	Percent
Northbound		
Light vehicles	156.2	87.2
Heavy vehicles	23.1	12.8
Total	179.3	
Southbound		
Light vehicles	172.9	91.8
Heavy vehicles	15.4	8.2
Total	188.4	

The Macquarie River is not accessible for large watercraft due to variable shallow water depth and presence of snags along the river in the area of the proposal. The waterway around the proposal area is occasionally used by small watercraft for recreational fishing and other recreational activities.

There are no public transport routes which utilise the bridge.

6.5.3 Potential impacts

Construction

There is a potential for traffic impacts, such as queuing, and delays associated with lane closures and construction of the bridge approaches. The existing bridge would remain open to traffic through the construction period of the new bridge. Traffic would change over to the new bridge upon completion of the bridge and approach tie-ins.

It is expected that background traffic volumes are likely to remain the same during the construction period. Construction vehicle traffic volumes would increase due to the movement of construction and service vehicles accessing the site for the haulage of construction materials and employee access. Construction traffic is expected to increase by about 25 light and 30 heavy vehicles to AM peak hour flow, and 30 light and 35 heavy vehicles per PM peak construction periods.

Due to the low traffic volume and anticipated minor impedance to traffic flow along Rawsonville Bridge, it is anticipated that impacts on the nearby Rawsonville Bridge Road Intersection would not be significant. As such, a SIDRA intersection performance model was not undertaken to assess impacts on the surrounding intersections.

It is anticipated that up to two weekend bridge closures may be required across the construction and demolition stages of the proposal. These closures are expected to commence at 7am on a Saturday morning with the bridge re-opening to traffic at 5am on the following Monday morning. These would occur on non-consecutive weekends to allow installation of girders on the new bridge during construction and removal of the timber truss sections of the existing bridge during demolition.

A detour would be in place during these closures with the route shown in Figure 6-7. The detour would be about 45 kilometres and accommodates light vehicles, GML, CML and HML (with travel conditions) 25/26m B-double vehicles. Rawsonville Bridge Road at the bridge is not currently a gazetted B-Double route. However, the new bridge would be suitable for HML vehicles.

The detour would increase traffic in the locality and along the detour route for the duration of the detour, which would be two non-consecutive weekends. These weekends would likely occur months apart due to the works required between the activities for which the closures are to support, which would reduce the impact of the increased traffic volume along the detour route. Additionally, due to the relatively low average traffic numbers which were recorded travelling over Rawsonville Bridge, consultation and notification, impacts from increased traffic flow on the detour are not anticipated to be significant.

Prior to the closures, the detour route would be signposted, and the proposed detour dates and route would be communicated to local agricultural businesses, residents and stakeholders. The management of traffic during these closures including detours would be described the TMP.

Access for watercraft along the Macquarie River would be maintained through construction as the central section of the river would remain open. During girder installation and demolition there may be short closures of the waterway where required such as when materials are craned into place and removed over the waterway.



- Proposal area
- Roads
- Detour
- Highway

Bridge closure detour route
Rawsonville Bridge Replacement

5/07/2021
60657302
Fig 6-4

0 0.5 1 2 Kilometers

Figure 6-7 Bridge closure detour route

Operation

The proposal is for the replacement of the existing bridge with a new wider bridge constructed immediately upstream of the current alignment. The new bridge approaches would tie in with the existing road network about 250 metres north and to the proposed upgraded intersection at the Mitchell Highway about 170 metres south of the new bridge.

The proposal would allow for heavy and/or wide vehicles to utilise the bridge which is not currently possible. An aspect of the justification and community support of the bridge replacement is the provision for large agricultural vehicles and machinery to cross the river at Rawsonville Bridge Road and it can be expected that local agricultural businesses would utilise the bridge for this purpose. Although this would impact the traffic usage of the bridge, it is not anticipated to be significant. Outside of the provision of heavy and/or wide vehicles to use the bridge, there is not anticipated to be a significant increase in traffic volumes or result in permanent changes to traffic routes or access within the local road network. Operational traffic conditions would be similar to the existing scenario and adverse traffic impacts would therefore be minimal. The proposal would improve safety for road users through provision of two lanes of travel, improved road approaches and the removal of potential safety risks associated with the poor condition of the existing bridge structure.

The proposal would enhance the regional road network by catering for HML. The proposal is consistent with the strategic road planning objectives for the region.

6.5.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Traffic and transport	<p>A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the TfNSW <i>Traffic Control at Work Sites Manual</i> (RTA, 2010) and <i>QA Specification G10 Control of Traffic</i> (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> • confirmation of haulage routes • measures to maintain access to local roads and properties • site specific traffic control measures (including signage) to manage and regulate traffic movement • requirements and methods to consult and inform the local community of impacts on the local road network • access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • a response plan for any construction traffic incident • consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • monitoring, review and amendment mechanisms. 	Contractor	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
Traffic and transport	<p>The TMP will also include measures relating to the two proposed bridge closures including:</p> <ul style="list-style-type: none"> • provision of detours which will accommodate equivalent vehicle access to Rawsonville Bridge Road • signpost vehicle detour route prior to weekend bridge closures • notification to local agricultural businesses and stakeholders of proposed weekend closures 	Contractor	Construction
Traffic and transport	Spotters would identify and communicate short closures to waterway users of the Macquarie River where required.	Contractor	Construction

6.6 Surface water, ground water and soils

6.6.1 Methodology

The assessment of surface water and groundwater was based on a desktop analysis of publicly available information on 18 June 2021 and a site inspection on 20 April 2021. The databases and resources that were searched include:

- Water NSW – NSW Water register
- Water NSW – NSW All Groundwater map
- Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016
- Water quality and drainage conditions were visually assessed and recorded during the site inspection.

6.6.2 Existing environment

Surface water

The proposal area is part of the Macquarie – Bogan catchment, with drainage of the land leading into the Macquarie River. A floodway in the northern bridge approach is located in a depression in the roadway which leads from east to west and draining into the Macquarie River downstream from the proposal.

Within the proposal area, the bank of the Macquarie River is lined with mature trees and has variable amounts of exotic groundcover vegetation with cleared areas on the northern bank used for access to the piers of the existing bridge. Significant scour is evident in the southern bank with the base of the east most pier in the second set of piers of the existing bridge being exposed. The river flows from east to west at a speed of about one metre per second with a maximum depth of about three metres. The riverbed has a substrate consisting of sand and gravel.

Surface water entitlements

A search of the Water NSW – NSW Water register, identified that there are 1,534 Water Access Licences (WAL) for water usage from the Macquarie and Cudgegong Regulated Rivers for the 2020-21 financial year. A summary is provided in Table 6-8 of the type and number of WAL's. Access to the Macquarie River in the proposal area is regulated through the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016.

Table 6-8 WAL's for water usage from the Macquarie and Cudgegong Regulated Rivers for the 2020-21 financial year

Access Licence Category	Number of WAL(s)	Total Share Component (ML)
DOMESTIC AND STOCK	193	4954.7
DOMESTIC AND STOCK [DOMESTIC]	74	823.5
DOMESTIC AND STOCK [STOCK]	32	180
LOCAL WATER UTILITY	9	18805
REGULATED RIVER (GENERAL SECURITY)	654	632547.4

Access Licence Category	Number of WAL(s)	Total Share Component (ML)
REGULATED RIVER (HIGH SECURITY)	78	13828
REGULATED RIVER (HIGH SECURITY) [RESEARCH]	4	4045
REGULATED RIVER (HIGH SECURITY) [TOWN WATER SUPPLY]	1	40
SUPPLEMENTARY WATER	489	49998

Groundwater

The use of the groundwater in the proposal area is currently governed by the *Murray-Darling Basin Water Resource Plan* with a region-specific *Macquarie-Castlereagh Alluvium Water Resource Plan* having been submitted and being assessed for implementation. No groundwater would be used as part of the proposal.

A search of the Water NSW Groundwater bore data found one monitoring bore and no groundwater bores within 500 metres of the proposal area. There are several groundwater bores approximately 1.7 kilometres downstream of the proposal area. Bores in the vicinity of the proposal area are described in Table 6-9.

Table 6-9 Groundwater bores near the proposal area

Bore ID	Status	Purpose	Location
GW036531	Active	Monitoring	Eastern side of the Rawsonville Bridge northern approach
GW008364	Discontinued	Irrigation	7R The Falls Road, Dubbo
GW060815	Discontinued	Domestic and stock	10R The Falls Road, Dubbo
GW803828	Discontinued	Domestic and stock	6L Glen Isla Road, Rawsonville
GW803827	Discontinued	Domestic and stock	6L Glen Isla Road, Rawsonville

Soils

The proposal is located within the Brigalow Belt South bioregion and the Pilliga subregion. The topography of the Pilliga subregion is characterised by Stepped sandstone ridges, long gentle outwash slopes intersected by sandy stream beds and prior stream channels. The geology of the proposal area consists of Quaternary alluvial deposits overlying Devonian granites.

The proposal area is identified as Dermosols under the Australian Soil Classification and mapped as hard alkaline red soils under the ARSIS soil atlas. Under the Dubbo LEP 2011 there are no maps indicating the presence of acid sulfate soils (ASS). According to the Australian Soil Resource Information System, the area has a low probability of ASS being present.

6.6.3 Potential impacts

The potential impacts to surface water, groundwater and soils are broken down into each construction work stage, as previously described in Section 3.3.1.

Construction

Construction water use would be managed within the sustainable limits of the area and catchment. It may be necessary to reduce or limit of water extraction and some construction activities if water supply is heavily constrained. The TfNSW Senior Manager Environment & Sustainability (Western) would be contacted if water supply becomes an issue and direction would be provided. All dirty and waste water created on site would be managed and disposed of as part of an ESCP to prevent mixing with clean water and discharge into the Macquarie River. No water would be extracted from the Macquarie River or any other source of surface or groundwater.

Stage 1 – Advance Works – Tree Clearance

Prior to construction, up to 2.61 hectares of vegetation, including 0.61 hectares of native vegetation from the riparian area of the Macquarie River, may be removed. Removal of this vegetation and ground surface disturbance have the potential to result in erosion and sedimentation. Without management measures in place, erosion and sedimentation could potentially impact on downstream water quality if sediments enter the Macquarie River.

Stage 2 – Preliminary Earthworks

The preliminary earthworks would involve ground disturbance and construction activities directly north and south of the new bridge alignment and extend into the riparian area. As mentioned above, activities, such as ground surface disturbance, have the potential to result in erosion and sedimentation if not managed correctly.

Excavated spoil from the preliminary earthworks would be placed in stockpiles and the compound site. If not managed, disturbance, such as wind or rain, could release materials from the stockpiles into the Macquarie River and surrounding environment and negatively affect the water quality.

Stage 3 – Bridge Construction

A temporary in-stream structure would be established within the Macquarie River to allow access for construction plant and equipment to construct the bridge. Temporary structures in the waterway would extend out to the pier locations from each bank, leaving the central section of the waterway open to maintain river flow and fish passage. Placing and removal of the temporary in-stream structures would disturb the river bed and increase turbidity. Hydrocarbon and silt booms would be installed within the waterway during construction to protect water quality.

Cranes would be used on the bank of the Macquarie River for placement of bridge components during construction. This has the potential to destabilise the bank and result in sediments being released into the river. This impact would be mitigated by the construction of crane pads to provide stability and reduce risk of destabilisation. Silt curtains, or similar, would also be deployed in the watercourse to contain sediments and prevent turbidity affecting downstream areas.

There is potential that during the installation of the piers of the new bridge, groundwater may be encountered, and that the piers could interfere with aquifers present underneath the Macquarie River. No excavation would be undertaken below the riverbed and dewatering of groundwater is not expected to be required. As such, the potential impact on groundwater or aquifers in the locality would be negligible.

As mentioned in Section 6.6.2, there are a number of groundwater bores downstream of the proposal area. The proposal is not expected to impact upon groundwater resource availability or the ability of a WAL holder to access groundwater from their bore.

The use of construction plant and equipment to construct the new bridge poses potential for substances, such as hydrocarbon fuels and other chemicals, to be spilled or to accidentally leak into the Macquarie River. As identified in Section 6.9.4, an emergency spill plan would be developed and would include measures to appropriately contain the spill and reduce impacts to the receiving environment.

Stage 4 – Final roadworks construction

Roadworks would take place on the extent of the bridge approaches to the bridge and abutments. This would include activities that may disturb the ground, such as shaping batters, installing culverts and shaping the roadway. These activities could mobilise sediment which could discharge into the river, impacting turbidity. Erosion and sediment impacts would be managed by erosion and sediment controls at the area of works and silt curtains (or similar) situated in the Macquarie River.

Stage 5 – Bridge demolition

The piers and abutments of the existing bridge would be removed using conventional excavation machinery, including saw cutting techniques and a hydraulic breaker. Waterway piers would be removed to 0.5 metres below the existing riverbed level. Temporary cofferdams may be required in the waterway to remove the base of Piers 1 and 2. The foundation of Pier 3 would be excavated and removed from the northern riverbank. Pier removal may require scaffold access from a temporary rock platform or bridge. As mentioned above, works on the riverbed may disturb sediments and result in increased turbidity levels in the Macquarie River. These impacts would be managed by use of standard soil and water safeguards, including in stream sediment controls, such as silt curtains.

Particulates, fine materials and slurries can be generated from activities, such as sawing, cutting, grinding and jack hammering undertaken as part of the bridge demolition. Protective sheets, channels and temporary bunding can be used to prevent material falling into the Macquarie River during the demolition processes.

As with the bridge construction, cranes would be used on the bank of the Macquarie River for demolition of the bridge. This impact would be mitigated by construction of crane pads providing stability for the bank area and intercepting disturbed sediments with silt curtains, or similar, installed in the river to reduce turbidity.

The use of construction plant and equipment and the use of chemical substances in the demolition stage could result in accidental spills and leaks into the Macquarie River. Additionally, contaminants from the existing bridge could be released through the demolition process. Potential sources of contamination and appropriate mitigation measures to reduce impacts as a result of accidental spills and identified hazardous materials are discussed in Section 6.9.4.

Operation

As described further in Section 1.1, open scuppers are a feature of the bridge design to allow surface water to drain from the bridge deck into the Macquarie River. This has the potential to move hydrocarbon fuels or oil leaks that may be present on the bridge into the Macquarie River during a rain event. This is consistent with the existing bridge structure.

Subsurface water flow, including groundwater movement into the river, could be impacted by placement of barriers to subsurface water flow. This would mainly apply to the abutment piles. However, due to the minimal displacement and spacing of the piles, is not anticipated to interfere with any groundwater – surface water interactions and would have a negligible impact on subsurface water flow.

6.6.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Soil and water	An Erosion and Sediment Control Plan (ESCP) will be prepared and implemented as part of the CEMP for the main construction works (Bridge demolition, construction, drainage and landscape works). The ESCP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction	Contractor	Pre-construction
Soil and water	An incident management plan is to be developed as a component of the CEMP and/or ESCP The incident management plan is to include: <ul style="list-style-type: none"> • Locations for spill kits and floating booms to contain spills • Adopting the TfNSW Environmental Incident Classification and Reporting Procedure and notification of the TfNSW Project Manager as soon as practicable • Contact details for the TfNSW Project and Environment Managers, and the for incident notification purposes under the POEO Act including Dubbo Regional Council, local EPA, EPA pollution line, NSW Health, SafeWork NSW and Fire and Rescue NSW 	Contractor	Pre-construction
Soil and water	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system	Contractor	Detailed design / Pre-construction
Soil and water	Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment etc.) entering drain inlets or waterways	Contractor	Pre-construction
Soil and water	The ESCP would include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather	Contractor	Pre-construction
Soil and water	Erosion and sediment control measures are to be implemented and maintained to:	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	<ul style="list-style-type: none"> • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert clean water around the site <p>(Erosion and sediment control measures will be in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book))</p>		
Soil and water	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request	Contractor	Construction
Soil and water	Erosion and sediment control measures are not to be removed until the works are complete and areas are stabilised	Contractor	Construction
Soil and water	Work areas are to be stabilised progressively during the works	Contractor	Construction
Soil and water	The maintenance of established stockpile sites is to be in accordance with the <i>Roads and Maritime Services Stockpile Site Management Guideline</i> (EMS-TG-10)	Contractor	Construction
Soil and water	<p>An emergency spill kit is to be kept on site at all times and maintained throughout the construction work</p> <p>The spill kit must be appropriately sized for the volume of substances at the work site</p> <p>The spill kit must be readily accessible on the bridge and temporary instream work structures</p>	Contractor	Construction
Soil and water	Emergency contacts will be kept in an easily accessible location on vehicles, vessels, plant and site office. All workers will be advised of these contact details and procedures	Contractor	Construction
Soil and water	All workers will be advised of the location of the spill kit and trained in its use	Contractor	Construction
Soil and water	Exposed areas on the creek banks (such as abutments and temporary access tracks) are to be covered with geofabric when exposed for prolonged periods	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Soil and water	Concrete wash bays are to be established prior to any concreting works	Contractor	Construction
Water quality	Construction water is to be managed within the sustainable limits of the area and catchment. The Regional Environmental Manager would be contacted if water supply becomes an issue and direction would be provided	Contractor	Construction
Water quality	There is to be no release of dirty water into drainage lines and/or waterways	Contractor	Construction
Water quality	Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) is to be carried out on a regular basis to identify any potential spills or erosion and sediment controls	TfNSW Project Manager/ Contractor	Construction
Water Quality	Control measures to minimise the risk of water pollution are to be implemented including: <ul style="list-style-type: none"> all fuels, chemicals, and liquids will be stored at least 50 metres away from the existing stormwater drainage system and stored in an impervious bunded area within the compound site plant and maintenance machinery is to be refuelled in impervious bunded areas in the designated compound area vehicle wash downs and/or concrete truck washouts are to be carried out within a designated bunded area of an impervious surface or carried out off-site 	Contractor	Construction
Water quality	Clean rock is to be used for any instream temporary rock platforms	Contractor	Construction
Water quality	Sediment and erosion controls are to be used for in-stream works to avoid impacts on water quality and fish passage e.g. erosion fencing, stockpile covers and silt curtains	Contractor	Construction
Water quality	Silt curtains and erosion and sediment controls are to be installed, monitored and maintained as needed to contain any sediment runoff into the Macquarie River	Contractor	Construction
Ground water	Interruptions to water flows associated with groundwater dependent ecosystems are to be minimised through detailed design.	TfNSW Project Manager	Detailed design

Other safeguards and management measures that would address surface water, ground water and soil impacts are identified in Section 6.7.4 and Section 6.9.4.

6.7 Hydrology and flooding

A Bridge Hydraulics investigation was undertaken by Roads and Maritime Services in December 2019. The assessment is provided in Appendix I with a summary provided below.

6.7.1 Methodology

Hydraulic Investigation

RMS used several technical reports and documents to interpolate the likely flood levels and characteristics for the proposal site. These included:

- *Macquarie River, Dubbo, Compilation of Flood Studies Addendum* (Cardno, 2019)
- *Narromine Floodplain Risk Management Study* (Lyll & Associates, 2009)
- *New Dubbo Bridge Concept Design Report* (Jacobs, 2018)

Flood levels of the 1955, 1990 and 2010 floods of the Macquarie River were interpolated to determine the likely 50 year, 100 year and 2000 year Average Recurrence Interval (ARI) floods at the proposal area. These levels were used to determine the design of the proposal.

6.7.2 Existing environment

The proposal area is situated within the Macquarie – Bogan catchment which has an area of 74,800 square kilometres. The major river within the catchment is the Macquarie River which flows from east to north west with several major tributaries entering the Macquarie within this reach including the Cudgegong, Turon, Bell, Little and Talbragar Rivers with the mouth occurring at the Barwon River about 70 kilometres west of Walgett.

The natural topography of the proposal area is around 248 Australian Height Datum (AHD) and comprises a sloped landform declining gently from the south towards the southern bank of the river with a generally flat floodplain to the north of the river. The riparian area of the Macquarie River is incised into the landscape with a drop of about five metres from the upper to lower riverbank. The Macquarie River has been impacted by flooding and hydrological disturbances which has also been accelerated by land clearing. The riparian area within the proposal area has been impacted by historic disturbance from bridge construction and maintenance as well as vegetation clearing and construction of access tracks, particularly on the northern riverbank.

The proposal area is not mapped on the flood planning maps under Dubbo LEP 2011. Historically, flooding of rural areas along the Macquarie River and its tributaries is common. The existing bridge has been impacted by prior flooding including wash away of an abutment.

The Macquarie River at the proposal area is at 236.340 AHD and a waterway span of about 60 metres. In December 2010, a significant flood occurred within the Macquarie River, with the inundation of upstream and downstream areas and at the proposal site and a flood level at the proposal site of 249.357 AHD.

Predicted Flood Levels

The predicted flood levels calculated within the Bridge Hydraulics Report (Appendix I) were interpolated using flood data from the *Narromine Floodplain Risk Management Study* (Lyll & Associates, 2009) and *New Dubbo Bridge Concept Design Report* (Jacobs, 2018) are outlined in Table 6-10. Flood levels which are higher than the bridge soffit (under-surface of the bridge) are shown in **bold**.

Table 6-10 Predicted flood levels at the proposed bridge

Scenario	Existing Bridge	Proposed Bridge	Difference (m)
50 Year ARI	Not Known	248.639	0
100 Year ARI	Not Known	249.999	0
2000 Year ARI	251.500	251.500	0
Deck level at abutment A (Dubbo)	250.527	251.711	+1.184
Deck level at abutment B (Rawsonville)	250.329	251.711	+1.382
Soffit Level at abutment A (Dubbo)	249.477	250.221	+0.744
Soffit level at abutment B (Rawsonville)	249.279	250.221	+0.942

Waterway obstruction

The current bridge obstructs about 73.59 square metres of the waterway through the existing piers, substructure with an additional 15.34 square metres obstructed by the temporary support system at Pier 7, equalling a total obstruction area of 88.93 square metres. The proposed bridge substructure has an obstruction area of about 22.64 square metres giving a net available waterway area of 66.29 square metres.

Under the proposed road design road level, the 100 Year ARI flood level has a net obstruction area of about 31.21 square metres. This would result in a gain of about 60 square metres in comparison to the observed 2021 flood levels.

Floodways

There are three floodways within the proposal area with floodway 1 and 2 located 445 metres and 170 metres north of the northern abutment and floodway 3 located 100 metres south of the southern abutment.

The proposed road design for floodway 2 would be raised from RL 246.338 to RL 247.500 with a culvert comprised of four 600mm pipes installed 100 to 200 millimetres below the floodplain. Road design at floodway 3 would be raised from RL 249.382 to RL 250.354 and floodway 1 would be consistent with the existing road design level.

6.7.3 Potential impacts

Construction

The proposal would involve the installation of temporary instream structures, such as rock platforms or a temporary bridge to facilitate the bridge construction and demolition. These structures would be placed in the waterway ensuring the central span of the river remains open at all times to maintain river flow and fish passage. These structures can potentially detain water, increasing inundation and alter flood paths.

Temporary instream structures used in the bridge construction and demolition must maintain water levels so that upstream crossings are not inundated. The temporary structures would be constructed just above normal water level to minimise potential afflux effects during construction.

Flooding may result in temporary inundation of works areas and the compound site. A Flood Contingency Management Plan would be prepared to manage potential water quality and flood impacts to reduce any risks associated with flooding. This would include long term rainfall forecasting to program high risk works that may be more susceptible to flooding, such as instream works.

Operation

An objective of the proposal was to provide similar flood immunity to the existing structure. Through removal of the existing bridge, piers and temporary propping system and construction of the new bridge, there would be a gain of 66.29 square meters of available waterway area. The new road alignment would increase the obstruction area. However, the overall gain of available waterway would be about 60 square meters in comparison to the 2010 observed flood levels. The road level at floodway 2 would be raised by about 1.2 metres and would be maintained through installation of a pipe culvert to minimise flooding impacts on the road. As the floodway would be facilitated by the new culverts and design, this is not expected to alter any flood characteristics. Design of the batters and table drains has been undertaken to avoid flooding issues.

6.7.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Flooding	<p>A Flood Contingency Management Plan is to be prepared for the work site, compound site and ancillary areas. The plan is to:</p> <ul style="list-style-type: none"> monitor long term rainfall forecasts and schedule high risk work activities around these forecasts have contingency locations for the temporary flood storage of equipment and materials outside of potential inundation areas have contingency measures to secure and stabilise work areas and compound sites prior to flooding 	Contractor	Pre-construction
Flooding	Any major changes to the bridge geometry are to be investigated for potential changes to flood characteristics. This includes changes to upstream and downstream water levels, velocities and direction	TfNSW Project Manager	Detailed design

Impact	Environmental safeguards	Responsibility	Timing
Flooding	Temporary instream structures are to avoid fully impeding flow in the Macquarie River	Contractor	Construction
Aquatic impacts	Works are to be restricted to periods of normal flow (i.e. no work during major flood events)	Contractor	Construction
Aquatic impacts	Stockpiles are to be placed in designated stockpile locations such that they are not subject to a 1 in 10 year flood event i.e. at top of banks	Contractor	Construction

Other safeguards and management measures that would address hydrology and flooding impacts are identified in Section 6.6.4.

6.8 Noise and vibration

A Noise and Vibration Impact Assessment (NVIA) was prepared by AECOM in June 2021. A copy of the assessment is provided in Appendix J with a summary provided in the sections below.

6.8.1 Methodology

A quantitative assessment of construction noise and vibration has been carried out, with the following documents considered applicable to the proposal:

- Construction Noise and Vibration Guideline (CNVG), Roads and Maritime Services, 2016
- Interim Construction Noise Guideline (ICNG), Department of Environment and Climate Change (DECC), 2009
- Australian Standard AS 2436-2010, Guide to noise and vibration control on construction, demolition and maintenance sites, 2010
- British Standard 5228: Part 1 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise, 2009
- International Standard ISO 9613-2:1996 - Acoustics -- Attenuation of sound during propagation outdoors - Part 2: General method of calculation, 1996
- Assessing Vibration: a technical guideline (AVATG), NSW Department of Environment and Conservation (DEC), 2006
- DIN 4150:Part 3-1999 Structural vibration – Effects of vibration on structures, Deutsches Institut für Normung, 1999
- British Standard 7385: Part 2 1993 Evaluation and Measurement of Vibration in Buildings Part 2, 1993
- British Standard 6472: Part 1 2008 Evaluation of Human Exposure to Vibration in Buildings, 2008.

Existing noise environment

In order to establish the existing noise environment within the vicinity of the proposal, ambient noise monitoring was conducted at a representative location as shown in Table 6-11. Noise logging was conducted from 20 April to 25 April 2021 to measure the background noise level. The noise monitoring was conducted and processed in accordance with the *Noise Policy for Industry* (NPfI).

Table 6-11 Noise logging locations and equipment

Logger	Address	Start date	End date	Logger type
L1	148 Narromine Road, Dubbo	20/04/2021	25/04/2021	Ngara

The background noise level is defined by the NSW EPA as ‘the underlying level of noise present in ambient noise when extraneous noise is removed’. It can include sounds that are normal features of a location and may include birds, traffic, insects etc. The background noise level is considered to be represented by the L_{A90} descriptor. The measured noise levels were analysed to determine a single assessment background level (ABL) for each day, evening and night period in accordance with the EPA’s NPfI, for each monitoring location.

The ABL is established by determining the lowest ten-percentile level of the L_{A90} noise data acquired over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABLs determined over the entire monitoring period. An overall representative L_{Aeq} noise level is determined by logarithmically averaging each assessment period for the entire monitoring period. The background noise levels are shown in Table 6-12.

Attended monitoring was also conducted on 20 April 2021 at two locations (A1 and A2). The purpose of these measurements was to characterise the noise environment in the vicinity of the residential receivers. The results are shown in Table 6-13.

Construction noise modelling

In order to assess noise impacts during the proposal works, a noise model was created to represent 'reasonable' worst periods of construction activities. The construction of the proposal has been modelled in SoundPLAN Version 8.0. The following features were included in the noise model:

- Ground topography
- Ground absorption and reflection
- Buildings (residential and non-residential)
- Construction noise sources.

Noise modelling was undertaken for the proposal construction stages listed in Section 3.3.1. The predicted impact from the assumed 'reasonable' worst case 15 minute period of each stage of construction works has been assessed. The assessment assumes no noise mitigation at the construction site and that relevant equipment as listed in Section 3.3.4 for the construction stage is in use for the entire 15 minute period. Neutral weather conditions were assumed for all construction scenarios. The results of the noise modelling for the different construction phases are provided in Table 6-18.

Vibration assessment

The assessment of intermittent vibration outlined in the EPA guideline Assessing Vibration: A Technical Guideline is based on Vibration Dose Values (VDVs). The VDV accumulates the vibration energy received over the daytime and night-time periods.

No Australian Standards exist for the assessment of building damage caused by vibration. Conservative criteria for vibration are subsequently adopted.

6.8.2 Existing environment

The proposal area is surrounded by a mixture of land uses including agricultural properties, both broad acre and small lots, and rural residential living with some recreational and historic areas. The closest residential receiver is located 31 metres west of the proposal area.

The existing noise environment was determined by analysing the results of noise monitoring undertaken on the 20 April to 25 April 2021. The existing noise environment is shown in Table 6-12 and the attended noise results are shown in Table 6-13.

Table 6-12 Existing environment noise background (LA90) and ambient (LAeq) noise levels

Measurement location	Background LA90 and ambient noise levels LAeq, dB(A)		
	Day ¹	Evening ¹	Night ¹
L1 – 148 Narromine Road, Dubbo			
Rating background level LA90	38	30	20 ²
Log Average LAeq	54	53	38

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays & Public Holiday; Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday & Public Holidays; Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.
2. In accordance with Noise Policy for Industry Table 2.1, a minimum RBL has been adopted where the measured RBL is less than 35 dB(A) during the day, 30 dB(A) in the evening, or 30 dB(A) at night.

Table 6-13 Attended noise monitoring results

Monitoring location	Date and time	Description	Attended measurement results, dB(A)			
			LA1, 15min	LA10, 15 min	LAeq, 15min	LA90, 15min
A1 – 148 Narromine Road, Dubbo	9:32 20/04/2021	<ul style="list-style-type: none"> • Road traffic on Narromine Road dominant • Intermittent birdsong 	58	54	50	38
A2 – 9R Rawsonville Bridge Road, Rawsonville	9:53 20/04/2021	<ul style="list-style-type: none"> • Distant road traffic on Narromine Road • Distant aircraft • Birdsong, flies 	64	44	50	33

6.8.3 Criteria

Construction noise criteria

The NSW EPA's Interim Construction Noise Guideline (ICNG) is the principal guideline for the assessment and management of construction noise in NSW. As the proposal works are expected to continue for a period of more than three weeks and are within relatively close proximity to noise sensitive receivers, a quantitative assessment, based on 'reasonable' worst case construction scenarios, has been carried out for these works. Noise levels due to construction activities are predicted at nearby receivers using environmental noise modelling software and compared to the levels provided in Section 4 of the ICNG.

Where an exceedance of the noise management levels (NMLs) is predicted, the ICNG advises that receivers can be considered 'noise affected' and the proponent should apply all feasible and reasonable work practices to minimise the noise impact. The proponent should also inform all potentially impacted residents of the nature of the works to be carried out, the expected noise level and duration, as well as provide contact details.

Where construction noise levels reach 75 dB(A) residential receivers are considered to be 'highly noise affected' and the proponent should, in consultation with the community, consider restricting hours to provide respite periods.

Table 6-14 Construction noise management levels - residential receivers

Representative logger	Period ¹	Rating background level, dB(A)	Construction noise management level (NML)
L1 – 148 Narromine Road, Dubbo	Day (recommended standard hours)	38	48
	Day (outside recommended standard hours)	38	43

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays and public holidays.

For this impact assessment, the construction noise study area has been considered under a single Noise Catchment Area (NCA). The noise environment at each of the sensitive receivers within a NCA has a similar noise environment to the unattended monitoring location within that NCA, based on site observations. Each of these sensitive receivers is assigned the same background noise level and noise management level. Construction NMLs are shown in Table 6 14.

Construction road traffic noise criteria

To assess noise impacts from construction traffic, an initial screening test should be undertaken by evaluating whether existing road traffic noise levels would increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. Where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion, then noise mitigation should be considered for those receivers affected. The Road Noise Policy does not require assessment of noise impact to commercial or industrial receivers.

Construction vibration criteria – Structural damage

BS 7385 sets guide values for building vibration based on lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration induced damage and are presented in Table 6-15. A conservative limit provided by TfNSW as part of its environmental procedures, is two millimetres per second at the property boundary.

Table 6-15 BS 7385: Transient vibration guide values - minimal risk of cosmetic damage

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	

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 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

Construction vibration criteria – Human comfort (intermittent vibration)

The assessment of intermittent vibration outlined in the EPA guideline Assessing Vibration: A Technical Guideline is based on VDV. The VDV accumulates the vibration energy received over the daytime and night-time periods.

Maximum and preferred VDV for intermittent vibration arising from construction activities are listed in Table 6-16. The VDV criteria are based on the likelihood that a person would be annoyed by the level of vibration over the entire assessment period.

Table 6-16 Preferred and maximum vibration dose values for intermittent vibration (mm/s^{1.75})

Location	Daytime		Night-time	
	Preferred	Max	Preferred	Max
Residences ¹	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

Notes:

1. Criteria for residences are lower than schools as people expect to be able to relax/sleep in their homes without annoyance and are generally more concerned about structural damage than would be the case within schools and offices.

6.8.4 Potential impacts

Construction

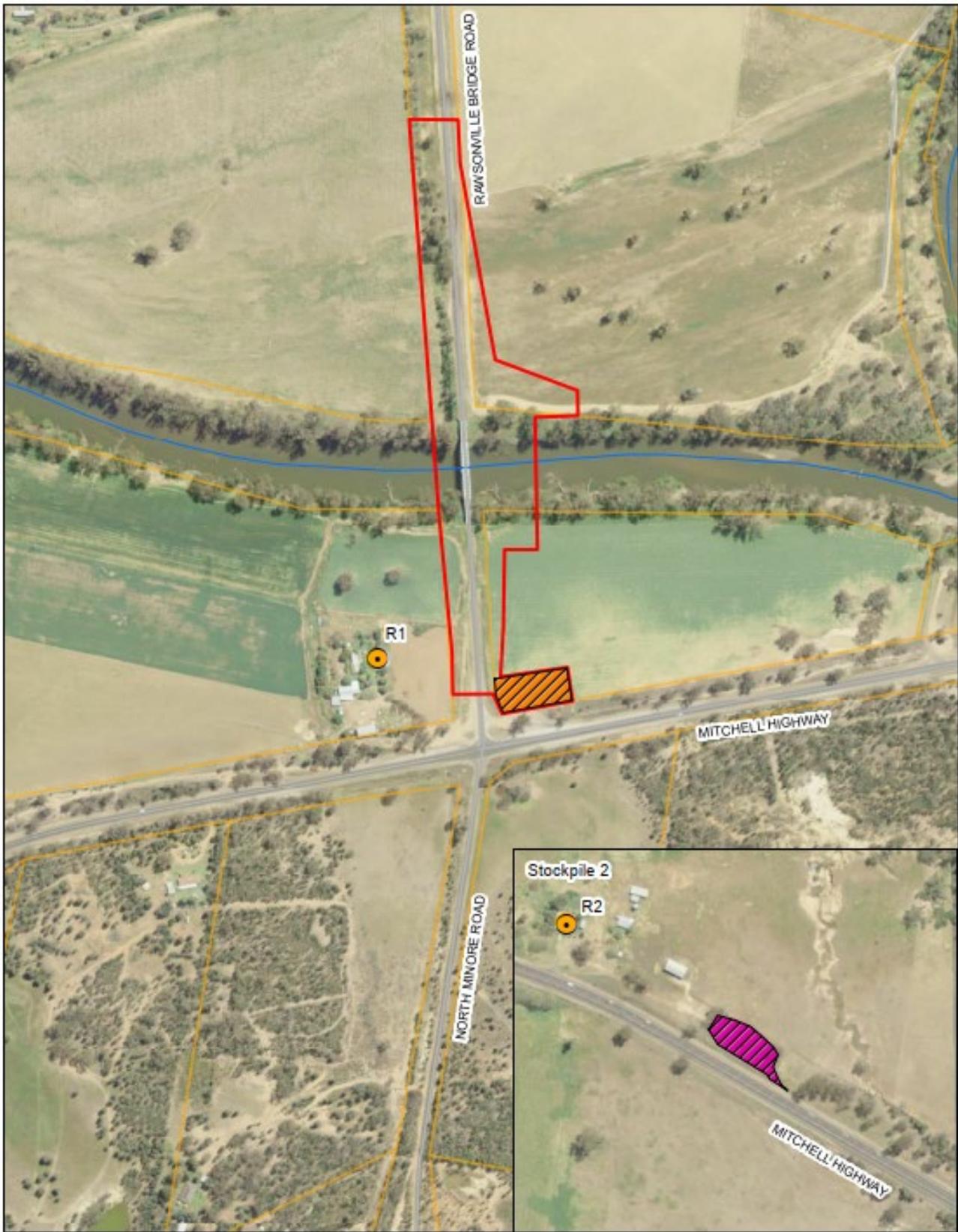
Construction noise (standard hours)

A summary of the number of receivers where construction noise levels are predicted to exceed NMLs during the loudest construction stages are presented in Table 6-18 for standard construction hours.

Noise levels at some receivers are predicted to exceed the NML, where construction works are relatively close to the receivers and the relatively low NMLs in this rural environment.

Up to two receivers are predicted to exceed the daytime NMLs by more than 10 dB(A) during the construction phase. Of these exceedances, two are during Stage 1 – Advance works with one exceedance occurring in both Preliminary earthworks and Bridge Construction.

Advance works includes tree clearance which would be expected to last two weeks. The two receivers are shown in Figure 6-8 and detailed in Table 6-17.



-  Residential receiver
-  Compound site
-  proposal area
-  Stockpile site

Residential receivers affected by the proposal
Rawsonville Bridge Replacement
5/07/2021
60657302
Fig. **6-5**

N
0 50 100 200 Meters

Figure 6-8 Residential receivers impacted by the proposal

Table 6-17 Affected residential receivers

Receiver	Address	Distance from closest noise source (m)
R1	148 Narromine Road, Dubbo	30 (southern bridge approach)
R2	120 Narromine Road, Dubbo	150 (stockpile 2)

R1 is located to the south west of the proposal area on the corner of the Mitchell Highway and Rawsonville Bridge Road. R2 is located on the Mitchell Highway, 150 metres from stockpile 2 and about 2.6 kilometres east of the proposal area.

No receivers are expected to be ‘highly affected’ where noise levels over 75 dB(A) are predicted during the loudest construction stage (refer Table 6-24).

Appendix C of the NVIA presents the construction noise contours for all construction phases and also indicates the level of exceedance over the NMLs for each nearby noise sensitive receiver.

There may be differences between predicted and measured noise levels due to variations in instantaneous operating conditions, plant in operation during the measurement and also the location of the plant equipment. The acoustic shielding calculated in the model due to fixed building structures would also vary as the construction equipment moves around the site.

Table 6-18 Predicted construction noise impacts for residential receivers (day)

Construction scenario	Overall sound power level of construction scenario, dB(A)	Exceedance of NML	
		>10-20 dB	>20 dB
Residential receivers where noise levels exceed NML			
1 – Advance works	118	R1, R2	-
2 – Preliminary earthworks	114	R1	-
3 – Bridge construction	120	R1	-
4 – Final roadworks construction	115	-	-
5 – Bridge demolition	115	-	-

Noise mitigation measures have been recommended to mitigate the construction noise impact at adjacent sensitive (residential) receivers. The measures for works to be completed during standard hours include:

- Standard mitigation measures
- Notification for the potentially affected residents
- Verification of construction noise levels.

Construction noise (out of hours)

As noted in Section 3.3.3, it is understood that construction works would generally be undertaken during standard construction hours. Two out of hours periods of work would be required for activities associated with bridge construction and demolition.

A summary of the number of receivers where construction noise levels are predicted to exceed NMLs during construction stages that may be undertaken out of hours is presented Table 6-19.

Table 6-19 Predicted construction noise impacts - Out-of-hours period 1 work

Construction scenario	Overall sound power level of construction scenario, dB(A)	Exceedance of NML	
		>10-20 dB	>20 dB
Residential receivers where noise levels exceed NML			
3 – Bridge construction	110	R1	-
5 – Bridge demolition	110	R1	-

Noise levels at one receiver are predicted to exceed NMLs by between 5-15 dB(A) during the Bridge construction and Bridge demolition. This is the receiver located at 148 Narromine Road, Dubbo, 150 meters south west of the existing bridge and proposed bridge location. Where works are to be undertaken outside of standard hours specific noise mitigation measures include:

- Standard mitigation measures
- Notification for the potentially affected residents
- Verification of construction noise levels.

Construction traffic assessment

Construction activities were based on indicative construction movements and have been used in lieu of rigorously defined vehicle movements. Construction traffic movements in this assessment were used to conservatively assess the following number of vehicles:

- 25 light vehicle and 30 heavy vehicle movements per AM peak period
- 30 light vehicle and 35 heavy vehicle movements per PM peak period.

The existing AM and PM peak traffic flows along the Mitchell Highway are presented in Table 6-20 below. The results indicate that the predicted noise increases on the Mitchell Highway are lower than the 2 dB(A) screening criteria presented in the Road Noise Policy. As a result, no further consideration of construction traffic is required at this stage.

Table 6-20 Existing traffic flows and additional traffic flows due to detour route

Period	Route	Existing peak hour flow		Additional peak hour flow		Relative noise increase, dB(A)
		Light	Heavy	Light	Heavy	
AM peak		391	66	25	30	1.0

Period	Route	Existing peak hour flow		Additional peak hour flow		Relative noise increase, dB(A)
		Light	Heavy	Light	Heavy	
PM Peak	Mitchell Highway	489	82	30	35	1.0

Construction vibration

Vibration intensive works may take place as part of the bridge replacement works. The works may include the use of hydraulic hammers, impact piling and jackhammers.

Typical safe working distances for vibration intensive equipment are provided below in Table 6-21. Should these safe working distances be maintained, no adverse vibrational impacts are predicted.

Table 6-21 Recommended minimum working distances for vibration intensive plant

Plant	Rating/Description	Minimum working distance (m)	
		Cosmetic damage (BS 7385) Light-framed structures	Human response (EPA's Vibration guideline)
Small Hydraulic Hammer	(300 kg - 5 to 12 t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18 t excavator)	7 m	23 m
Impact Pile Driver (9t) ¹	10 kJ per blow	35 m	104 m
Pile Boring	25 kJ per blow	49 m	147 m
	50 kJ per blow	64 m	192 m
	85 kJ per blow	79 m	236 m
	133 kJ per blow	93 m	280 m
	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2 m
Small Hydraulic Hammer	(300 kg - 5 to 12 t excavator)	2 m	7 m

Notes:

1. The safe working distances are based on the use of a 9t hammer, however the energy produced would vary depending on the drop height. The safe working distance are based on the piles being driven at refusal.

The closest receiver, 148 Narromine Road, is located 150 metres south west of the proposed bridge location and would not be within the cosmetic damage distance of the vibration intensive equipment associated with these works. Measures provided in Section 6.8.5, and standard safeguards, would mitigate potential human response impact to this receiver.

Construction mitigation measures

The construction noise and vibration assessment detailed a number of exceedances of the noise management levels within this project. These were predicted as a result of various different construction activities. Two sensitive receivers were identified at 148 Narromine Road, Dubbo and 120 Narromine Road, Dubbo.

In addition, specific noise mitigation has also been recommended in accordance with the TfNSW Construction Noise and Vibration Guideline. This includes notifications and verification as detailed in Table 6-22 below.

Table 6-22 Specific noise mitigation measures

Measure	Rating/Description
Notification (letterbox drop or equivalent)	<p>Advanced warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.</p> <p>Letterbox drops are to be undertaken at 148 Narromine Road, Dubbo and 120 Narromine Road, Dubbo at least 5 days prior to the start of works.</p>
Verification	<p>Verification should include measurement of the background noise level and construction noise.</p> <p>Verification should assess at 148 Narromine Road, Dubbo and 120 Narromine Road, Dubbo.</p>

Operation

The proposed activity would not increase the volumes of traffic, traffic composition, traffic behaviour, or change the alignment of the current road. There is not anticipated to be any changes to the current operating noise environment.

6.8.5 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Noise and vibration	<p>Noise and vibration will be managed as part of the CEMP. The CEMP will generally follow the approach in the ICNG (DECC, 2009) and identify:</p> <ul style="list-style-type: none"> all potential significant noise and vibration generating activities associated with the activity feasible and reasonable mitigation measures to be implemented, taking into account Beyond the 	Contractor	Pre-construction

	<p>Pavement: urban design policy, process and principles (Roads and Maritime, 2014).</p> <ul style="list-style-type: none"> • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • contingency measures to be implemented in the event of non-compliance with noise and vibration criteria 		
Noise and vibration	<p>All sensitive receivers (e.g. schools, local residents) likely to be affected by the standard hours work or the out of hours work will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> • the proposal • the construction period and construction hours • contact information for project management staff • complaint and incident reporting • how to obtain further information 	Contractor	Pre-construction
Noise and vibration	<p>In addition to the standard mitigation measures set out in Appendix C of the NVIA, specific noise mitigation measures would be implemented where noise levels are anticipated to be more than 10 dB(A) over the NML. This includes the following:</p> <ul style="list-style-type: none"> • Notification – letterbox drops will be undertaken for the noise affected residences at least five days prior to the start of works • Verification – will be undertaken to assess the most affected receivers and will include measurement of the background noise level and construction noise 	TfNSW Project Manager/ Contractor	Construction
Noise and vibration	<p>Where works are to be undertaken outside of standard hours, the following specific noise mitigation measures in addition to the standard mitigation measures set out in Appendix C of the NVIA would be implemented where noise levels are anticipated to be more than 10 dB(A) over the NML. This includes the following:</p> <ul style="list-style-type: none"> • Notification – letterbox drops will be undertaken for the noise affected residences at least five days prior to the start of works • Verification – will be undertaken to assess the most affected receivers and will include measurement of the background noise level and construction noise 	TfNSW Project Manager/ Contractor	Construction
Noise and vibration	<p>Vibration monitoring is recommended to determine site specific safe working distances. Works should begin farthest from sensitive receivers and then site specific safe working distances calculated based on the vibration measurements. If ongoing works are required</p>	Contractor	Construction

	within the site specific safe working distances then a temporary relocatable vibration monitoring system would be installed, to warn operators (via flashing light, audible alarm, short message service (SMS) etc.) when vibration levels are approaching the cosmetic damage objective		
Noise and vibration	Impact hammer size and maximum drop height would be selected taking into account the safe working distances and the distance between the area of construction and the most affected sensitive receiver. The use of less vibration intensive methods of construction or equipment would be considered where feasible and reasonable when working in proximity to existing structures Equipment would be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts	Contractor	Construction
Noise and vibration	Vibration intensive works at locations where high vibration levels are generated at sensitive receivers, would be scheduled during less sensitive times of the day, wherever feasible, e.g. 9.00 am to 5.00 pm or as determined through community consultation	Contractor	Construction

6.9 Contamination and hazardous materials

6.9.1 Methodology

AECOM undertook a hazardous materials survey at the bridge on 27 April 2021. The objective of the survey was to as far as practicable, identify and evaluate the presence, condition and extent of hazardous materials at the bridge, and to provide demolition specific recommendations.

For the purpose of the report, hazardous materials include the following:

- Asbestos containing materials (ACM)
- Lead in paint
- Copper Chrome Arsenate (CCA)
- Synthetic mineral fibre (SMF)
- Polychlorinated biphenyls (PCB)

The survey included the following:

- A review of the existing plans and Site documentation, where provided
- A survey of the accessible areas at the Site to identify and locate hazardous materials
 - The survey was conducted by a combination of ‘destructive’ and ‘semi-intrusive’ techniques where practicable
- Suspected ACM and lead in paint were sampled. Samples were forwarded to a National Association of Testing Authorities (NATA) accredited laboratory for analysis and issue of NATA endorsed report
- Suspected CCA treated timber were sampled. Samples were forwarded to a NATA accredited laboratory for analysis and issue of NATA endorsed report
- When sampling was not possible (i.e. lack of accessibility or risk of causing contamination), a reasonable assumption was made as to the presence or absence of a hazardous materials (ACM or lead in paint). This reasonable assumption was based on the surveyors’ experience, taking into account factors, such as age, physical appearance, and fixing method. Where possible, non-sampled materials were cross referenced to similarly sampled items and are denoted as “Similar to” in the register
 - SMF materials were visually identified or as a result of asbestos identification analysis
 - Representative fluorescent light fittings were visually inspected and assessed against the *Guidelines for the identification of PCBs and Materials Containing PCBs, United Nations Environmental Programme, 1999*
- Suspected hazardous materials were photographed where possible
- Delivery of a hazardous materials register outlining the location, type, extent, condition, and recommendation of the identified hazardous materials
- Delivery of a report, including the hazardous materials register, removal recommendations (when hazardous materials are detected or assumed), photographic records and NATA laboratory report.

For more detailed information on the hazardous materials and methodologies used and the hazardous materials register, refer to Appendix K.

6.9.2 Existing environment

A review was carried out of the following NSW EPA databases on 21 June 2021:

- The Contaminated Lands Register

- List of NSW contaminated sites notified to EPA.

The search of the EPA Contaminated Lands Register and the list of NSW contaminated sites notified to the EPA did not identify any contaminated sites within the proposal area or in the immediate vicinity. A site inspection was also conducted on 27 April 2021 to identify visible sources of contamination.

The proposal area is located about 21 kilometres west of Dubbo in a predominantly disturbed environment. Historically, the landscape has encountered disturbances due to pastoralism, forestry and transportation infrastructure construction. The existing bridge and approaches are part of an operational road corridor and is situated within a road reserve. Adjacent to the road reserve and within the broader landscape, the land has been used primarily for agricultural purposes, such as grazing and cropping.

The existing bridge structure was identified as potentially containing hazardous materials which due to the bridges age and era of construction were determined as a potential risk. The survey identified two detected or assumed hazardous materials, these included:

- Lead paint
- CCA

6.9.3 Potential impacts

Construction

Due to the identification of two contaminants associated with the existing bridge structure, hazardous material risk management strategies should be implemented where demolition works would be undertaken on the existing bridge. These are detailed in the mitigation measures as outlined below in Section 6.9.4

The construction plant, equipment and general demolition and construction work would require the use of a variety of substances, such as hydrocarbon fuel, lubricants, solvents and paints. There is potential for accidental spills of these substances to occur and result in contamination impacts to both terrestrial, aquatic and groundwater environments. The activities where there is a potential for accidental spills to occur include but are not limited to the use of plant and equipment on the in-stream structure, refuelling and maintenance of plant and equipment and the use of paints on the proposed bridge.

Mitigation measures as outlined below in Section 6.9.4 would be used to reduce the chance of accidental spills occurring and would assist in mitigating the impacts of a spill, should it occur. Restrictions would be placed on potentially contaminating activities and incident management plans would be prepared to prevent the risk of contamination of surface, groundwater or soil during construction (refer to Section 6.6.4).

It is unlikely that unknown contamination would be encountered during the construction of the proposal. If contamination is encountered, a procedure would be employed to appropriately contain, handle and dispose of contaminated material as outlined in Section 6.9.4.

Operation

The design of the proposed bridge allows for the bridge deck to be drained using open scuppers (an opening for the purpose of draining water). The scuppers would drain surface water from the deck and direct it into the Macquarie River. Should oil or hydrocarbon fuels which have leaked from traffic be present on the bridge, there is potential that surface water could mobilise these contaminants and release them into the river. This is consistent with the existing bridge drainage system.

6.9.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Hazards and risk management	<p>Hazard and Risk will be managed as part of the CEMP. The CEMP will include, but not be limited to:</p> <ul style="list-style-type: none"> • details of hazards and risks associated with the activity • measures to be implemented during construction to minimise these risks • record keeping arrangements, including information on the materials present on the site, material safety data sheets, and personnel trained and authorised to use such materials • a monitoring program to assess performance in managing the identified risks • contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations <p>The CEMP will be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and EPA or Office of Environment and Heritage publications</p>	Contractor	Pre-construction
Bridge Demolition – Lead paint	<p>Lead paint should be addressed during demolition works. Lead paint management should be conducted under controlled conditions in accordance with applicable legislation outlined in Appendix K. The following recommendations are provided when undertaking lead paint removal works.</p> <p>Removal methods include:</p> <ul style="list-style-type: none"> • Removal of lead-painted products in its entirety – Material/structures covered in lead paint may be removed in its entirety (with lead paint in-situ) and replaced with new materials that do not contain lead paint • Removal of lead paint from the structural surface – This process involves the removal of lead paint from a structure surface only. Lead paint removal may be conducted using the following methods: <ul style="list-style-type: none"> • Wet scraping and wet sanding • On site chemical stripping • Removal by heat gun and scraper <p>The removal of lead paint from structural surfaces may be defined as a lead process or lead risk work based on <i>WHS Regulation, clauses 392 and 394</i>. As such, the following should be considered:</p> <ul style="list-style-type: none"> • Seek approval from the regulator regarding the nature of the removal works with respect to lead processes and lead risk work 	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	<ul style="list-style-type: none"> Where removal works are deemed a lead process or lead risk work, address relevant WHS Regulation clauses associated with lead processes <p><i>The WHS Regulation (Chapter 7)</i> outlines specific requirements relating to lead risk work that need to be conducted by a person conducting a business or undertaking (or the contractor engaged to do the work), including:</p> <ul style="list-style-type: none"> Ensuring information is provided to workers about the risks and health effects when working with lead Ensuring health monitoring is provided to workers before lead risk works starts and one month after starting Ensuring a lead risk work notification form is submitted at least seven (7) days before lead works commences <p>Other considerations include:</p> <ul style="list-style-type: none"> Preparation of a Safe Work Method Statement for the selected methodology Limiting access to the lead paint work area (e.g. barricading, signage) Providing suitable decontamination facilities and processes Managing lead related waste in accordance with the requirements detailed in <i>Protection of the Environment Operations (Waste) Regulation 2014</i> Schedule 1 of the NSW <i>Protection of the Environment Operations (waste) Regulation 2014</i> requires lead waste transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained 		
Bridge demolition – CCA	<p>CCA treated timber should be removed during demolition works with methodologies applied to minimise exposure by direct contact and the release of airborne particulates. The following recommendations may provide a reduction to CCA exposure which if not correctly mitigated can result in:</p> <ul style="list-style-type: none"> Cover any existing skin injuries, such as cuts, wounds or abrasions, before you work with CCA treated timber Avoid sawing or sanding the wood in confined spaces. Work with CCA treated wood outdoors whenever possible Where sawing or sanding is required, consider using equipment fitted with dust extracting devices 	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	<p>(HEPA filter) to mitigate the generation of dust contaminated with CCA</p> <ul style="list-style-type: none"> • Remove accumulated dust on a regular basis • Practice good hygiene, this includes <ul style="list-style-type: none"> • Keep food and drinks away from sawdust or CCA treated wood surfaces • Wash your hands and face after working with the wood, and before eating, drinking or any other activity that involves hand-to-mouth contact, such as smoking • Use the personal protective equipment (PPE) that is adequate for the activities. This may include <ul style="list-style-type: none"> • Cut resistance gloves • Dust mask labelled either as P1 or P2 • Eye goggles • Dispose of CCA treated timber in line with the requirements of an approved waste collection facility. CCA treated timber is pre-classified as general solid waste (non-putrescible) as is categorised as building and demolition waste. Remove in accordance to the SafeWork NSW Code of Practice: Demolition Work 		
Contamination	<p>If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the TfNSW and/or EPA</p>	Contractor	Construction
Accidental spill	<p>A site-specific emergency spill plan will be developed and include spill management measures in accordance with the TfNSW <i>Code of Practice for Water Management</i> (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including TfNSW and EPA officers)</p>	Contractor	Pre-construction
Chemical handling	<p>The storage of chemicals and hazardous materials would be conducted in accordance with the relevant Material Safety Data Sheets and in accordance with requirements of <i>the Environmentally Hazardous Chemicals Act 1985</i></p>	Contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Hazardous materials	<p>When suspected hazardous materials are encountered, the following procedure protocol should be followed:</p> <ul style="list-style-type: none"> • Cease work and restricted access by isolating the area with a barrier and warning signage • Engage a hazardous materials consultant or equivalent specialist (e.g. licensed asbestos assessor or competent person) to undertake an assessment of the unexpected find <ul style="list-style-type: none"> • The hazardous materials consultant or equivalent specialist (e.g. licensed asbestos assessor or competent person) should provide information following the assessment detailing the sample result, material identification, and recommendation to appropriately mitigate the find if a hazardous material is identified • Hazardous material removal may require the engagement of a licensed contractor and implementation of specific controls which may include air monitoring • If the unexpected find is deemed to be emergency asbestos removal work, a SafeWork NSW notification shall not be required, however the engaged asbestos removal contractor must advise SafeWork NSW within 24 hours of being advised and/or undertaking the emergency works • Following the removal of the hazardous material a clearance inspection may be required by a hazardous materials consultant or equivalent (e.g. licensed asbestos assessor or competent person) • Following successful hazardous material removal works and clearance certificate (where required) remove barriers and recommence demolition and redevelopment works under normal conditions. 	Contractor	Construction

Other safeguards and management measures that would address contamination impacts are identified in Section 6.6.4 and Section 6.7.4.

6.10 Aboriginal cultural heritage

6.10.1 Methodology

An Archaeological Survey Report was prepared by AREA Environmental and Heritage Consultants in June 2021. This assessment was conducted in accordance with the Code of Practice for the Investigation of Aboriginal Objects in Stage 2 of the PACHCI (Roads and Maritime, 2011).

The PACHCI involves a staged approach to comprehensively review potential impacts to Aboriginal cultural heritage as a result of TfNSW activities. The Aboriginal cultural heritage assessment carried out as part of this REF is considered consistent with the requirements of the PACHCI process.

The Archaeological Assessment involved both a desktop review and fieldwork component. The desktop review involved an analysis of relevant literature and database search results. The databases searched as part of the desktop review are summarised in Table 6-23. For the purposes of this section, the study area refers to the proposal area.

The fieldwork component was conducted on 11/05/2021 and involved a comprehensive site survey. Due to the size of the proposal area the survey was broken into two survey units, being the bridge and the intersection, with the area surveyed on foot with all ground exposures examined for Aboriginal objects. All landforms within the proposal area were assessed.

Two Aboriginal community representatives from the Dubbo Local Area Land Council (LALC) were present during the fieldwork.

The full Archaeological Assessment is attached in Appendix G.

6.10.2 Existing environment

Background

The proposal area falls within the traditional lands of the Wiradjuri peoples, which have occupied the Darling Basin region for at least 40,000 years BP (before present). Occupation sites within the region at Cowra and Manildra have been dated to 7,000 years BP. The Wiradjuri people conducted complex ceremonies and rituals including carving intricate designs into the bark of trees in significant areas, such as burial sites and ceremony grounds.

Disturbances which have historically occurred within the proposal area include vegetation clearing and earthworks associated with the construction, use and maintenance of the existing bridge, Rawsonville Bridge Road, the Mitchell Highway and North Minore Road. Clearing of vegetation to establish and maintain agricultural activities has occurred in private land adjacent to the road areas and the Macquarie River.

There have also been impacts along the Macquarie River from flooding and erosion which has been accelerated by land clearing, both in the riparian area and beyond. The southern riverbank has evidence of scour which has exposed the piles of the second pier which were originally set under the ground surface.

The proposal area occurs within 200 metres of the Macquarie River, which is identified as a sensitive landform and has a high potential for the presence of Aboriginal sites. The Macquarie River is of high significance to the local Aboriginal community with culturally modified trees, stone artefacts, burial mounds, hearths and ceremonial sites appearing in the archaeological record for the Dubbo region. Isolated stone artefacts or scatters and culturally modified trees are most likely to occur within the proposal area.

Database search results

The results of the database searches are summarised in Table 6-23.

Table 6-23 Aboriginal heritage database searches

Database	Date of search	Search parameters	Results
Aboriginal Heritage Information Management System (AHIMS)	11/05/2021	2km buffer of the proposal area	Three Aboriginal sites identified in search area
Dubbo LEP 2011	11/05/2021	Schedule 5: Environmental Heritage	n/a
National Native Title Claims Search (NTV)	11/05/2021	NSW	No native title claims identified within the proposal area
State Heritage Register	11/05/2021	Dubbo Regional LGA	No Aboriginal heritage items identified within the proposal area

The search of the AHIMS database identified three records for Aboriginal heritage sites within 2 kilometres of the proposal area; however, none are located within the study area. The Aboriginal heritage sites within the search area included two sites recorded as “Artefact” and one recorded as “modified Tree (carved or scarred)”.

Fieldwork results

No Aboriginal objects or areas of potential archaeological deposit were recorded within the proposal area during the fieldwork component of the Archaeological Assessment. Much of the study area was heavily grassed which reduced ground surface visibility, which may have impacted the ability to identify isolated or scattered stone artefacts. However, it was noted that a significant proportion of the proposal area was highly disturbed, which may have contributed to the absence of archaeological sites.

One tree with a scar was identified in the proposal area but was determined not to be of Aboriginal origin. Site officers requested that this tree be cordoned off during work to avoid damage. This tree is not an Aboriginal artefact or site.

6.10.3 Potential impacts

Construction

The proposal works, including excavation, would be carried out in areas that have been subject to previous disturbance, such as the initial bridge works and road works. The findings of the Archaeological Assessment did not indicate that there are any previously recorded Aboriginal sites in this location and did not identify any new sites during the fieldwork component. In the unlikely scenario that potential items of Aboriginal significance were identified during construction, works would stop immediately and the unexpected finds procedure as outlined in Section 6.10.4 would be employed.

Operation

Operation of the proposal would be consistent with the existing bridge. However, due to the likely reduction in maintenance activities due to the removal of the existing bridge, during operation there would likely be a reduction in ongoing disturbance to the riparian area within the proposal area.

6.10.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s is found during construction. This applies where TfNSW does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place Work will only re-commence once the requirements of that Procedure have been satisfied	Contactors	Construction
Aboriginal heritage	If suspected human remains are located during any stage of the proposal, activities must be stopped immediately, and the NSW police must be notified	Contactors	Construction

6.11 Air quality, greenhouse gas and climate change

The Department of Agriculture, Water and the Environment National Pollutant Inventory (NPI) was searched on 21 July 2021 to identify facilities with a licence to produce air emissions near the proposal area. The NSW Department of Planning, Industry and Environment Air Quality Data Service was accessed on 7 September 2021 to provide baseline air quality for the proposal area.

6.11.1 Existing environment

Air quality

The proposal area is located within a rural area. The existing air quality within and surrounding the proposal area would be influenced by local agricultural operations and from vehicle emissions on the Mitchell Highway.

The search of the NPI indicated that there were thirteen facilities with a licence to produce emissions in the Dubbo Regional LGA. However, only one facility, Boral Terramungamine Quarry (8 kilometres west), was located within 10 kilometres of the proposal area and is unlikely to influence air quality in the vicinity of the proposal.

No background air quality data was available for the Dubbo area, with the closest air quality monitoring station at Bathurst located about 170 kilometres south east and Tamworth located about 260 kilometres north east. Available data, which was restricted to particulate material PM₁₀ and PM_{2.5} for these areas the period 1/09/2020 to 1/09/2021, is shown in Table 6-24. Particulate matter air quality readings were predominantly within the maximum concentrations per year as identified in the *National Environmental Protection Measure for Ambient Air* (AIR NEPM), exceedances of these guidelines identified in bold.

Table 6-24 Air quality measurements for Bathurst and Tamworth

Location	Measure	Annual average (24hr) (µg/m ³)	Monthly Averages (24hr)(µg/m ³)	Monthly Maximum (24hr) (µg/m ³)
Bathurst	PM ₁₀	17.0	7.9 – 19.3	14.5 – 29.2
	PM _{2.5}	7.6	3.5 – 8.0	5.9 – 13.8
Tamworth	PM ₁₀	16.8	11.2 – 18.5	18.8 – 33.3
	PM _{2.5}	6.8	3.1 – 7.9	5.9 - 15.5

The land surrounding the proposal area is predominantly cleared and cultivated for agricultural use. This introduces air quality impacts due to large areas of bare ground and agricultural operations agitating the surface and emitting dust into the air. Impacts from this source can vary with long dry periods emitting significant amounts of dust into the air while wet periods suppress dust emission.

There are two residential receivers in the immediate vicinity of the proposal, being 148 Narromine Road located 30 metres west of the southern bridge approach and 120 Narromine Road being 150 metres north west of stockpile site 2. These residences are located next to cultivated agricultural fields and would be subject to dust from operations in these areas. Additionally, both receivers front onto the Mitchell Highway and would be subject to emissions from traffic including heavy vehicles and agricultural machinery.

Greenhouse gas and climate change

Existing sources of greenhouse gas emissions within proximity to the proposal area are mainly from vehicle emissions from the road network and agricultural operations. These include heavy vehicles travelling along the Mitchell Highway and agricultural machinery used in the surrounding fields.

6.11.2 Potential impacts

Construction

Without employing management measures to control emissions to air from construction activities, the local air quality could be negatively impacted during the construction period. The potential sources of air emissions during the construction phase include dust from earthworks and exposed earth surfaces. Earthworks would be carried out for constructing access tracks, new bridge approaches, crane pads, in stream structures and demolition of the existing bridge. Stockpiles and new road surfaces prior to sealing may generate dust. The transportation of materials for the road construction and waste materials can result in dust impacts if loads are not covered and from emissions from vehicle exhausts.

Safeguards and management measures as outlined in Section 6.11.3 would be utilised to reduce and minimise air emissions and consequent impacts.

The potential sources of greenhouse gas emissions during the construction phase are likely to occur from exhaust emissions from construction plant and equipment, as well as exhaust emissions from light and heavy vehicles. Given the extent of works associated with the proposal, the volume of emissions would be minor.

Operation

The proposal would not increase traffic volumes during operation.

6.11.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Air quality	<p>Air Quality will be managed as part of the CEMP. The CEMP will include, but not be limited to:</p> <ul style="list-style-type: none"> • potential sources of air pollution • air quality management objectives consistent with any relevant published EPA and/or OEH guidelines • mitigation and suppression measures to be implemented • methods to manage work during strong winds or other adverse weather conditions • a progressive rehabilitation strategy for exposed surfaces 	Contactor	Pre-construction
Air quality	Vehicles transporting waste or other materials that may produce dust are to be covered during transportation	Contractor	Construction

Air quality	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust	Contractor	Construction
Greenhouse gas and emissions	Construction vehicles, plant and equipment are to be maintained in accordance with manufacturer instructions and vehicles and equipment are to be monitored for 'dirty' exhaust fumes	Contractor	Construction

Other safeguards and management measures that would address air quality impacts are identified in Section 6.6.4.

6.12 Waste and resource use

6.12.1 Policy Setting

The waste regulatory framework is administered under the principal legislation of the POEO Act and the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The purpose of these Acts is to prevent degradation of the environment, eliminate harmful wastes, reduce the amount of waste generated and establish priorities for waste reuse, recovery and recycling. The WARR Act establishes a waste hierarchy, which comprises the following principles:

- Avoidance of waste, such as unnecessary resource consumption
- Resource recovery, such as the reuse, reprocessing and recycling of waste products generated during construction
- Disposal of waste, where resources cannot be recovered.

By adopting the WARR Act principles, TfNSW encourages the most efficient use of resources and reduces cost and environmental harm in accordance with the principles of ecologically sustainable development.

6.12.2 Potential impacts

As outlined in Section 3.3.1, the main activities to be carried out as part of the proposal are:

- Advance works
- Preliminary earthworks
- Construction of the bridge
- Final roadworks construction
- Bridge demolition

The wastes which are likely to be generated during each activity are presented in Table 6-25.

Table 6-25 Main proposal activities and likely wastes to be generated

Stage	Likely wastes
1. Advance works	<ul style="list-style-type: none"> • Green waste
2. Preliminary earthworks	<ul style="list-style-type: none"> • Spoil material from excavations • General wastes from construction personnel • Road waste, such as asphalt, gravels
3. Construction of bridge	<ul style="list-style-type: none"> • Spoil material from excavations • Waste from construction activities • General wastes from construction personnel • Packaging materials, such as pallets, plastic bags • Temporary in-stream structure (potentially rock)
4. Final roadworks construction	<ul style="list-style-type: none"> • Waste from construction activities • General wastes from construction personnel

Stage	Likely wastes
	<ul style="list-style-type: none"> Excess stockpiled materials, such as spoil
5. Bridge demolition	<ul style="list-style-type: none"> Identified hazardous materials including Lead paint and CCA containing materials Demolished bridge components including piers and trusses Temporary in-stream structure (potentially rock) Road pavement and bitumen Geotextile fabric or gravel where practicable from the temporary construction compound site and stockpile area Removed sediment and erosion controls, such as silt fence

The construction activity likely to generate the largest quantity of waste is the demolition of the existing bridge. The existing bridge is mostly made of timber and steel and contains hazardous materials, such as Lead paint and CCA containing materials. Waste classification would be undertaken to ensure various waste streams containing hazardous material would be disposed of in an appropriate licenced waste facility. Whylandra Waste Disposal facility would be used for disposal of demolition concrete including piers, road pavement and bitumen.

Rock from in stream structures and crane pads would be stored at an appropriate TfNSW stockpile site for future reuse or recycling or possibly installed as scour protection for the new bridge abutments.

If excess spoil or stockpiled materials are left over following the completion of the final roadworks phase of the proposal would be disposed of in accordance with the NSW EPA Waste Classification Guidelines (EPA, 2014). These materials would be removed offsite by a licensed contractor to an approved waste facility.

The tree trimming and vegetation removal during Stage 1 activities is anticipated to produce a small amount of green waste. Where possible, this green waste would be re-used as mulch during the rehabilitation phase of the proposal.

6.12.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Waste	<p>A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:</p> <ul style="list-style-type: none"> measures to avoid and minimise waste associated with the project classification of wastes and management options (re-use, recycle, stockpile, disposal) lead related waste is to be managed in accordance with the requirements detailed in Protection of the Environment Operations (Waste) Regulation 2014 schedule 1 of the NSW Protection of the Environment Operations (waste) Regulation 	Contractor	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	<p>2014 requires lead waste transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained</p> <ul style="list-style-type: none"> • specify the measures to be implemented for the removal and disposal of asbestos containing material if found. The removal and disposal of asbestos would be carried out in accordance with the requirements of the Code of Practice How to Safely Remove Asbestos (Safe Work Australia, 2016) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures for storage, transport and disposal • monitoring, record keeping and reporting <p>The WMP will be prepared taking into account the <i>Environmental Procedure - Management of Wastes on Roads and Maritime Services Land</i> (Roads and Maritime, 2014) and relevant TfNSW Waste Fact Sheets</p>		
Hazardous waste	<p>As part of the Waste Management Plan (WMP), the following measures will be implemented in relation to disposal of identified hazardous materials as identified in Section 1.1</p> <ul style="list-style-type: none"> • schedule 1 of the NSW Protection of the Environment Operations (waste) Regulation 2014 requires lead waste transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained • specify the measures to be implemented for the removal and disposal of asbestos containing material. The removal and disposal of asbestos would be carried out in accordance with the requirements of the Code of Practice How to Safely Remove Asbestos (Safe Work Australia, 2016) • dispose of CCA treated timber in line with the requirements of an approved waste collection facility. CCA treated timber is pre-classified as general solid waste (non-putrescible) as it is categorised as building and demolition waste. Remove in accordance to the <i>SafeWork NSW Code of Practice: Demolition Work</i> 	Contractor	Construction, post-construction

Impact	Environmental safeguards	Responsibility	Timing
Resource use	A far as reasonably practicable, construction materials would be sourced within the Central West region so as to reduce transport costs, including fuel usage	Contractor	Pre-construction / construction

6.13 Cumulative impacts

There is a requirement under clause 228(2) of the EP&A Regulations to take into account any cumulative environmental impacts of the proposal with other existing or planned future activities. Cumulative impacts have the potential to arise from the interaction of individual components within the proposed site and the effects of the proposal with other projects.

6.13.1 Rawsonville Bridge Road intersection upgrade

The Rawsonville Bridge Road intersection upgrade would occur immediately south of the proposal area. The delivery of the intersection upgrade and the proposal have been developed concurrently as the Rawsonville Bridge Project and would occur sequentially with the proposal commencing following completion of the intersection upgrade. The intersection upgrade was assessed separately as a Minor Works REF, with several environmental assessments and technical reports informing both proposals.

Environmental impacts, such as noise and vibration, biodiversity and Aboriginal heritage, were assessed for both proposals cumulatively in technical documents. This was deliberate as to ensure significant cumulative impacts were identified between the proposals and appropriate safeguards would be developed. Due to this combined assessment of impacts and construction timeline, significant cumulative impacts between the two proposals have been avoided and appropriate safeguards developed.

6.13.2 Other projects and developments

Relocation of utilities would be undertaken prior to commencement of works under a separate Step 2 Environmental Approval. This would add to the impact of the proposal as these works would be undertaken as preparatory works in order to allow for earthworks and removal of the existing bridge.

A search was carried out of the Dubbo Regional Council Application Tracker website for Development Applications (DA)'s submitted between the months of June 2020 and June 2021. The search results identified that there were no large DA's submitted to Dubbo Regional Council within this time that would be likely to interact with the proposal and result in cumulative impacts.

The Department of Planning Industry and Environment's Major Project register was also searched on 22 June 2021 and did not identify any major projects located near the proposal area.

At the time of preparing this REF, there were no other known major developments near the proposal area. As the proposal is not expected to commence until 2022, it is suggested that these searches are conducted again closer to the start of the works.

6.13.3 Potential impacts

Cumulative impacts would be restricted to the utility relocation works prior to the commencement of the proposal. Due to the limited extent of these works, being relocation of communication and local private water pipes, there are not anticipated to be any significant impacts. Additional cumulative impacts are not likely to occur as the proposal would not be carried out at the same time as other TfNSW projects or other DAs. The proposal is not part of a broader program of works and is therefore unlikely to result in cumulative traffic impacts.

6.13.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Cumulative impacts	The CEMP would be revised to consider potential cumulative impacts from surrounding development activities as they become known.	TfNSW Project Manager/ Contractor	Construction

7. Environmental management

7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in the REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the TfNSW Environment Officer, Central West, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification *G36 – Environmental Protection (Management System)*, QA Specification *G38 – Soil and Water Management (Soil and Water Plan)*, QA Specification *G40 – Clearing and Grubbing*, QA Specification *G10 – Traffic Management*.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN1	General - minimise environmental impacts during construction	<p>A CEMP will be prepared and submitted for review and endorsement of the TfNSW Environment Manager prior to commencement of the activity.</p> <p>As a minimum, the CEMP will address the following:</p> <ul style="list-style-type: none"> any requirements associated with statutory approvals details of how the project will implement the identified safeguards outlined in the REF issue-specific environmental management plans roles and responsibilities communication requirements induction and training requirements procedures for monitoring and evaluating environmental performance, and for corrective action reporting requirements and record-keeping procedures for emergency and incident management procedures for audit and review <p>The endorsed CEMP will be implemented during the undertaking of the activity.</p>	TfNSW Project Manager / Contractor	Pre-construction / detailed design	Standard safeguard
GEN2	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be	TfNSW Project Manager / Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<p>implemented during the project. This will include up-front site induction and regular "toolbox" style briefings</p> <p>Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include:</p> <ul style="list-style-type: none"> • areas of Aboriginal heritage sensitivity • residential areas requiring noise management measures • adjoining residential areas requiring particular noise management measures • threatened species habitat • location of spill kits and the use of spill kits 			
GEN3	General – environmental awareness	<p>Works and ancillary areas are to be clearly delineated and marked</p> <p>Vehicles and plant/equipment are to be kept away from environmentally sensitive areas and outside the dripline of trees.</p>	Contractor	Construction	Additional safeguard
NAH1	Non-Aboriginal heritage	<p>The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered</p> <p>Work will only re-commence once the requirements of that Procedure have been satisfied</p>	Contacto	Detailed design / pre-construction	Section 4.10 of QA <i>G36 Environment Protection</i>
NAH2	Non-Aboriginal heritage	<p>A Photographic Archival Recording will be implemented prior to works commencing on the bridge</p> <p>Any images taken will be placed on the TfNSW bridge files and may be utilised in any heritage resource for future researchers.</p>	TfNSW Project Manager	Pre- construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<p>Copies will also be provided to the State Library of NSW as a heritage resource for future researchers</p> <p>The archival photographic recording should include a detailed recording of the Dare truss span and in particular the foundry marks in the top chord splice plates and bottom chords, metal shoes, braces and hanger rods, along with main timber truss elements and connections</p> <p>Attention should also be given to the concrete piers and in particular the decorative capitals</p> <p>The bridge should also be recorded digitally using photogrammetry and laser scanning techniques</p>			
NAH3	Non-Aboriginal heritage	<p>TfNSW should develop and implement a bridge specific heritage interpretation plan in accordance with the TfNSW Heritage Interpretation Strategy 2020, the local community and Dubbo Regional Council's requirements</p> <p>The heritage interpretation plan should include provision for the retention and reuse of the rare top chord splices and bottom chord metal elements with the FRODINGHAM IRON & STEEL CO LTD ENGLAND foundry marks</p> <p>Further research on the design, metallurgy, origin, chronology and history of foundry marks should be undertaken by TfNSW</p>	TfNSW Project Manager	Pre-construction	Additional safeguard
PLS1	General notification	<p>All businesses, residential properties and other key stakeholders (e.g. local councils, and agricultural properties) affected by the activity will be notified at least five working days prior to commencement of the activity. The notification will include:</p> <ul style="list-style-type: none"> • details of the project • construction period and construction hours 	TfNSW Project Manager & Contractor	Pre-construction	General notification

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> contact information for project management staff complaint and incident reporting and how to obtain further information 			
BIO1	Biodiversity	<p>A CEMP would be prepared in accordance with TfNSW <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). It will include, but not be limited to:</p> <ul style="list-style-type: none"> plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas requirements set out in the Landscape Guideline (RTA, 2008) pre-clearing survey requirements procedures for unexpected threatened species finds and fauna handling procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management (DPI Fisheries, 2013) protocols to manage weeds and pathogens 	Contractor	Detailed design / pre-construction	Section 4.8 of QA G36 <i>Environment Protection</i>
BIO2	Aquatic impacts	The extent/width of rock platforms should maintain maximum waterway area, as practicable, under Span 2 (between Piers 1 and 2) during construction so as to maintain open and for continuous fish passage at all times. No part of the river should be placed within pipes	Contractor	Construction	Additional safeguard
BIO3	Aquatic impacts	Replace/add snags into the waterway post-construction where practicable so as to replicate the pre-construction condition	Contractor	Post-construction	Additional safeguard
BIO4	Aquatic impacts	Aquatic habitat shall be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the <i>Biodiversity</i>	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<i>Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011) and Section 3.3.2 Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (DPI 2013)			
BIO5	Vegetation removal	All vegetation removal would be limited to the minimum extent necessary to construct the bridge, approaches and intersection	Contractor	Construction	Additional safeguard
BIO6	Vegetation removal	Prior to the commencement of any works, a physical clearing boundary is to be demarcated and implemented. The demarcation of the exclusion zone will be in accordance with <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 2: exclusion zones</i> (RTA 2011). Clearing would not occur outside of the road reserve	Contractor	Pre-construction	Additional safeguard
BIO7	Vegetation removal	A 'Clearing and Grubbing Plan' would be developed in accordance with <i>Guide 4 (clearing of vegetation)</i> of the TfNSW <i>Biodiversity Guidelines</i> (RTA 2011). This will include best practice methods for the removal of woody vegetation and non-woody vegetation	Contractor	Construction	Additional safeguard
BIO8	Vegetation removal	As mature trees with a DBH >40 cm diameter are proposed to be cleared, an ecologist must be onsite to undertake a pre-clearance survey prior to and whilst the tree/s are being removed (see <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 1 Pre-clearing Process</i> and <i>Guide 4 Clearing of vegetation and removal of bushrock</i> (RTA 2011)	Contractor	Construction	Additional safeguard
BIO9	Vegetation removal	Within the riparian area, the sections of felled trees including hollows should be placed on the ground to provide habitat for ground-dwelling fauna, where practicable	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
BIO10	Vegetation removal	<p>Areas of cleared vegetation would be rehabilitated progressively through final construction activities. This would include:</p> <ul style="list-style-type: none"> • Riparian area: Re-instatement of stripped topsoil and planting of tube stock which is representative of the PCT which occupied that area, including a mix of canopy, mid storey and ground species. This would be restricted from the existing vegetation to the maintenance corridor of the new bridge, allowing for clear access ways where required. • Batter areas: Re-instatement of stripped topsoil and supplemented with roadside rehabilitation seed mix where required. • Roadside and stockpile: Re-instatement of stripped topsoil, where available, and application of roadside rehabilitation seed mix where required. • Compound: The compound would be rehabilitated as agreed with landholder. 	TfNSW Project Manager Contractor	Construction Post- construction	Additional safeguard
BIO11	Protection of native flora	If unexpected threatened flora species are discovered, stop works immediately and follow the <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 1 (Pre-clearing process)</i> (RTA 2011)	Contractor	Construction	Additional safeguard
BIO12	Protection of native fauna	Construction of the new bridge should include the rehabilitation of the approaches of the existing bridge and other ancillary areas. This should include removal of the existing pavement and tilling to allow the regeneration of native plants and should be maintained through the road corridor maintenance programs in place with Dubbo Regional Council and TfNSW.	TfNSW Project Manager	Post- construction	Additional safeguard
BIO13	Protection of native fauna	Prior to the felling of any hollow-bearing trees for construction, compensatory nest boxes, or equivalent alternative compensatory habitat, such as lopped hollows, should be	TfNSW Project Manager	Pre- construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		installed within the local area (up to 1 km from the proposal area). The nest boxes should be targeted at woodland birds, parrots, bats and arboreal mammals according to the proportion of hollows removed that are likely to be used by these types of fauna. The ratio of nest boxes installed to tree hollows removed should be at least 2:1. The condition of all alternative compensatory habitat should be monitored			
BIO14	Protection of native fauna	If unexpected threatened flora species are discovered, stop works immediately and follow the <i>Biodiversity Guidelines – Protecting and Protection of native fauna Managing Biodiversity on RTA Projects: Guide 1</i> Protection of native fauna (<i>Pre-clearing process</i>) (RTA 2011)	Contractor	Construction	Additional safeguard
BIO15	Protection of native fauna	WIRES should be consulted if any injured fauna are encountered	Contractor	Construction	Additional safeguard
BIO16	Protection of native fauna	If it is perceived that significant impacts are occurring to aquatic environments within the vicinity of the work area (e.g. spill of any chemicals), works at that location should cease and TfNSW environment branch should be contacted for further advice	Contractor	Construction	Additional safeguard
BIO17	Protection of native fauna	To minimise the risk of injury or mortality to fauna and their young the following measures are recommended: <ul style="list-style-type: none"> All clearing is to follow the RTA biodiversity guidelines with respect to the pre-clearing process, including the capture and relocation (by licenced wildlife carers or ecologists) of fauna that have the potential to be disturbed as a result of clearing activities Vegetation removal is to be undertaken as per guide 4 of the RTA biodiversity guidelines, including the implementation of staged clearing	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
BIO18	Protection of native fauna	Routine corridor maintenance should be carried out to manage midstorey vegetation on road batters to reduce congregation of wildlife and improve sight lines for motorists during the operational phase	Contractor	Construction	Additional safeguard
BIO19	Protection of native fauna	A targeted microbat survey would be undertaken on the existing bridge prior to commencement of the bridge demolition works. If microbats bats are found to be occupying the bridge structure, works would stop and a licenced fauna ecologist would be engaged to remove and relocate the microbats	Contractor / TfNSW Project Manager	Pre- demolition	Additional safeguard
BIO20	Weeds and disease	Control the movement of vehicles, machinery and workers so as to minimise the potential for spread of weeds within and outside the proposal area	Contractor	Construction	Additional safeguard
BIO21	Weeds and disease	All vehicles would be inspected and, if necessary, cleaned before their first entry to the proposal area to minimise spread of weeds	Contractor	Construction	Additional safeguard
BIO22	Weeds and disease	A weed management plan should be implemented with appropriate hygiene protocols to reduce the likelihood of new weed or disease infestations within the proposal area. This would be delivered through the road corridor maintenance programs in place with Dubbo Regional Council and TfNSW	TfNSW Project Manager	Post- construction	Additional safeguard
TT1	Traffic and transport	<p>A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the TfNSW <i>Traffic Control at Work Sites Manual</i> (RTA, 2010) and <i>QA Specification G10 Control of Traffic</i> (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> • confirmation of haulage routes • measures to maintain access to local roads and properties 	Contractor	Pre-construction	Section 4.8 of QA <i>G36 Environment Protection</i>

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> • site specific traffic control measures (including signage) to manage and regulate traffic movement • requirements and methods to consult and inform the local community of impacts on the local road network • access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • a response plan for any construction traffic incident • consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • monitoring, review and amendment mechanisms 			
TT2	Traffic and transport	<p>The TMP will also include measures relating to the two proposed bridge closures including:</p> <ul style="list-style-type: none"> • provision of detours which will accommodate equivalent vehicle access to Rawsonville Bridge Road • signpost vehicle detour route prior to weekend bridge closures • notification to local agricultural businesses and stakeholders of proposed weekend closures 	Contractor	Construction	Additional safeguard
TT3	Traffic and transport	Spotters would identify and communicate short closures to waterway users of the Macquarie River where required.	Contractor	Construction	Additional safeguard
SGS1	Soil and water	An Erosion and Sediment Control Plan (ESCP) would be prepared and implemented as part of the CEMP for the main construction works (Bridge demolition, construction, drainage and landscape works). The ESCP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction	Contractor	Pre-construction	Core standard safeguard SW1 Section 2.1 of QA G38 Soil and Water Management

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SGS2	Soil and water	<p>An incident management plan is to be developed as a component of the CEMP and/or ESCP.</p> <p>The incident management plan is to include:</p> <ul style="list-style-type: none"> • Locations for spill kits and floating booms to contain spills • Adopting the TfNSW Environmental Incident Classification and Reporting Procedure and notification of the TfNSW Project Manager as soon as practicable • Contact details for the TfNSW Project and Environment Managers, and the for-incident notification purposes under the POEO Act including Dubbo Council, local EPA, EPA pollution line, NSW Health, SafeWork NSW and Fire and Rescue NSW 	Contractor	Pre-construction	Additional safeguard
SGS3	Soil and water	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system	Contractor	Detailed design / Pre-construction	Additional safeguard
SGS4	Soil and water	Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment etc.) entering drain inlets or waterways	Contractor	Pre-construction	Additional safeguard
SGS5	Soil and water	The ESCP would include arrangements for managing wet weather events, including monitoring of potential high-risk events, such as storms, and specific controls and follow-up measures to be applied in the event of wet weather	Contractor	Pre-construction	Section 2.2 of QA <i>G38 Soil and Water Management</i>
SGS6	Soil and water	<p>Erosion and sediment control measures are to be implemented and maintained to:</p> <ul style="list-style-type: none"> • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets 	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> Reduce water velocity and capture sediment on site Minimise the amount of material transported from site to surrounding pavement surfaces Divert clean water around the site. (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book))			
SGS7	Soil and water	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request	Contractor	Construction	Additional safeguard
SGS8	Soil and water	Erosion and sediment control measures are not to be removed until the works are complete, and areas are stabilised	Contractor	Construction	Additional safeguard
SGS9	Soil and water	Work areas are to be stabilised progressively during the works	Contractor	Construction	Additional safeguard
SGS10	Soil and water	The maintenance of established stockpile sites is to be in accordance with the <i>Roads and Maritime Services Stockpile Site Management Guideline</i> (EMS-TG-10)	Contractor	Construction	Additional safeguard
SGS11	Soil and water	An emergency spill kit is to be kept on site at all times and maintained throughout the construction work The spill kit must be appropriately sized for the volume of substances at the work site The spill kit must be readily accessible on the bridge and temporary instream work structures	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SGS12	Soil and water	Emergency contacts will be kept in an easily accessible location on vehicles, vessels, plant and site office. All workers will be advised of these contact details and procedures	Contractor	Construction	Additional safeguard
SGS13	Soil and water	All workers will be advised of the location of the spill kit and trained in its use	Contractor	Construction	Additional safeguard
SGS14	Soil and water	Exposed areas on the creek banks, such as abutments and temporary access tracks, are to be covered with geofabric when exposed for prolonged periods	Contractor	Construction	Additional safeguard
SGS15	Soil and water	Concrete wash bays are to be established prior to any concreting works	Contractor	Construction	Additional safeguard
SGS16	Water quality	Construction water is to be managed within the sustainable limits of the area and catchment. The Regional Environmental Manager would be contacted if water supply becomes an issue and direction would be provided	Contractor	Construction	Additional safeguard
SGS17	Water quality	There is to be no release of dirty water into drainage lines and/or waterways	Contractor	Construction	Standard safeguard EIA-P05-G01-T02
SGS18	Water quality	Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) is to be carried out on a regular basis to identify any potential spills or erosion and sediment controls	TfNSW Project Manager/ Contractor	Construction	Standard safeguard EIA-P05-G01-T02
SGS19	Water Quality	Control measures to minimise the risk of water pollution are to be implemented including: <ul style="list-style-type: none"> all fuels, chemicals, and liquids will be stored at least 50 metres away from the existing stormwater drainage system and stored in an impervious bunded area within the compound site plant and maintenance machinery is to be refuelled in impervious bunded areas in the designated compound area 	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> vehicle wash downs and/or concrete truck washouts are to be carried out within a designated bunded area of an impervious surface or carried out off-site 			
SGS20	Water quality	Clean rock is to be used for any instream temporary rock platforms	Contractor	Construction	Additional safeguard
SGS21	Water quality	Sediment and erosion controls are to be used for in-stream works to avoid impacts on water quality and fish passage e.g. erosion fencing, stockpile covers and silt curtains	Contractor	Construction	Additional safeguard
SGS22	Water quality	Silt curtains and erosion and sediment controls are to be installed, monitored and maintained as needed to contain any sediment runoff into the Macquarie River	Contractor	Construction	Additional safeguard
SGS23	Ground water	Interruptions to water flows associated with groundwater dependent ecosystems are to be minimised through detailed design	TfNSW Project Manager	Detailed design	Additional safeguard
HF1	Flooding	<p>A Flood Contingency Management Plan is to be prepared for the work site, compound site and ancillary areas. The plan is to:</p> <ul style="list-style-type: none"> monitor long term rainfall forecasts and schedule high risk work activities around these forecasts have contingency locations for the temporary flood storage of equipment and materials outside of potential inundation areas have contingency measures to secure and stabilise work areas and compound sites prior to flooding 	Contractor	Pre-construction	Additional safeguard
HF2	Flooding	Any significant changes to the bridge geometry during detailed design are to be investigated for potential changes to flood	TfNSW Project Manager	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		characteristics. This includes changes to upstream and downstream water levels, velocities and direction			
HF3	Flooding	Temporary instream structures are to avoid fully impeding flow in the Macquarie River	Contractor	Construction	Additional safeguard
HF4	Aquatic impacts	Works are to be restricted to periods of normal flow (i.e. no work during major flood events)	Contractor	Construction	Additional safeguard
HF5	Aquatic impacts	Stockpiles are to be placed in designated stockpile locations such that they are not subject to a 1 in 10 year flood event i.e. at top of banks	Contractor	Construction	Additional safeguard
NV1	Noise and vibration	<p>Noise and vibration will be managed as part of the CEMP. The CEMP will generally follow the approach in the ICNG (DECC, 2009) and identify:</p> <ul style="list-style-type: none"> • all potential significant noise and vibration generating activities associated with the activity • feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014) • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • contingency measures to be implemented in the event of non-compliance with noise and vibration criteria 	Contractor	Pre-construction	Additional safeguard
NV2	Noise and vibration	All sensitive receivers (e.g. schools, local residents) likely to be affected by the standard hours work or the out of hours work will be notified at least five days prior to commencement of any	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<p>works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> • the proposal • the construction period and construction hours • contact information for project management staff • complaint and incident reporting • how to obtain further information 			
NV3	Noise and vibration	<p>In addition to the standard mitigation measures set out in Appendix C of the NVIA, specific noise mitigation measures would be implemented where noise levels are anticipated to be more than 10 dB(A) over the NML. This includes the following:</p> <ul style="list-style-type: none"> • Notification – letterbox drops will be undertaken for the noise affected residences at least five days prior to the start of works • Verification – will be undertaken to assess the most affected receivers and will include measurement of the background noise level and construction noise 	TfNSW Project Manager/ Contractor	Construction	Additional safeguard
NV4	Noise and vibration	<p>Where works are to be undertaken outside of standard hours, the following specific noise mitigation measures in addition to the standard mitigation measures set out in Appendix C of the NVIA would be implemented where noise levels are anticipated to be more than 10 dB(A) over the NML. This includes the following:</p> <ul style="list-style-type: none"> • Notification – letterbox drops will be undertaken for the noise affected residences at least five days prior to the start of works • Verification – will be undertaken to assess the most affected receivers and will include measurement of the background noise level and construction noise 	TfNSW Project Manager/ Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
NV5	Noise and vibration	Vibration monitoring is recommended to determine site specific safe working distances. Works should begin farthest from sensitive receivers and then site-specific safe working distances calculated based on the vibration measurements. If ongoing works are required within the site specific safe working distances then a temporary relocatable vibration monitoring system would be installed, to warn operators (via flashing light, audible alarm, short message service (SMS) etc.) when vibration levels are approaching the cosmetic damage objective	Contractor	Construction	Additional safeguard
NV6	Noise and vibration	Impact hammer size and maximum drop height would be selected taking into account the safe working distances and the distance between the area of construction and the most affected sensitive receiver The use of less vibration intensive methods of construction or equipment would be considered where feasible and reasonable when working in proximity to existing structures. Equipment would be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts	Contractor	Construction	Additional safeguard
NV7	Noise and vibration	Vibration intensive works at locations where high vibration levels are generated at sensitive receivers, would be scheduled during less sensitive times of the day, wherever feasible, e.g. 9.00 am to 5.00 pm or as determined through community consultation	Contractor	Construction	Additional safeguard
CHZ1	Hazards and risk management	Hazard and Risk will be managed as part of the CEMP. The CEMP will include, but not be limited to: <ul style="list-style-type: none"> • details of hazards and risks associated with the activity • measures to be implemented during construction to minimise these risks 	Contacto	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> • record keeping arrangements, including information on the materials present on the site, material safety data sheets, and personnel trained and authorised to use such materials • a monitoring program to assess performance in managing the identified risks • contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations <p>The CEMP will be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and EPA or Office of Environment and Heritage publications</p>			
CHZ2	Bridge Demolition – Lead paint	<p>Lead paint should be addressed during demolition works. Lead paint management should be conducted under controlled conditions in accordance with applicable legislation outlined in Appendix K. The following recommendations are provided when undertaking lead paint removal works.</p> <p>Removal methods include:</p> <ul style="list-style-type: none"> • Removal of lead-painted products in its entirety – Material/structures covered in lead paint may be removed in its entirety (with lead paint in-situ) and replaced with new materials that do not contain lead paint • Removal of lead paint from the structural surface – This process involves the removal of lead paint from a structure surface only. Lead paint removal may be conducted using the following methods: <ul style="list-style-type: none"> • Wet scraping and wet sanding • On site chemical stripping • Removal by heat gun and scraper 	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<p>The removal of lead paint from structural surfaces may be defined as a lead process or lead risk work based on <i>WHS Regulation, clauses 392 and 394</i>. As such, the following should be considered:</p> <ul style="list-style-type: none"> • Seek approval from the regulator regarding the nature of the removal works with respect to lead processes and lead risk work • Where removal works are deemed a lead process or lead risk work, address relevant <i>WHS Regulation</i> clauses associated with lead processes <p>The <i>WHS Regulation (Chapter 7)</i> outlines specific requirements relating to lead risk work that need to be conducted by a person conducting a business or undertaking (or the contractor engaged to do the work), including:</p> <ul style="list-style-type: none"> • Ensuring information is provided to workers about the risks and health effects when working with lead • Ensuring health monitoring is provided to workers before lead risk works starts and one month after starting • Ensuring a lead risk work notification form is submitted at least seven (7) days before lead works commences. <p>Other considerations include:</p> <ul style="list-style-type: none"> • Preparation of a Safe Work Method Statement for the selected methodology • Limiting access to the lead paint work area (e.g. barricading, signage) • Providing suitable decontamination facilities and processes • Managing lead related waste in accordance with the requirements detailed in <i>Protection of the Environment Operations (Waste) Regulation 2014</i> • Schedule 1 of the <i>NSW Protection of the Environment Operations (waste) Regulation 2014</i> requires lead waste 			

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained			
CHZ3	Bridge demolition – CCA	<p>CCA treated timber should be removed during demolition works with methodologies applied to minimise exposure by direct contact and the release of airborne particulates. The following recommendations may provide a reduction to CCA exposure which if not correctly mitigated can result in:</p> <ul style="list-style-type: none"> • Cover any existing skin injuries, such as cuts, wounds or abrasions, before you work with CCA treated timber • Avoid sawing or sanding the wood in confined spaces Work with CCA treated wood outdoors whenever possible • Where sawing or sanding is required, consider using equipment fitted with dust extracting devices (HEPA filter) to mitigate the generation of dust contaminated with CCA • Remove accumulated dust on a regular basis • Practice good hygiene, this includes: <ul style="list-style-type: none"> • Keep food and drinks away from sawdust or CCA treated wood surfaces • Wash your hands and face after working with the wood, and before eating, drinking or any other activity that involves hand-to-mouth contact, such as smoking • Use the personal protective equipment (PPE) that is adequate for the activities. This may include: <ul style="list-style-type: none"> • Cut resistance gloves • Dust mask labelled either as P1 or P2 • Eye goggles 	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> Dispose of CCA treated timber in line with the requirements of an approved waste collection facility. CCA treated timber is pre-classified as general solid waste (non-putrescible) as is categorised as building and demolition waste. Remove in accordance to the SafeWork NSW Code of Practice: Demolition Work 			
CHZ4	Contamination	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the TfNSW and/or EPA	Contractor	Construction	Section 4.2 of QA G36 <i>Environment Protection</i>
CHZ5	Accidental spill	A site-specific emergency spill plan will be developed and include spill management measures in accordance with the TfNSW Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including TfNSW and EPA officers)	Contractor	Pre-construction	Additional safeguard
CHZ6	Chemical handling	The storage of chemicals and hazardous materials would be conducted in accordance with the relevant Material Safety Data Sheets and in accordance with requirements of the Environmentally Hazardous Chemicals Act 1985	Contractor	Construction	Additional safeguard
CHZ7	Hazardous materials	<p>When suspected hazardous materials are encountered, the following procedure protocol should be followed:</p> <ul style="list-style-type: none"> Cease work and restricted access by isolating the area with a barrier and warning signage Engage a hazardous materials consultant or equivalent specialist (e.g. licensed asbestos assessor or competent 	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<p>person) to undertake an assessment of the unexpected find</p> <ul style="list-style-type: none"> • The hazardous materials consultant or equivalent specialist (e.g. licensed asbestos assessor or competent person) should provide information following the assessment detailing the sample result, material identification, and recommendation to appropriately mitigate the find if a hazardous material is identified • Hazardous material removal may require the engagement of a licensed contractor and implementation of specific controls which may include air monitoring • If the unexpected find is deemed to be emergency asbestos removal work, a SafeWork NSW notification shall not be required, however the engaged asbestos removal contractor must advise SafeWork NSW within 24 hours of being advised and/or undertaking the emergency works • Following the removal of the hazardous material a clearance inspection may be required by a hazardous materials consultant or equivalent (e.g. licensed asbestos assessor or competent person) • Following successful hazardous material removal works and clearance certificate (where required) remove barriers and recommence demolition and redevelopment works under normal conditions 			
ACH1	Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s is found during construction. This applies where TfNSW does not have approval to disturb the object/s or where a specific safeguard	Contractor	Construction	Section 4.9 of QA G36 <i>Environment Protection</i>

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		for managing the disturbance (apart from the Procedure) is not in place Work will only re-commence once the requirements of that Procedure have been satisfied			
ACH3	Aboriginal heritage	If suspected human remains are located during any stage of the proposal, activities must be stopped immediately, and the NSW police must be notified.	Contractor	Construction	Additional safeguard
AGC1	Air quality	Air Quality will be managed as part of the CEMP. The CEMP will include, but not be limited to: <ul style="list-style-type: none"> potential sources of air pollution air quality management objectives consistent with any relevant published EPA and/or OEH guidelines mitigation and suppression measures to be implemented methods to manage work during strong winds or other adverse weather conditions a progressive rehabilitation strategy for exposed surfaces 	Contractor	Pre-construction	Section 4.4 of QA G36 <i>Environment Protection</i>
AGC2	Air quality	Vehicles transporting waste or other materials that may produce dust are to be covered during transportation	Contractor	Construction	Standard safeguard EIA-P05-G01-T02
AGC3	Air quality	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust	Contractor	Construction	Standard safeguard EIA-P05-G01-T02
AGC4	Greenhouse gas and emissions	Construction vehicles, plant and equipment are to be maintained in accordance with manufacturer instructions and vehicles and equipment are to be monitored for 'dirty' exhaust fumes	Contractor	Construction	Additional safeguard
WRU1	Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:	Contractor	Pre-construction	Core standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> • measures to avoid and minimise waste associated with the project • classification of wastes and management options (re-use, recycle, stockpile, disposal) • lead related waste is to be managed in accordance with the requirements detailed in Protection of the Environment Operations (Waste) Regulation 2014 • schedule 1 of the NSW Protection of the Environment Operations (waste) Regulation 2014 requires lead waste transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained. • specify the measures to be implemented for the removal and disposal of asbestos containing material if found. The removal and disposal of asbestos would be carried out in accordance with the requirements of the Code of Practice How to Safely Remove Asbestos (Safe Work Australia, 2016) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures for storage, transport and disposal • monitoring, record keeping and reporting. • The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant TfNSW Waste Fact Sheets 			Section 4.2 of QA G36 Environment Protection
WRU2	Hazardous waste	As part of the Waste Management Plan (WMP), the following measures will be implemented in relation to disposal of identified hazardous materials as identified in Section 1.1	Contractor	Construction, post-construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		<ul style="list-style-type: none"> • schedule 1 of the NSW Protection of the Environment Operations (waste) Regulation 2014 requires lead waste transporters to provide tracking information to the EPA via the WasteLocate online tool. Lead related waste must be disposed at a suitably approved waste collection facility. All tipping dockets must be retained • specify the measures to be implemented for the removal and disposal of asbestos containing material. The removal and disposal of asbestos would be carried out in accordance with the requirements of the Code of Practice How to Safely Remove Asbestos (Safe Work Australia, 2016) • dispose of CCA treated timber in line with the requirements of an approved waste collection facility. CCA treated timber is pre-classified as general solid waste (non-putrescible) as it is categorised as building and demolition waste. Remove in accordance to the SafeWork NSW Code of Practice: Demolition Work 			
WRU3	Resource use	A far as reasonably practicable, construction materials would be sourced within the Central West region so as to reduce transport costs, including fuel usage	Contractor	Pre-construction / construction	Additional safeguard
CI1	Cumulative impacts	The CEMP would be revised to consider potential cumulative impacts from surrounding development activities as they become known	TfNSW Project Manager/ Contractor	Construction	Additional safeguard

7.3 Licensing and approvals

Licences and approvals required for the proposal are outlined in Table 7-2 below.

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
<i>Fisheries Management Act 1994 (s199)</i>	Notification to the Minister for Primary Industries prior to any dredging or reclamation works	A minimum of 28 days prior to the start of work
<i>Fisheries Management Act 1994 (s219)</i>	Permit to obstruct the free passage of fish (temporary or permanent) from the Minister for Primary Industries (subject to the extent and nature of the temporary in-stream structure)	Prior to start of the activity
<i>Roads Act 1993 (s138)</i>	A consent under s138 for road closures associated with construction	Prior to start of the activity
<i>Crown Land Management Act 2016 (Division 3.4, 5.5 and 5.6)</i>	Lease or licence to occupy areas of Crown land	Prior to the start of the activity

8. Conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

8.1 Justification

The REF has assessed the potential biophysical, social and economic impacts of the proposal, as well as the public interest. The proposed construction of a new bridge and bridge approaches and demolition of the existing bridge would result in a number of environmental impacts including:

- Loss of a previously listed TfNSW s170 heritage item
- Changes to traffic conditions and traffic delays during construction
- Altered visual amenity and landscape character of the proposal area
- Water quality risks to the Macquarie River
- Increased temporary noise levels during construction.

The proposal is consistent with multiple NSW and Australian strategic documents and would support improved regional transport infrastructure within the Central West region. The REF has concluded that the adverse impacts of the proposal would be outweighed by the long-term beneficial impacts of improved HML and wide vehicle access, increased structural capacity and improved safety for all road users. Therefore, the proposal is considered justified.

8.1.1 Social factors

Social and economic factors have been assessed in Section 6.2 of this REF. The construction works would generally be carried out within the existing road corridor, with a small area of temporary and permanent private property acquisition, and with private property access maintained at all times. The construction compound site would be located within an existing agricultural field leased by the landowner for the duration of construction. The land would be rehabilitated as agreed with the landowner. This would restrict the capacity for the landowner to conduct agricultural activities for the duration of the construction period.

The proposal would have a long-term, positive effect for the local community through the provision of two lanes of travel over the Macquarie River as well as allowing access for wide agricultural machinery and vehicles and improvement in overall road user safety. The community would also benefit from the reduction in maintenance requirements for the bridge reducing disruptions associated with bridge works and improved durability in flood events.

8.1.2 Biophysical factors

Potential environmental impacts predicted to result from the proposal are described throughout Section 6 of this REF. There is likely to be a minor biophysical impact from the loss of native vegetation, and temporary impacts to amenity, including water quality, noise and vibration and visual impacts. These impacts are not considered to be significant and would be manageable with the application of the safeguards and management measures summarised in Section 7.

8.1.3 Economic factors

TfNSW carried out value management exercises as part of the identification of the preferred option. The value management exercises concluded that full replacement of the existing bridge was a more economically viable option than performing rehabilitation works to the existing bridge or continuing frequent maintenance. The proposal provides the greatest value and reduces maintenance costs in the long-term.

8.1.4 Public interest

During construction, the public is likely to experience the following:

- Visual impacts (refer to Section 6.4.2)
- Minor traffic delays (refer to Section 6.5.3)
- Minor noise impacts (refer to Section 6.8.4).

The duration of these impacts would be limited to the construction period only.

Although the existing bridge may contribute to the character of the area, a new bridge would provide a public benefit and would be in the public interest as it would improve road user safety and improve access for regional freight transport.

8.2 Objects of the EP&A Act

The consistency of the proposal with the objects of the EP&A Act is provided below.

Object	Comment
1.3(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 replacement of the existing bridge with a new bridge would improve the safety of road users and would provide access for HML and wide vehicles which would benefit the regional economy. The proposal is consistent with this object.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is discussed further in Section 8.2.1.
1.3(c) To promote the orderly and economic use and development of land.	The new bridge would be constructed immediately upstream of the existing bridge, minimising the amount of land required for the proposal area. Replacing the existing bridge would incur long-term road closures and was not considered feasible. The new bridge would also be wider and cater for HML vehicles which would increase the efficiency of freight transport through regional NSW. The proposal is consistent with this object.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the project.

Object	Comment
<p>1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.</p>	<p>The proposal would result in the disturbance of up to 0.51 ha of aquatic EECs listed under the FM Act. ToS carried out identified that there would be no significant impact to the EECs as a result of the proposal. Management measures would be implemented to minimise impacts to these EECs.</p> <p>The proposal would result in the removal of up to 0.61 hectares of native PCT vegetation. Management measures would be implemented to minimise impacts to native vegetation</p> <p>The proposal is consistent with this object.</p>
<p>1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).</p>	<p>An Aboriginal cultural heritage assessment was carried out in accordance with Stage 2 of the TfNSW PACHCI procedure. The assessment did not identify any new Aboriginal sites.</p> <p>The bridge was previously listed on the TfNSW s170 heritage register. A heritage interpretation area is proposed to be established in a suitable location near the new bridge providing opportunity to display photographs of the old bridge and road features on signage.</p>
<p>1.3(g) To promote good design and amenity of the built environment.</p>	<p>The proposal has been designed in accordance with relevant structural and civil guidelines and is anticipated to improve road safety.</p>
<p>1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.</p>	<p>Not relevant to the project.</p>
<p>1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.</p>	<p>Not relevant to the project.</p>
<p>1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.</p>	<p>TfNSW has carried out community participation throughout the development of the proposal including:</p> <ul style="list-style-type: none"> • Participation of Aboriginal stakeholders during the Archaeological Assessment carried out in April 2021 • Involving the community in the inputs and design of the heritage interpretation area.

8.2.1 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the project.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD are discussed below.

The precautionary principle

The precautionary principle deals with reconciling scientific uncertainty about environmental impacts with certainty 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 proposal does not pose a threat of serious or irreversible damage to the environment. The potential impacts described in the REF have been predicted with a reasonable level of scientific certainty. Mitigation and management measures have been proposed based on previous experience with similar projects.

A CEMP would be prepared prior to the construction period commencing and would provide for the implementation of specific mitigation measures to reduce environmental impacts.

Intergenerational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Inter-generational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

The short- and long-term impacts of the proposed bridge upgrade have been considered and addressed through the development of the concept design and REF and on-balance would benefit both current and future generations.

Conservation of biological diversity and ecological integrity

This principle states that the, “diversity of genes, species, populations and communities, as well as the ecosystems and habitats to which they belong, must be maintained and improved to ensure their survival”.

Database searches at both the state and federal level were carried out to determine biodiversity values of the proposal area, as well as a detailed field investigation (refer to Section 6.3.2). Impacts to biodiversity and the overall ecosystem would generally be minor and limited to the construction period. Mitigation measures have been prescribed to reduce impacts to the biodiversity values, both terrestrial and aquatic.

The proposal would have a limited impact on the flora and fauna and would not compromise the biological diversity or ecological integrity of the proposed area.

Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources which may be affected by the carrying out of a project, including air, water, land and living things.

The proposal reflects the natural, social and economic values of the locality. This REF has examined the environmental consequences of the proposal and identified mitigation measures and safeguards to manage the potential adverse impacts. The value of environmental safeguards implementation was not able to be determined at the time this REF was prepared.

8.3 Conclusion

The proposed bridge replacement at Rawsonville Bridge is subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal, as described in the REF, best meets the project objectives but would still result in some impacts on non-Aboriginal heritage, visual amenity, traffic, biodiversity and noise. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also improve safety for road users, improve HML and wide vehicle access and reduce on-going costs of maintenance associated with the existing bridge. On balance the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of Agriculture, Water and the Environment is not required.

9. Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.



Neil Standen

Team Leader, Impact Assessment & Permitting

AECOM

Date: 11/11/21

I have examined this review of environmental factors and accept it on behalf of TfNSW.



Peter Hamilton

Project/Contract Manager

Regional Maintenance Delivery Western

Date: 11/11/21

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Terms and acronyms used in this REF

Term/ Acronym	Description
ABL	Assessment background level
ACM	Asbestos containing material
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ARI	Average recurrence interval
(AS) 5100	Bridge Design loading in accordance with Australian Standard
ASS	Acid Sulfate Soils
BC Act	<i>Biodiversity Conservation Act 2016 (NSW).</i>
CCA	Copper Chrome Arsenate
CEMP	Construction environmental management plan
CLM Act	<i>Contaminated Lands Management Act 1997 (NSW)</i>
DA	Development application
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EIA	Environmental impact assessment
EPA	Environmental Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW).</i> Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).</i> Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
FBE	Focus Bridge Engineering
FBA	Framework Biodiversity Assessment
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
GDE	Ground Dependent Ecosystem
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
HLP400	Heavy Load Platform standards
HML	Higher Mass Limits
ICNG	Interim Construction Noise Guideline
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local government area
LLS	Local Land Service

Term/ Acronym	Description
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
MADIA	Manildra and District Improvement Association
MNES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
NATA	National Association of Testing Authorities
NCA	Noise catchment area
NML	Noise management level
NP&W Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NPI	National Pollutant Inventory
NPfI	Noise Policy for Industry
NRAR	Natural Resource Access Regulator
NVIA	Noise and Vibration Impact Assessment
OEH	Office of Environment and Heritage (a government department which has since been abolished and merged into the newly formed DPIE)
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PCB	Polychlorinated biphenyls
PCT	Plant Community Type
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
PPE	Personal protective equipment
QA Specifications	Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by TfNSW.
RBL	Rating background level
REF	Review of Environmental Factors
Roads and Maritime	NSW Roads and Maritime Services
S170	Section 170 heritage register
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SES	NSW State Emergency Services
SHI	State Heritage Inventory
SM1600	Stationary Load standards
SMF	Synthetic mineral fibre
SoHI	Statement of Heritage Impact
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TMP	Traffic Management Plan
ToS	Test of Significance
VDV	Vibration dose values
WAL	Water Access License
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
WMP	Waste Management Plan

Term/ Acronym	Description
WM Act	<i>Water Management Act 2000</i>

Appendix A

Consideration of clause 228(2) factors and matters of national environmental significance and Commonwealth land

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline (DUAP 1995/1996) and the *Roads and Related Facilities EIS Guideline* (DUAP 1996) as detailed in the 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 proposal on the natural and built environment.

Factor	Impact
<p>a) Any environmental impact on a community?</p> <p>There would-be short-term noise, vibration, visual and traffic impacts to the community during the construction period. With the use of the safeguards listed in Sections 6.8.4, 6.1.3 and 6.5.3, these impacts are considered to be minor and would not extend beyond the construction phase of the proposal.</p> <p>The existing bridge was delisted from the TfNSW s170 heritage register in February 2021. The proposal involves removal of the existing bridge. There is the opportunity for aspects of heritage to be retained through a themed heritage interpretation area to be established in a suitable location near the new bridge with potential input from the community and Dubbo Regional Council.</p> <p>The proposal would improve the safety of the road by providing two lanes of travel across the Macquarie River. The community would also benefit through wider lanes of the new bridge, particularly for wide agricultural machinery and vehicles which cannot cross the existing bridge. The new bridge would also improve HML vehicle access and rectify the structural issues with the existing bridge.</p>	<p>Short term</p> <p>Minor</p> <p>Negative</p> <p>Long term</p> <p>Moderate</p> <p>Negative</p> <p>Long term</p> <p>Moderate</p> <p>Positive</p>
<p>b) Any transformation of a locality?</p> <p>Under the proposal, a new bridge would be constructed immediately upstream of the existing bridge which would be followed by the demolition of the existing bridge. The new bridge would be visually different and would involve a different construction (Super-T) type than the existing Dare truss timber bridge. The new bridge would be more prominent in the landscape due to its size and higher position.</p> <p>There would be no long term change to the Macquarie River and impacts to the riverbank and riparian area would be rehabilitated following construction. The new bridge is designed to require minimal maintenance whereas the existing bridge requires significant ongoing maintenance works, including current temporary propping of the northern approach span, to remain operational. Following the proposal, the ongoing maintenance works would be significantly reduced resulting in a positive impact on the locality.</p>	<p>Long term</p> <p>Minor</p> <p>Negative</p> <p>Long term</p> <p>Minor</p> <p>Positive</p>
<p>c) Any environmental impact on the ecosystems of the locality?</p> <p>A biodiversity assessment report was prepared which identified that the proposal would result in the disturbance of up to 0.51 ha of aquatic EECs, however this was determined to not be a significant impact.</p> <p>The use of in-stream structures and works on the banks of the Macquarie River was also identified to have potential impacts to aquatic biodiversity, such as through potential obstruction to fish passage, disturbance and erosion of the banks and accidental spills. Removal of riparian vegetation would be limited and cleared areas</p>	<p>Long term</p> <p>Minor</p> <p>Negative</p> <p>Short term</p> <p>Minor</p>

Factor	Impact
<p>would be revegetated on completion of the proposal. Safeguards as listed in Section 6.3.4. would be used to reduce the impacts to as low as possible.</p>	<p>Negative</p>
<p>d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>The existing bridge would be removed and replaced by a new, modern structure and would therefore have a different character to the existing bridge.</p> <p>The construction period would result in a temporary decrease in the visual amenity as a result of the presence of construction machinery including large cranes, demolition works and use of land for the compound site. Removal of riparian and roadside vegetation from the proposal area would also reduce the aesthetic value of the locality. These impacts would be minimised through the use of the safeguards, such as revegetation measures, as provided in Section 6.4.3</p>	<p>Long term</p> <p>Minor</p> <p>Negative</p> <p>Short term</p> <p>Minor</p> <p>Negative</p>
<p>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?</p> <p>A Stage 2 PACHCI assessment has been carried out for the proposal and involved a site survey and consultation with Aboriginal stakeholders. The assessment identified one non-Aboriginal scar tree. Exclusion fencing would be installed around the one non-Aboriginal scar tree to provide an adequate protection zone.</p> <p>The existing bridge was delisted from the TfNSW s170 heritage register in February 2021. Mitigation measures would be implemented including archival recording of the bridge prior to work commencing. There is also the opportunity for aspects of heritage to be retained through a themed heritage interpretation area established in a suitable location near the new bridge with potential input from the community and Dubbo Regional Council.</p>	<p>Nil</p> <p>Long term</p> <p>Minor</p> <p>Negative</p>
<p>f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>Although the proposal would involve the disturbance of up to 0.51 ha of EECs listed under the FM Act, this has been assessed to not be a significant impact and an offset strategy is not required.</p> <p>The proposal may have the potential to impact upon aquatic biodiversity through the use of in-stream structures, disturbance and erosion of the banks and accidental spills. The proposal is unlikely to have an impact on aquatic biodiversity or on the habitat of fauna (within the meaning of the NPW Act) with the implementation of the safeguards as listed in Section 6.3.4.</p>	<p>Long term</p> <p>Minor</p> <p>Negative</p> <p>Short term</p> <p>Minor</p> <p>Negative</p>
<p>g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air. The construction work has the potential to temporarily impact on aquatic biodiversity as a result of increased erosion and sedimentation and chemical or fuel spills.</p>	<p>Short term</p> <p>Minor</p> <p>Negative</p>

Factor	Impact
<p>The proposal is unlikely to have a significant impact on threatened species, populations or ecological communities and their habitats. Potential impacts to the habitat or protected fauna would be minimised by implementing the safeguards listed in Section 6.3.4.</p>	
<p>h) Any long-term effects on the environment?</p> <p>The proposal would impact on a previous item of State heritage significance and would therefore change the heritage significance and aesthetic value of the proposal area. The existing bridge has been delisted from the s.170 heritage register and the new bridge would not hold any heritage significance.</p> <p>The proposal would improve the safety for road users by providing two lanes of travel, access for HML and wide vehicles and a strengthened bridge.</p>	<p>Long-term</p> <p>Major</p> <p>Negative</p> <p>Long term</p> <p>Moderate</p> <p>Positive</p>
<p>i) Any degradation of the quality of the environment?</p> <p>Water quality may be temporarily impacted during the proposal as a result of erosion and sedimentation, increased turbidity, and potential fuel or chemical spills during construction. Safeguards and management measures listed in Section 6.6.4 would be implemented to minimise these impacts.</p>	<p>Short-term</p> <p>Minor</p> <p>Negative</p>
<p>j) Any risk to the safety of the environment?</p> <p>The proposal would improve safety for road users through wider travel lanes, improved road approaches and the removal of potential safety risks associated with the existing bridge structure.</p>	<p>Long-term</p> <p>Moderate</p> <p>Positive</p>
<p>k) Any reduction in the range of beneficial uses of the environment?</p> <p>The proposal would maintain traffic throughout the majority of the construction period, either over the existing bridge or new bridge. However, there may be traffic delays and reduced speed zones which could increase travel times. Additionally, two non-consecutive weekend closures may be required for bridge construction and demolition. These closures would impact the use of Rawsonville Bridge Road and impact access for road users crossing the Macquarie River. These impacts would be mitigated through the implementation of safeguards listed in Section 6.5.4.</p>	<p>Short term</p> <p>Minor</p> <p>Negative</p>
<p>l) Any pollution of the environment?</p> <p>Water quality may be temporarily impacted during the proposal as a result of erosion and sedimentation, increased turbidity, and potential fuel or chemical spills during construction. Identified hazardous materials associated with the existing bridge would, if not managed appropriately, be at risk of polluting the environment. Safeguards and management measures listed in Section 6.5.4 would be implemented to minimise these impacts.</p>	<p>Short-term</p> <p>Minor</p> <p>Negative</p>
<p>m) Any environmental problems associated with the disposal of waste?</p> <p>The largest quantities of waste from the proposal would be generated during the demolition of the existing bridge. This waste would consist primarily of wood, metal, concrete and road pavement and includes identified hazardous materials. These hazardous materials would be identified and disposed of in accordance with the appropriate guidelines as outlined in Section 6.12.3. Waste materials would be classified in accordance with the EPA's Waste Classification Guidelines.</p>	<p>Nil</p>
<p>n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p>	<p>Nil</p>

Factor	Impact
<p>Resources required for the proposal are readily available and not in short supply</p>	
<p>o) Any cumulative environmental effect with other existing or likely future activities?</p> <p>The Rawsonville Bridge Road intersection upgrade is proposed to occur immediately south of the proposal area. The delivery of the proposal and the proposed intersection upgrade is part of the combined Rawsonville Bridge Project. As part of the project, delivery of the proposals would occur sequentially, with the bridge replacement taking place following completion of the intersection works. Various environmental impacts have been assessed across both proposals to capture impacts cumulatively where appropriate. These impacts would be managed through measures outlined in Section 6.13.4.</p> <p>There are no other activities known to occur concurrently with the proposal work. Given the minor nature of the work and the isolated nature of the site, the proposal is unlikely to have a cumulative environmental impact.</p>	<p>Short-term</p> <p>Minor</p> <p>Negative</p>
<p>p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The proposal is not located within a coastal area and would not impact on coastal processes and coastal hazards.</p>	<p>Nil</p>

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act 1999, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of Agriculture, Water and the Environment.

A referral is not required for proposed actions that may affect nationally listed threatened species, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
a) Any impact on a World Heritage property? No impact. There are no World Heritage properties in the study area.	Nil
b) Any impact on a National Heritage place? No impact. There are no National Heritage properties in the study area.	Nil
c) Any impact on a wetland of international importance? No impact. There are no wetlands of international importance in the study area.	Nil
d) Any impact on a listed threatened species or communities? The biodiversity assessment concluded that the proposal is unlikely to have a significant impact to listed threatened species or communities.	Nil
e) Any impacts on listed migratory species? The biodiversity assessment concluded that the proposal is unlikely to have a significant impact to listed migratory species.	Nil
f) Any impact on a Commonwealth marine area? No impact. There are no Commonwealth marine areas in the study area.	Nil
g) Does the proposal involve a nuclear action (including uranium mining)? No impact. The proposal does not involve a nuclear action.	Nil
h) Additionally, any impact (direct or indirect) on the environment of Commonwealth land? No impact. The proposal does not involve Commonwealth land.	Nil

Appendix B

Detailed design

Appendix C

Biodiversity Assessment Report, AECOM 2021

Appendix D

Statement of Heritage Impact (SoHI), Focus Bridge Engineering 2020

Appendix E

Delisting documentation

Appendix F

Statutory consultation checklists, consultation letters and agency responses

Infrastructure SEPP

Certain development types

Development type	Description	Yes / No	If 'yes' consult with	ISEPP clause
Car Park	Does the project include a car park intended for the use by commuters using regular bus services?	No	Dubbo Regional Council	ISEPP cl. 95A
Bus Depots	Does the project propose a bus depot?	No	Dubbo Regional Council	ISEPP cl. 95A
Permanent road maintenance depot and associated infrastructure	Does the project propose a permanent road maintenance depot or associated infrastructure, such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities?	No	Dubbo Regional Council	ISEPP cl. 95A

Development within the Coastal Zone

Issue	Description	Yes / No / NA	If 'yes' consult with	ISEPP clause
Development with impacts on certain land within the coastal zone	Is the proposal within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land?	No	Dubbo Regional Council	ISEPP cl. 15A

Note: See interactive map here: <https://www.planning.nsw.gov.au/policy-and-legislation/coastal-management>. Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a <i>substantial</i> impact on the stormwater management services which are provided by council?	No	Dubbo Regional Council	ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will <i>strain</i> the capacity of the existing road system in a local government area?	No	Dubbo Regional Council	ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a <i>substantial</i> impact on the capacity of any part of the system?	No	Dubbo Regional Council	ISEPP cl.13(1)(c)

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a <i>substantial</i> volume of water?	No	Dubbo Regional Council	ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a <i>minor</i> or <i>inconsequential</i> disruption to pedestrian or vehicular flow?	No	Dubbo Regional Council	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than <i>minor</i> or <i>inconsequential</i> excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Yes	Dubbo Regional Council	ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than <i>minor</i> or <i>inconsequential</i> ?	No	Dubbo Regional Council	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a <i>minor</i> extent?	Yes	Dubbo Regional Council	ISEPP cl.15
Flood liable land	Are the works located on flood liable land? (to any extent). If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance	Yes	State Emergency Services Email: erm@ses.nsw.gov.au	ISEPP cl.15AA

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable land* published by the New South Wales Government.

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the <i>National Parks and Wildlife Act 1974</i> , or on land acquired under that Act?	No	Environment, Energy and Science, DPIE	ISEPP cl.16(2)(a)
National parks and reserves	Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No	Environment, Energy and Science, DPIE	ISEPP cl. 16(2)(b)
Aquatic reserves	Are the works adjacent to an aquatic reserve or a marine park declared under the <i>Marine Estate Management Act 2014</i> ?	No	Department of Planning, Industry and Environment	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the <i>Sydney Harbour Foreshore Authority Act 1998</i> ?	No	Property NSW	ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No	Rural Fire Service <u>[Refer to the NSW Rural Fire Service publication <i>Planning for Bush Fire Protection (2006)</i>]</u>	ISEPP cl.16(2)(f)
Artificial light	Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	No	Director of the Siding Spring Observatory	ISEPP cl.16(2)(g)
Defence communications buffer land	Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011.	No	Secretary of the Commonwealth Department of Defence	ISEPP cl. 16(2)(h)
Mine subsidence land	Are the works on land in a mine subsidence district within the meaning of the <i>Mine Subsidence Compensation Act 1961</i> ?	No	Mine Subsidence Board	ISEPP cl. 16(2)(i)

Appendix G

Aboriginal Cultural Heritage Assessment Report, AREA 2021

Appendix H

Land acquisition details

Appendix I

Bridge Hydraulics Report, RMS 2019

Appendix J

Noise and Vibration Assessment Report, AECOM 2021

Appendix K

Hazardous Materials Survey Report, AECOM 2021

