Colemans Bridge Strengthening and Maintenance

Review of Environmental Factors

Roads and Maritime Services | June 2019

NSW GOVERNMENT

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Executive summary

The proposal

Roads and Maritime Services (Roads and Maritime) proposes to undertake bridge truss strengthening and maintenance on Colemans Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area. Colemans Bridge spans over Leycester Creek, approximately 70 metres north-west of Wilsons River. The Leycester Creek and Wilson's River sub-catchment forms part of the larger Richmond River catchment of northern NSW and drains to the sea at Ballina.

The work is required to improve the structural capacity of the bridge in order to keep Colemans Bridge serviceable. Colemans Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore Central Business District (CBD) and South Lismore (as well as allied townships and farmland to the south and west).

Colemans Bridge is listed as a heritage item of State significance on the State Heritage Register. Accordingly, application will be made to the NSW Heritage Office for a Section 57(2) exemption to facilitate the Project prior to works on bridge.

The proposal will include the following aspects:

- Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage
- Construction activities are required above and below the deck and on the embankment eight metres either side of the bridge. Construction works are not required within the water however access to the underside of the bridge may be required via the water with the use of a barge and elevated work platform. If required access for this work would be undertaken from a public boat ramp near Ballina Street Bridge.
- Construction activities above the deck include:
  - Re-stressing of the stress laminated timber (SLT) deck
  - Strengthening of the top chord of the dare trusses with new truss lateral sway brace
  - Replacement of the existing traffic barrier
  - Replacement of the bridge wearing course
  - Minor footway repairs
  - Repainting of the bridge truss with hand tools to restore the appropriate heritage bridge colour scheme (steel elements black, timber elements white).
  - Minor localised painting of the bridge in appropriate bridge heritage colours. Localised painting for repairs to the steel bottom chords will remain grey.
- Construction activities below the deck include:
  - Localised steel bottom chord corrosion repairs and repaint
  - Timber trestle pier repairs
- Minor vegetation clearing within eight metres of the bridge will be required to facilitate works around timber trestle piers
- Minor earthworks will be required to provide access to timber trestle piers and below deck work areas
- Elevated (hung) scaffolding will be required to conduct work for the SLT deck re-stressing and localised repairs to the steel bottom chord and girders.

Weather permitting, construction is expected to start in late 2019 and will take approximately eight months to complete, weather permitting. To minimise the period of disruption to the public, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures. At all times during closures alternate detours would be available in the order of

between 2.8 km and 3.7 km, depending on the route taken, origin and destination. During the project pedestrian access on one side of the bridge would be maintained at all times.

Need for the proposal

Colemans Bridge is one of 26 bridges identified for conservation in the *Roads and Maritime Services Timber Truss Bridge Conservation Strategy*, which was developed in consultation with the Heritage Council of NSW. The strategy was developed to address the long-term management of these structures and aims to establish a balance between infrastructure provision and heritage conservation. Given its heritage value, Colemans Bridge was identified to be retained and upgraded to meet the current vehicle load standards while preserving its heritage features.

The NSW Government is funding the Colemans Bridge upgrade as part of its $145 million-dollar Bridges for the Bush commitment to improve road freight productivity in regional NSW by replacing and upgrading bridges resulting in fewer bridge closures.

Colemans Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore CBD and South Lismore (as well as allied townships and farmland to the south and west). It is important to Roads and Maritime that the bridge remains in a serviceable condition at all times.

Appraisal of the bridge by Roads and Maritime has found it requires maintenance and strengthening to improve safety, amenity, capacity and longevity in the short to medium term. The required work includes:

- Strengthening the Dare-type trusses
- Upgrading the extant crash barrier (thrie beam) which is in poor condition
- Repairing and resealing the extant SLT decking which is damaged and uneven
- Repairing modern crash barriers and fencing on the bridge approaches
- Replacing a trestle post on one timber pier on the western bank
- Repainting the bridge. The timber truss will be painted with; timber elements in a white colour scheme and steel elements in a black colour scheme. Localised painting for repairs to the steel bottom chords will remain grey. Previous painting on the bridge involved the removal of lead paint, therefore there is no lead paint removal required as part of this proposal.

The proposal is required to:

- Ensure Colemans Bridge remains serviceable and complies with current road safety requirements
- Maintain safety for road users and pedestrians
- Protect the heritage values of the bridge.

Proposal objectives and development criteria

Strengthening and maintenance works are required on Colemans Bridge to improve safety and increase the service life of the bridge whilst retaining its heritage value.

The objectives of the proposal are to:

- Improve the structural capacity of the bridge through strengthening
- To support bridge longevity and maintain a safe connected road network
- To reduce future maintenance.

The works would be carried out in accordance with:

- Australian Bridge Design Code (Standards Australia, 1996)
- Australian Standard AS5100- 2017 Bridge Design
- Roads and Maritime Services Technical Directions and Specifications
- Roads and Maritime Timber Truss Bridge Conservation Strategy (2012a)

- Roads and Maritime Services Timber Truss Bridge Overarching Conservation Management Plan (2018).

Options considered

The following options were considered for the proposal:

Option 1: Do nothing

This option involves not undertaking any maintenance work and would lead to further deterioration of the bridge. The 'do nothing' option therefore does not meet the objectives of the brief or Roads and Maritime Timber Truss Bridge Conservation Strategy and the New South Wales Government's Bridges for the Bush program.

Option 2: Proposal with full bridge closure

This option involves maintenance works on the bridge being undertaken as proposed under full bridge closure which would allow the project to be completed in four months.

Option 3: Proposal with some weekend and occasional Monday closures

This option involves maintenance works on the bridge being undertaken as proposed with the bridge closed to traffic on some weekends during the extent of the project. There may also be odd occasions where the bridge will need to be closed on Mondays following the weekend closures. This option would allow the project to be completed in approximately eight months.

Option 3 - Proposal with some weekend and occasional Monday closures - is the recommended option to meet the proposal objectives whilst aiming to minimise impacts of the project on local residents, businesses and motorists by reducing bridge closures on Mondays - Fridays. The number of weekend closures would be up to 20 over the duration of the project. This option allows heritage values to be retained and is consistent with Roads and Maritime obligations under the Timber Truss Bridge Conservation Strategy.

Statutory and planning framework

All relevant statutory planning instruments have been examined in relation to the proposal. The proposal is categorised as development for the purpose of 'a road and/or road infrastructure facilities' and is being carried out by or on behalf of a public authority. Under clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (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 *Environment Planning and Assessment Act 1979* (EP&A Act).

Roads and Maritime is the determining authority for the proposal. This Review of Environmental Factors (REF) fulfils Roads and Maritime'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.

The proposal has also been assessed against relevant NSW legislation and other environmental planning instruments and no further statutory approvals are required. The matters of National Environmental Significance (NES) that are protected under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been considered for the proposal and a referral to the Department of the Environment would not be required.

Community and stakeholder consultation

Preliminary consultation with affected stakeholders, landowners, businesses, Lismore City Council (LCC) and government agencies has been undertaken and has informed the proposal. The proposal will be placed on public exhibition. Following the public display period, all submissions will be formally considered, and responses provided in a submissions report which will also be made available to the public via the project website.

Roads and Maritime Services, Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) has been undertaken for the proposal. Roads and Maritime's Cultural and Heritage Officer advised that the proposal was unlikely to have an impact on Aboriginal cultural heritage.

Formal consultation has also been initiated with LCC and Roads and Maritime – Maritime Division has been consulted as per the requirements of ISEPP. Advice received as part of this consultation has been addressed in this REF.

Consultation with key stakeholders affected by the bridge works will be ongoing.

Environmental impacts

The main potential environmental impacts of the proposal are summarised as follows:

- Traffic disruption: The proposal would temporarily affect access and connectivity for road users, including residents, businesses, tourists and transport. There may be up to twenty weekend and Monday closures during the proposed works. Alternate detours would be available ranging between approximately 2.8 km and 3.7 km, depending on the route taken, origin and destination. In most instances, the impact would be an inconvenience, with minor additional travel time and fuel cost incurred
- Heritage: The proposed strengthening and maintenance of Colemans Bridge will see the structure enhanced and its functionality retained. The proposed works respect the heritage significance of the item; will ensure that bridge's most significant elements (the Dare Trusses) are conserved; and are consistent with the modern approach to timber truss bridge management.
- Socio-economic: The Colemans Bridge proposal would reduce the choice of routes during occasional weekend and Monday closures creating inconveniences to residents, businesses and road users. The proposal has the potential to have socio-economic related and cumulative environmental impacts with other existing or likely future activities in the locality. The proposal's potential impacts can be managed by safeguards and management measures presented in the REF. Overall, while the short-term impacts cannot be avoided completely, no significant or long-term adverse impacts are likely as alternative detour routes are available within the Lismore Central Business District (CBD).
- Soil and water quality impacts: potential environmental impacts associated with erosion and sediment would be suitably managed through effective implementation of the safeguards of this REF
- Biodiversity: No substantial biodiversity impacts are anticipated as a result of the project. Works within Lismore CBD are within the yellow crazy ant infestation area, which are often spread by movement of plants and soil. Movement restrictions that currently remain in place until June 2019 prevent the carrying of vegetative matter and soil within a five kilometre radius of Lismore CBD unless it is directly to the Lismore Recycling and Recovery Centre. Relevant control measures extending beyond this period will be captured within the proposal Construction Environment Management Plan (CEMP).
- Construction noise levels: Construction works associated with the proposal will result in construction activities in close proximity to residential and commercial receivers. Noise levels are not predicted to exceed the highly affected level of 75 dBA at nearby residences. No significant vibration emitting plant is anticipated to be required and therefore negligible impacts are expected.

No significant impacts to any Matters of National Environmental Significance (MNES) listed in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) will occur as a result of the proposal.

Other potential environmental impacts would be generally minor in nature. A variety of safeguards have been developed to minimise the risk and potential magnitude of potential impacts posed by the proposal to the environment. The proposal would have a number of positive environmental impacts, including preserving heritage values and improvements to road safety and efficiency.

Justification and conclusion

Strengthening and maintenance works on Colemans Bridge is required to improve safety and increase the service life of the bridge while retaining its heritage value. Additional objectives of the proposal are to:

- Improve the structural capacity of the bridge through strengthening
- To support bridge longevity and maintain a safe connected road network
- To reduce future maintenance.

With effective implementation of the safeguards and management measures of this REF, environmental impacts associated with undertaking the work would be minor. Unavoidable impacts required for the work are not substantial and would not significantly affect the local environment. Overall the environment would benefit from the proposal as road safety would be improved.

Next steps

All comments received will be considered before the project commences. A submissions report summarising the comments made during consultation and a response to each issue will be available later in the year. Roads and Maritime will continue to keep the community updated as the project progresses.

Display of the review of environmental factors

The REF is on display for comment from 1 July 2019. The documents can be accessed in the following ways:

Internet

The documents will be available as pdf files on the Roads and Maritime Services website at: rms.nsw.gov.au/colemansbridge

Display

Static Displays

The REF can be viewed at the following locations:

- Lismore City Council, 43 Oliver Avenue, Goonellabah
- Lismore Library, 110 Magellan Street, Lismore
- Lismore Visitor Information Centre, 207 Molesworth Street, Lismore.

Staffed Displays

- Lismore Library, 110 Magellan Street, Lismore. Project staff will be available to discuss the project at Lismore Library from 2pm to 7pm on Tuesday 23rd July 2019. There will be no formal presentations so you can turn up at any time during the session to ask questions or provide feedback.

How can I make a submission?

To make a submission on the proposal, please send your written comments to:
Mail: Colemans Bridge Maintenance project REF, PO Box 576, Grafton NSW 2460
Email: grafton.regional.office@rms.nsw.gov.au

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1. Introduction

1.1 Proposal identification

Roads and Maritime Services (Roads and Maritime) propose to undertake bridge strengthening and maintenance on Colemans Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council LGA. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore CBD and South Lismore (as well as allied townships and farmland to the south and west). The work is required to improve the structural capacity of the bridge which would keep Colemans Bridge serviceable.

Colemans Bridge was built in 1908 and has two Dare-type truss spans; each 32 m long and comprising eight four-metre long panels. The bridge has an overall length of almost 91 m and has two timber beam approach spans at the western end and one timber beam approach span at the eastern end. The central twin-cylinder wrought and cast iron pier, constructed c.1884, was part of the previous bridge that was removed. Colemans Bridge is of State heritage significance and is a rare and representative example of a Dare-type truss bridge. The bridge also exhibits less common features of Dare-type truss bridges, including the abovementioned central iron piers, which combined with having two-lanes, footways, and long spans, represents a level of technical significance according to heritage listing descriptions.

Key features of the proposal include:

- Establishing a site compound located on a grassy area adjacent to the Winsome Hotel
- Re-stressing of the stress laminated timber (SLT) deck
- Repairing of the bridge wearing course
- Minor footway repairs
- Strengthening of the top chord of the dare trusses with new truss lateral sway brace
- Replacement of the traffic barrier
- Localised steel bottom chord corrosion repairs
- Timber trestle pier repairs
- Repainting of the bridge truss with hand tools to restore the appropriate heritage bridge colour scheme (steel elements black, timber elements white)
- Removal of vegetation within eight metres of the edge of the bridge to allow the works to be undertaken.

Construction is expected to commence in late 2019 and will take approximately eight months to complete. In order to minimise the period of disruption to the public and complete the works in the most efficient manner, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures. During closures alternate detours would be available in the order of between 2.8 km and 3.7 km, depending on the route taken, origin and destination. During the project pedestrian access on one side of the bridge would be maintained.

The location of the proposal is shown in Figure 1-1 and an overview of the proposal is provided in Figure 1-2. Chapter 3 describes the proposal in more detail.

Information shown is for illustrative purposes only

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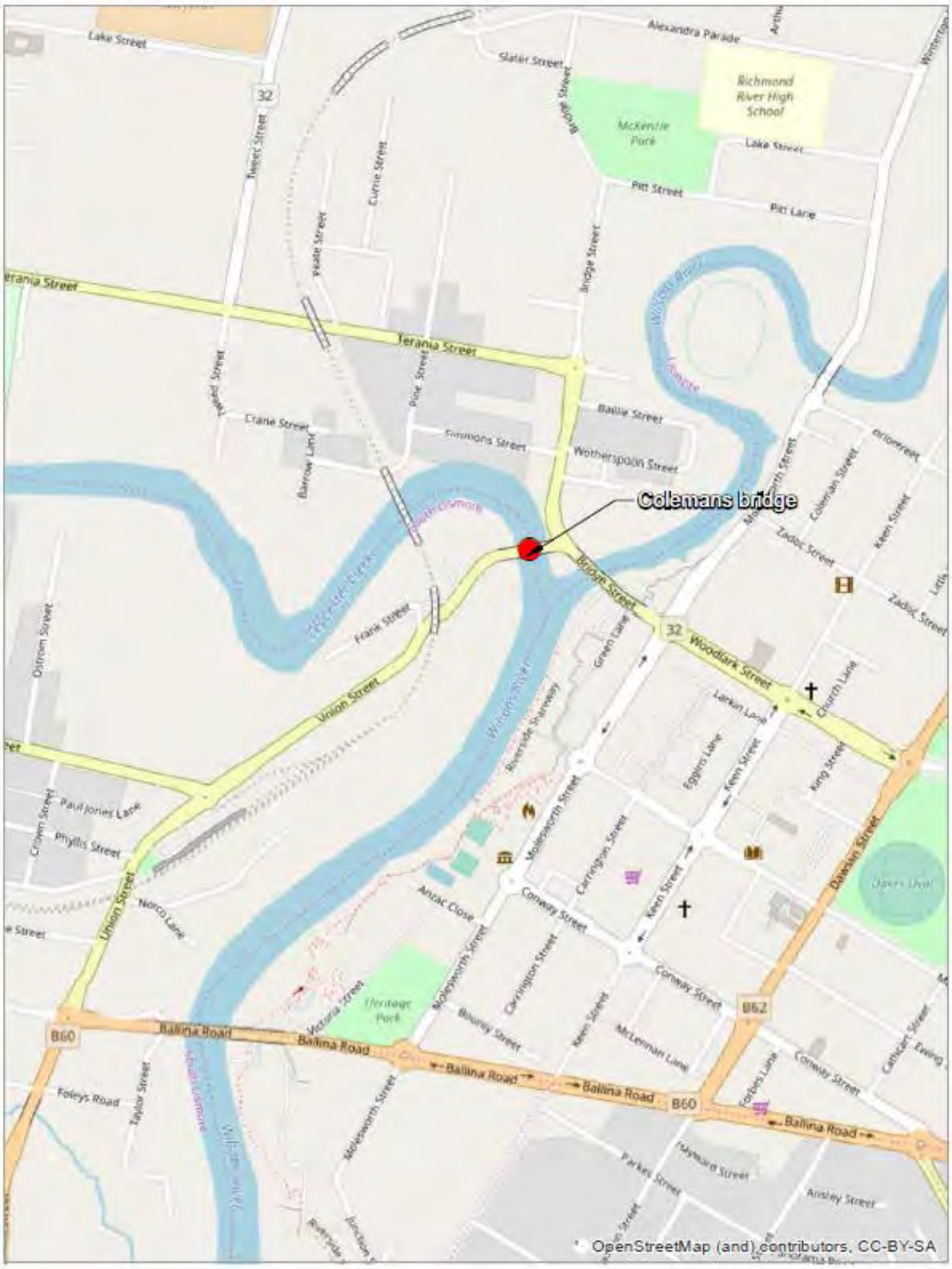
Source of base data: OpenStreetMap



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Location of the Proposal

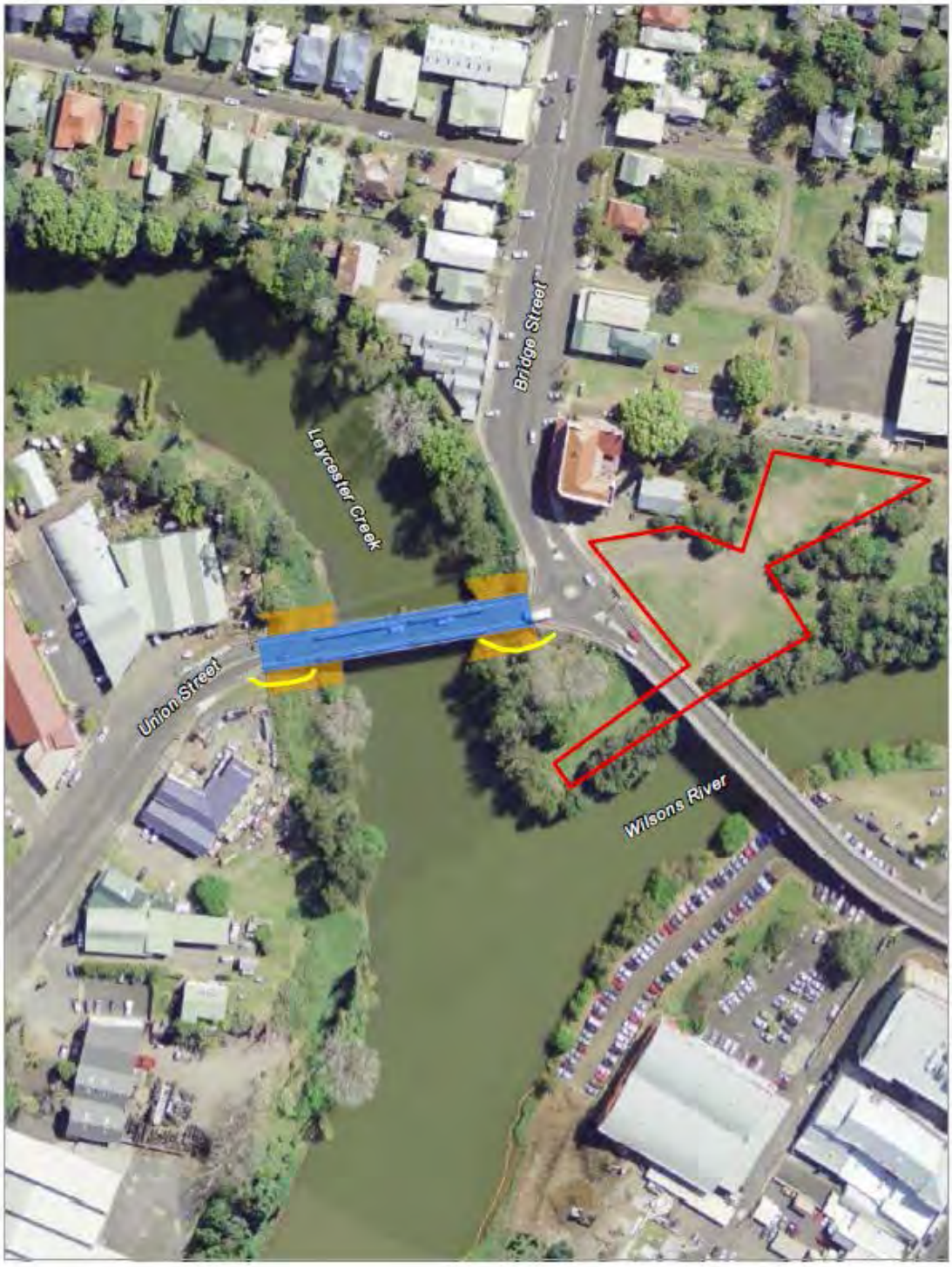
GeoLINK

Colemans Bridge Strengthening and Maintenance
Review of Environmental Factors
3276-1012

Figure 1-1

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: DGH Date: 07/06/2019
Source of base data: DFS&I



LEGEND

- Coleman's Bridge
- Proposed compound site
- Vegetation to be removed
- Access track

0 40

The Proposal

GeoLINK

Colemans Bridge Strengthening and Maintenance
Review of Environmental Factors
3276-1019 - Rev A

Figure 1-2

1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by GeoLINK on behalf of Roads and Maritime (Northern Region). For the purposes of these works, Roads and Maritime 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 (EP&A) 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 Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under 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 the Environment and Energy 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

Colemans Bridge is one of 26 bridges identified for conservation in the *Roads and Maritime Services Timber Truss Bridge Conservation Strategy*, which was developed in consultation with the Heritage Council of NSW. The strategy was developed to address the long-term management of these structures and aims to establish a balance between infrastructure provision and heritage conservation. Given its heritage value, Colemans Bridge was identified to be retained and upgraded to meet the current vehicle load standards while preserving its heritage features.

The NSW Government is funding the Colemans Bridge upgrade as part of its $145 million-dollar Bridges for the Bush commitment to improve road freight productivity in regional NSW by replacing and upgrading bridges resulting in fewer bridge closures.

Colemans Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore CBD and South Lismore (as well as allied townships and farmland to the south and west).

It is important to Roads and Maritime that the bridge remains in a serviceable condition at all times

Appraisal of the bridge by Roads and Maritime has found that it requires maintenance and strengthening to improve safety, amenity, capacity and longevity in the short to medium term:

- The Dare-type trusses requires strengthening
- The extant crash barrier (thrie - beam) is in poor condition and requires upgrading
- The extant SLT decking is damaged-uneven and needs to be repaired and resealed
- Repairs are required to modern crash barriers and fencing on the bridge approaches
- One timber pier on the western bank requires a replacement trestle post
- The existing bridge paintwork requires repainting. The Timber truss will be painted with; timber elements in a white colour scheme and steel elements in a black colour scheme. Localised painting for repairs to the steel bottom chords will remain grey.

The proposal is required to:

- Ensure Colemans Bridge remains serviceable and complies with current road safety requirements
- Maintain safety for road users and pedestrians
- Protect the heritage values of the bridge.

The proposal may be undertaken with low environmental impacts, and construction activities would be guided by the safeguards described in this REF.

Roads and Maritime are responsible for managing road related transport infrastructure and providing safe and efficient access for the road network for the people of NSW. The proposal incorporates Roads and Maritime's environment policy (2012), which states that:

Roads and Maritime Services is committed to carrying out its business in an environmentally responsible manner by effectively identifying and managing any risks which may potentially impact the environment. Roads and Maritime Services will take all reasonably practical steps to ensure there is continuous improvement in environmental performance, including ongoing communication and awareness raising, active reporting of environmental incidents and continuous learning from experience.

The overall intended outcome of the proposal is to deliver increases in the service life of the bridge at a minimum whole of life cost. This is consistent with the Bridge Maintenance Strategic Plan and the Government's policy to deliver value for money.

2.2 Existing infrastructure

Colemans Bridge was built in 1908 and has two Dare-type truss spans; each 32 m long and comprising eight four-metre long panels. The bridge has an overall length of almost 91 m and has two timber beam approach spans at the western end and one timber beam approach span at the eastern end. The central twin-cylinder wrought and cast-iron pier, constructed c.1884, was part of the previous bridge that was removed. Colemans Bridge is of State heritage significance and is a rare and representative example of a Dare-type truss bridge. The bridge also exhibits less common features of Dare-type truss bridges, including the abovementioned central iron piers, which combined with having two-lanes, footways, and long spans, represents a level of technical significance according to heritage listing descriptions.

Each side of the bridge has a pedestrian walkway composed with; a bituminous surfacing and timber post and rail pedestrian fencing. The walkways are separated from the vehicle carriageways by timber pedestrian fencing and steel w-beam crash barriers. Some services are set under the pedestrian walkway where they are affixed to it (including a Council water main). The speed limit over the bridge is 50 km/h.

2.3 Proposal objectives and development criteria

2.3.1 Proposal objectives

Strengthening and maintenance works are required on Colemans Bridge to improve safety and increase the service life of the bridge whilst retaining its heritage value.

The objectives of the proposal are to:

- Improve the structural capacity of the bridge through strengthening
- To support bridge longevity and maintain a safe connected road network
- To reduce future maintenance.

2.3.2 Development criteria

The works would be carried out in accordance with:

- Australian Bridge Design Code (Standards Australia, 1996)
- Australian Standard AS5100- 2017 Bridge Design
- Roads and Maritime Services Technical Directions and Specifications
- Roads and Maritime Timber Truss Bridge Conservation Strategy (2012a)
- Roads and Maritime Services Timber Truss Bridge Overarching Conservation Management Plan (2018).

2.3.3 Urban design objectives

RMS is committed to adopting an urban design approach suitable for all Road and Maritime transport infrastructure. Urban design has been integrated into the process of developing and designing the maintenance works on Colemans Bridge with the following objectives:

- Preserve the heritage significant details in the bridge
- Contribute to the accessibility and connectivity of communities
- Contribute to the overall quality of the public domain for the community
- Promote road safety through integrated urban and bridge design.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

Given the above, limited options were available and were mainly based around how the necessary works are completed. Four options were identified and then considered against the following criteria:

A. Ability of the option to satisfy the proposal objectives
B. Cost
C. Constructability
D. Impacts on road users
E. Impacts on the environment
F. Impacts on heritage values
G. Longevity of the bridge
H. Duration of work
I. Safety to workers
J. Resource availability and ability of the work to meet the objectives of ecologically sustainable development
K. Impacts on stakeholders and neighbours.

The preferred method was then chosen so that the performance of Colemans Bridge, in terms of environmental, economic and social impacts, is improved.

2.4.2 Identified options

Option 1: Do nothing

This option involves not undertaking any maintenance work and would lead to further deterioration of the bridge. The 'do nothing' option therefore does not meet the objectives of the brief or Roads and Maritime Timber Truss Bridge Conservation Strategy and the New South Wales Government's Bridges for the Bush program.

Option 2: Proposal with full bridge closure

This option involves maintenance works on the bridge being undertaken as proposed under full bridge closure which would allow the project to be completed in four months.

Option 3: Proposal with some weekend and occasional Monday closures

This option involves maintenance works on the bridge being undertaken as proposed with the bridge closed to traffic on some weekends during the extent of the project. There may also be odd occasions where the bridge will need to be closed on Mondays following the weekend closures. This option would allow the project to be completed in approximately eight months.

Option 3 - Proposal with some weekend and occasional Monday closures - is the recommended option to meet the proposal objectives whilst aiming to minimise impacts of the project on local residents, businesses and motorists by reducing bridge closures during the week.

This option allows heritage values to be retained and is consistent with Roads and Maritime obligations under the Timber Truss Bridge Conservation Strategy.

2.4.3 Analysis of options

An options assessment matrix (refer to Table 2-1) was undertaken to compare each option against the options consideration criteria (listed from A-K in Section 2.4.1). The results are discussed further below.

Table 2-1: Options assessment matrix

Option	Criteria										
	A	B	C	D	E	F	G	H	I	J	K
1	X	✓	✓	X	✓	✓	X	✓	✓	✓	X
	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	X
3	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓

Option 1: Do nothing

This option fails to meet the assessment criteria for the proposal:

- Does not satisfy proposal objectives
- Unacceptable impacts on road users
- Does not increase longevity of the bridge
- Unacceptable impacts on stakeholders and neighbours.

This option contravenes Roads and Maritime's responsibility to maintain road safety and environmental health in accordance with Roads and Maritime policies and guidelines. It would also not address the need for ongoing maintenance on the timber truss bridge.

Option 2: Proposal with full bridge closure

This option fails to meet the following assessment criteria for the proposal:

- Does not minimise impacts on road users when compared to option 3
- Does not minimise the length of time of impacts (ie bridge closure) on stakeholders and neighbours compared to option 3.

Option 3: Proposal with some weekend and occasional Monday closures

This option meets the assessment criteria for the proposal:

- Satisfies proposal objectives
- Minimises project costs
- Minimises the time for impacts on road users
- Acceptable impacts on heritage and environmental values
- Increases longevity of the bridge
- Satisfies constructability requirements
- Ensures a safe road environment
- Minimises the length of time of impacts on stakeholders and neighbours.

2.5 Preferred option

The preferred Option 3 – *Proposal with some weekend and occasional Monday closures* - has been selected to meet the proposal objectives whilst aiming to minimise impacts of the project on local residents, businesses and motorists by reducing bridge closures.

The nature of the proposal is such that environmental mitigation measures are available to reduce any negative impacts to the environmental and local biodiversity.

The proposal would be undertaken in a manner that is safe to workers and does not require any tasks which pose a greater than normal safety risk. Resources required for the proposal are readily available and are not in short supply, nor does their procurement result in significant environmental harm. The impacts on stakeholders and the community are considered minor.

The objectives of the EP&A Act encourage Ecologically Sustainable Development (ESD). The 'integration' principle of ESD requires the integration of economic, social development and environmental considerations into the decision-making process for all developments. These factors are consistent with the preferred options for the proposal.

2.6 Design refinements

The following design refinements have been incorporated into the proposal:

- The Roads and Maritime design team have reviewed options to strengthen the top chord of the dare trusses. The selected option for strengthening the top chord involves upgrading the lateral sway braces from a current composition of a Steel Parallel Flanged C-channel to a steel Universal Column (UC) section.
- The bridge superstructure will be repainted with steel elements in the colour black with timber truss elements repainted white. No blasting of existing paintwork will be required. Paint preparation will be undertaken with vacuum shrouded tools with hand tools used to undertake repainting of the bridge.
- The selected option of upgrading the existing steel thrie beam traffic barrier will be upgraded to a steel two Rectangular Hollow Section (RHS) rail Traffic Barrier System and will be painted in a white colour.

2.7 The Proposal

Roads and Maritime Services (Roads and Maritime) propose to undertake bridge truss strengthening and maintenance on Colemans Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area. The work is required to improve the structural capacity of the bridge in order to keep Colemans Bridge serviceable. Colemans Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore Central Business District (CBD) and South Lismore (as well as allied townships and farmland to the south and west). The bridge is listed on the Roads and Maritime Section170 Heritage Register and Conservation Register. The bridge is also listed on the State Heritage Inventory (SHI): a consequence of its s170 listing.

The proposal will include the following aspects:

- Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage

- Construction activities are required above and below the deck and on the embankment eight metres either side of the bridge. Construction works are not required within the water however access to the underside of the bridge may be required via the water with the use of a barge and elevated work platform. If required access for this work would be undertaken from a public boat ramp near Ballina Street Bridge
- Construction activities above the deck include:
  - Re-stressing of the stress laminated timber (SLT) deck
  - Strengthening of the top chord of the dare trusses with new truss lateral sway brace
  - Repair of the existing traffic barrier
  - Replacement of the bridge wearing course
  - Minor footway repairs
  - Repainting of the bridge truss with hand tools to restore the appropriate heritage bridge colour scheme (steel elements black, timber elements white).
  - Minor localised painting of the bridge in appropriate bridge heritage colours
- Construction activities below the deck include:
  - Localised steel bottom chord corrosion repairs and repaint
  - Timber trestle pier repairs
- Minor vegetation clearing within eight metres of the bridge will be required to facilitate works around timber trestle piers
- Minor earthworks will be required to provide access to timber trestle piers and below deck work areas
- Elevated (hung) scaffolding will be required to conduct work for the SLT deck re-stressing and localised repairs to the steel bottom chord and girders.

Construction is expected to commence in late 2019 and will take approximately eight months to complete. In order to minimise the period of disruption to the public and complete the works in the most efficient manner, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures. During closures alternate detours would be available in the order of between 2.8 km and 3.7 km, depending on the route taken, origin and destination. During the project pedestrian access on one side of the bridge would be maintained.

Plate 2-1 - Colemans Bridge viewed from the eastern abutment (southern side of bridge)

Plate 2-2 - View of bridge from eastern abutment (southern walkway)

Plate 2-3 - View of southern walkway

Plate 2-4 -Timber trestle piers on the western river bank

2.8 Design

2.8.1 Design criteria

The works would consist of above deck and below deck maintenance and strengthening works to ensure the bridge is capable of meeting modern safety standards and load capacity requirements. The works would be carried out in accordance with:

- Australian Bridge Design Code (Standards Australia, 1996)
- Australian Standard AS5100-2017 Bridge Design
- Roads and Maritime Services Technical Directions and Specifications
- Roads and Maritime Timber Truss Bridge Conservation Strategy (2012a)
- Roads and Maritime Timber Truss Bridge Overarching Conservation Management Plan (2018).

2.8.2 Engineering constraints

The main engineering constraints related to the proposal are:

- Balancing modern safety and structural requirements whilst retaining the heritage significance of the bridge
- Working over Leycester Creek
- Flooding associated with Leycester and Wilsons Creeks
- Minimising disruptions to local businesses, residents and motorists.

2.8.3 Major design features

The preferred option has been designed as an outcome that meets the proposal safety objectives whilst balancing the requirement of retaining the heritage significance of the bridge.

Major design features associated with the upgrade are discussed below.

New Crash Barrier

Replacement of the existing thrie beam crash barrier between abutments (spans 1 to 5) would be undertaken with a new steel traffic barrier comprising horizontal railing (150 x 100 x 8 mm RHS; hot-dipped galvanised steel) attached to new barrier posts (100 x 100 x 6 SHS). The new barrier will sit slightly proud of the trusses, as does the existing thrie beam barrier, and will better protect the trusses from direct or side-swipe impacts. The barrier posts will be affixed with plates to the bridge substructure in the locations of the existing barrier posts. The new traffic barrier will have a new colour scheme of (white).

Strengthening of Truss Top Chord

Strengthening of the truss top chord would be undertaken with the instalment of a new lateral sway brace fabricated from steel. The new sections will represent the same curvature style as the exiting lateral sway brace, however it will be fabricated into a steel Universal Column (UC) section instead of the existing Parallel Flanged Channel (PFC) section. This upgrading of the lateral sway brace will improve the stability and rigidity of the timber truss top chord. The new lateral sway brace system will have a colour scheme of (black).

2.9 Construction activities

2.9.1 Work methodology

The proposal would involve the following indicative methodology:

The final methodology would be determined in detailed design, including the sequence of construction steps.

Site Establishment

- Establish the site compound (refer to Section 3.4)
- Trim vegetation within eight meters of the bridge to provide access to below deck work areas
- Undertake minor earthworks where necessary to provide access the below deck work areas
- Install elevated (hung) scaffolding beneath the bridge.

Construction (above deck)

- Re-stress the stress laminated timber (SLT) deck
- Strengthen the top chord of the dare trusses
- Replace existing traffic barrier
- Repair the bridge wearing course
- Undertake minor footway repairs
- Undertake paint preparation of the bridge using hand tools and vacuum shrouded tools. No blasting would be required
- Undertake repainting of the bridge using hand tools. Steel elements would be painted black and timber elements painted white.

Construction (below deck)

- Undertake localised bottom chord corrosion repairs
- Undertake minor localised painting of the bridge
- Undertake timber trestle pier repairs.

Site Disestablishment

- Remove scaffolding
- Remove site compound
- Site remediation to remove waste, compounds and conduct rehabilitation of areas impacted.

All painting work would be undertaken according to Roads and Maritime *Specifications B223 (Management of Lead Chromium and Asbestos in Bridge Maintenance Painting), B220 (Protective treatment of Bridge Steel Work) and AS4361.1: Guide to lead paint management, Part 1: Industrial Application*.

2.9.2 Construction hours and duration

Construction is expected to begin in late 2019 and will take approximately eight months to complete.

Working hours will be varied throughout the project to minimise the impacts to traffic, local residents and businesses within the surrounding area. Work would generally be undertaken during the hours detailed below:

Monday – Friday (bridge open to traffic)	6:00 am to 6:00 pm
Saturday, Sunday and Monday[Notes 1 & 2] (bridge closed to traffic):	6:00 am to 6:00 pm. Noisy work would be planned from 7.00 am to 5.00 pm

Note 1: Bridge remains closed to traffic from start of closure to finish of closure ie closed overnight.
Note 2: Occasional bridge closures on Monday where necessary.

The bridge would be closed to traffic on up to 20 weekends during the extent of the project. There may also be odd occasions where the bridge will need to be closed on Mondays following the weekend closures. One of the footways would be kept open for pedestrian access throughout the project.

2.9.3 Plant and equipment

The main equipment and plant required for the proposal would include:

- Franna crane
- Excavator
- Delivery trucks (eg for equipment and materials)
- Compressors

- Generators
- Power tools including chainsaws, drills and pneumatic air tools
- Hand tools (including vacuum shrouded tools for painting)
- Hanging scaffolding
- Elevated Work Platforms
- Pavement machinery
- Site sheds and containers (including fuel storage).

Key materials associated with the work includes:

- Timber
- Steel
- Paint/ solvents
- Fuel
- Asphalt.

2.9.4 Earthworks

Earthworks would be limited to:

- Providing access to below deck work areas on the river bank (eg timber trestle piers)
- Preparation of the site compound area.

2.9.5 Source and quantity of materials

The work is for the purpose of maintenance therefore little material would be required. Painting materials would be sourced by the contractor undertaking the works from reputable paint and paint equipment manufacturers. Gravel for the site compound/ stockpile area would be sourced locally from licensed bulk landscape suppliers or quarries where possible. Replacement steel elements including the lateral sway brace and traffic barriers will be supplied by a contracted steel fabricator.

2.9.6 Traffic management and access

Construction is expected to commence in late 2019 and will take approximately eight months to complete. In order to minimise the period of disruption to the public and complete the works in the most efficient manner, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures. During closures alternate detours (refer to Figure 2-1) would be available in the order of up to 2.8 km and 3.7 km (approximate travel time by car of between five and seven minutes– without heavy traffic), depending on the route taken, origin and destination. All modes of vehicle-based transport would be affected and diverted during the bridge closure. During the project pedestrian access on one side of the bridge would be maintained.

The channel of Leycester Creek beneath the bridge would not be closed to maritime traffic as a result of the project.

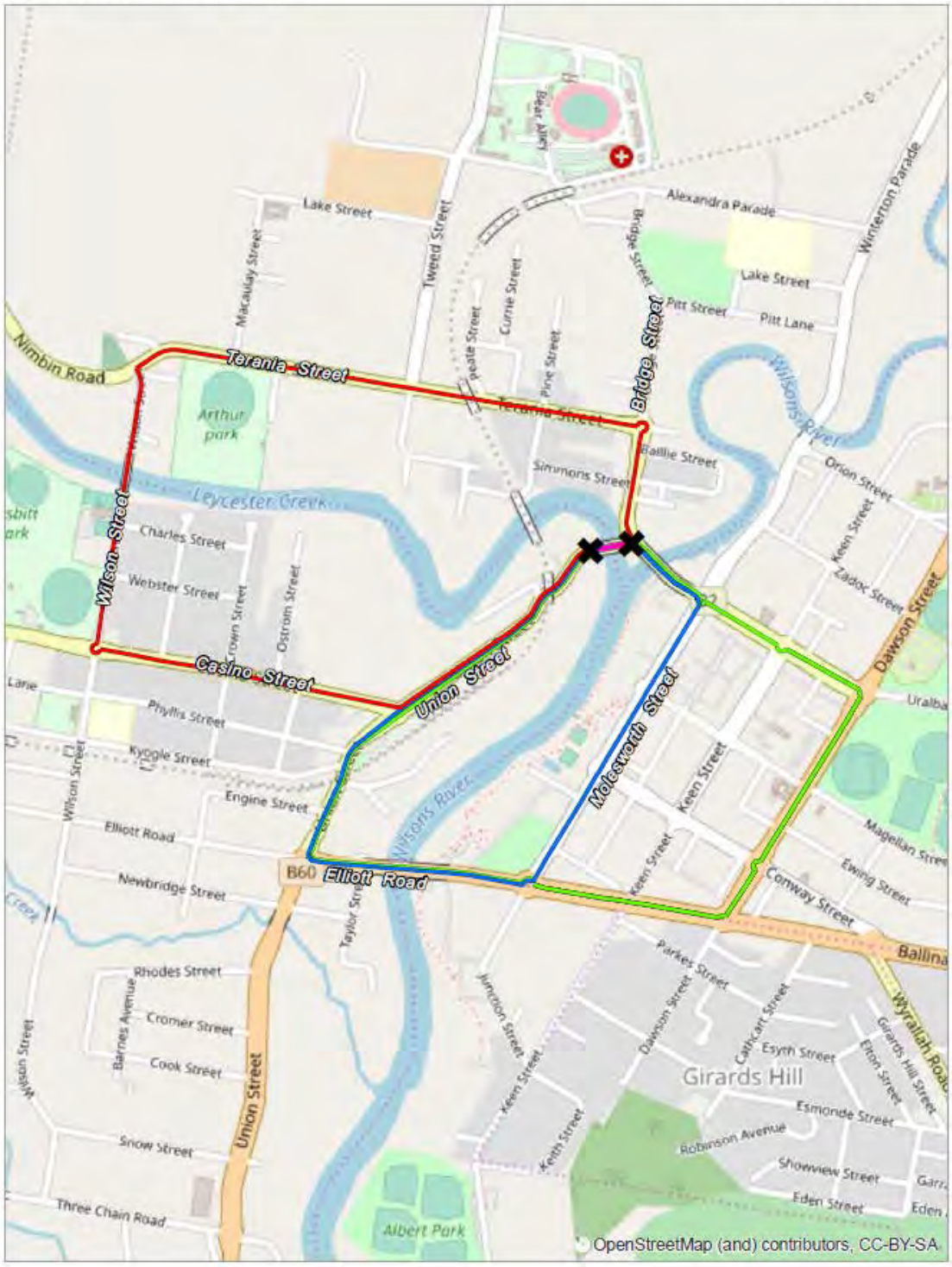
Potential traffic management impacts include:

- Occasional bridge closure and detours for an eight month period
- Disruptions to pedestrian access for the duration of the works, although one lane of pedestrian access would be maintained at all times
- Increased construction traffic locally
- Height restrictions for maritime vessels due to hanging scaffold.

Traffic will be managed according to the Roads and Maritime's *Traffic Control at Work Sites Manual Version 5* (RMS 2018). A site-specific Traffic Management Plan (TMP) will be prepared detailing the specifics of the site and any hazards and constraints. Work would not begin until the plan is approved and strategies to manage traffic within and around the work site are in place.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: DGH Date: 22/03/2019
Source of base data: OpenStreetMap



LEGEND

- Colemans Bridge
- Route option 1: 2.8 km, 6 minutes - approx. travel time by car (without heavy traffic)
- Route option 2: 3.7 km, 5 minutes - approx. travel time by car (without heavy traffic)
- Route option 3: 3.6 km, 7 minutes - approx. travel time by car (without heavy traffic)
- ✖ Road closure

0 300

Traffic Detour Routes

GeoLINK

Colemans Bridge Strengthening and Maintenance
Review of Environmental Factors
3276-1014

Figure 2-1

2.10 Ancillary facilities

A site compound/ stockpile/ hardstand area would be located on an area extending from the western bank of Wilson's River adjacent to the Winsome Hotel (refer to Plate 2-6) to the west of Fawcetts Bridge (refer to Plate 2-6). The area to be used for the site compound is mostly an existing area of Crown Land, forming public open space known as Pritchard Park but also included a parcel of private land directly behind the Winsome Hotel building. Use of this land is being negotiated between RMS and the owner. The location of the site compound is shown on Figure 1-2 and would also be used for works to be undertaken concurrently on Fawcetts Bridge.

The compound site would be constructed as a hardstand area of gravel or rock and used for site offices, toilets, car parking, storage of materials, plant and construction and fabrication of bridge components. This area has been used for a site compound during previous maintenance work undertaken by Roads and Maritime. No native vegetation clearing would be required to establish/ operate this ancillary facility.

Plate 2-5 - Compound site to the west of Fawcetts Bridge (from beneath Fawcetts Bridge)

Plate 2-6 - Compound Site to the east of Fawcetts Bridge within Pritchard Park

Possible stockpiling at the sites may be undertaken of the following materials:

- Vegetation/ mulch (small amounts)
- Excavated material (small amounts)
- New bridge materials.

Stockpiles would be managed in accordance with Roads and Maritime's *Stockpile Site Management Guideline(EMS-TG-10) and the QA Specification R44 – Earthwork.* Ancillary sites would be required for about eight months from late 2019.

As the compound site is located on the flood liable land, the site would be vacated when floods are forecast and a flood contingency plan detailing how materials would be removed in the event of a flood would be included in the Construction Environmental Management Plan (CEMP).

2.11 Public utility adjustment

There is an attached sewer main (exterior of the upstream walkway) and an attached water main (exterior of the downstream walkway).A powerline is also located on the downstream side of the bridge which also traverses part of the compound site at Pritchard Park including power poles stay braces.

No public utility adjustments are proposed.

2.12 Property acquisition

No property acquisition is required for the proposal.

3. Statutory and planning framework

3.1 Environmental Planning and Assessment Act 1979

3.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. 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 and road infrastructure facilities and is to be carried out on behalf of Roads and Maritime, it can be assessed under Division 5.1 of the EP&A Act. Development consent from Council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by State Environmental Planning Policy (State and Regional Development) 2011, State Environmental Planning Policy (State Significant Precincts) 2005 or Coastal Wetlands or Littoral Rainforest mapped under State Environmental Planning Policy (Coastal Management) 2018.

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 4 of this REF.

State Environmental Planning Policy 44 – Koala Habitat Protection

SEPP 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for Koalas, to ensure permanent free-living populations would be maintained over their present range. Clause 6 of SEPP 44 states that the SEPP applies only to land 'in relation to which a development application has been made'. Clause 94 of ISEPP precludes the proposal from requiring consent therefore Part 2 of SEPP 44 does not apply to the proposal. It is Roads and Maritime policy, however, to consider environmental issues relating to their work to the fullest extent possible, including impacts on Koalas. The proposal does not require removal of Koala feed trees therefore no impacts to Koalas or Koala habitat is expected to occur as a result of the proposal.

State Environmental Planning Policy (Primary Production and Rural Development) 2019

State Environmental Planning Policy (Primary Production and Rural Development) 2019 aims to facilitate the orderly and economic use and development of rural lands for rural and primary production purposes. Part of the objectives relates to the maintenance of the social, economic and environmental welfare of the state and the reduction of land use conflicts and support for primary production.

The proposal would not impose any significant impacts to local agricultural land or primary production.

3.1.2 Local Environmental Plans

Lismore Local Environmental Plan 2012

The proposal is located on land governed by the Lismore Local Environmental Plan (LEP) 2012, where the following zones apply:

- RE1 Public Recreation (site compound/ stockpile site)
- IN1 General Industrial
- The bridge crosses Leycester Creek which is zoned W2 Recreational Waterways.

The proposal is not inconsistent with nor would it hinder the objectives of these zones.

The proposal is precluded from requiring development consent under Clause 94 of the ISEPP.

In addition, the Lismore LEP 2012 includes a mapping layer which indicated vegetation occurring adjacent to the site compound, associated with the Wilsons Creek riparian zone contains vegetation buffer for bushfire prone land. This vegetation would not be impacted by the proposal.

The Lismore LEP 2012 includes a mapping layer which indicates the site is a flood planning area. The potential impacts and safeguards for flooding are discussed further in Section 5.2 of this REF.

3.2 Other relevant NSW legislation

Table 3-1 lists other NSW legislation relevant to the assessment of the proposal and provides comment on implications for the proposal.

Table 3-1: Other relevant NSW legislation

Legislation	Section(s)	Comment
Crown Land Management Act 2016		Leycester Creek and Lot 195 DP755729 are Crown Land. RMS' use and occupation of Crown land within the project footprint can proceed with notification to the department under s175 *Roads Act 1993*. Notification should include environmental approvals/ the determined REF, prior to commencement of works.
Fisheries Management Act 1994	Sections 199	Construction works within a waterway are not required and as such, written notification to the Minister (Department of Primary Industries - DPI) is not required. Access to the underside of the bridge may be required via Leycester Creek with the use of a barge and elevated work platform. If required, access for this work would be undertaken from a public boat ramp near Ballina Street Bridge. Access to Colemans Bridge via Leycester Creek may be required.
Fisheries Management Act 1994	Sections 219-220	A permit is required when barriers to the movement of fish including water course crossings are to be constructed or modified. The proposal does not involve creating a barrier to fish movement.
Fisheries Management Act 1994	Sections 204-205	It is not expected that any mangroves, seagrass or other marine vegetation would be damaged as a result of the proposal therefore a Permit to Harm is not required from DPI prior to commencement.

Legislation	Section(s)	Comment
Fisheries Management Act 1994	Schedules 4, 4A, 5 and 6	The proposal is considered unlikely to have a significant impact on any threatened aquatic species or communities listed under Schedules 4, 4A, 5 and 6 of the FM Act.
Heritage Act 1977		Colemans Bridge is listed *as heritage item of State significance in the RMS s170 Register and on the State Heritage Register.* A Statement of Heritage Impact (SOHI) has been prepared for the proposal including recommended safeguards to avoid any adverse heritage impacts. The Heritage Consultant has recommended that the works may be undertaken in accordance with an exemption under sS.57 (2) of the NSW Heritage Act. Works are being undertaken in accordance with the Timber Truss Bridge Overarching Conservation Management Plan as discussed with OEH. All relics are afforded automatic statutory protection by the relic's provisions of the Act. Sections 139 to 145 within Division 9 of The Act prevent the excavation or disturbance of land for the purpose of discovering, exposing or moving a relic, except by a qualified archaeologist to whom an excavation permit from the Heritage Council of NSW has been issued. Section 146 of The Act requires that the inadvertent discovery of relics be reported to the Heritage Council in a timely and appropriate manner.
National Parks and Wildlife Act 1974	Sections 87(1), 90	The provisions of the Act are unlikely to be triggered by the proposal. Indigenous heritage investigations found that the proposal is unlikely to have an impact on Indigenous heritage. Work would cease if an artefact or place of significance is disturbed or encountered during the proposal and the appropriate Local Aboriginal Land Council (LALC) and OEH Cultural Heritage Division notified immediately.
Biosecurity Act 2015		In NSW, the administration of weed control is the responsibility of the Minister for Primary Industries under the *Biosecurity Act 2015.* The Act is implemented and enforced by the Local Control Authority for the area, usually local government or NSW Agencies. Roads and Maritime are therefore required to control declared weeds on land under their control. A search of the WeedWise database (22/03/2019) within the Lismore LGA control area identified 135 priority weed species. Three of these were observed on-site (Cockspur Coral Tree, Moonflower, Lantana). The mitigation measures in place as part of this REF are consistent with the aims and objectives of the Biosecurity Act. The proposal being within the Lismore CBD occurs within a designated yellow crazy ant infestation area. Yellow crazy ants, although not a direct threat to humans, are serious and classified as a prohibited matter event under the *Biosecurity Act 2015* as they are a serious environmental pest which pose a risk to our economy, environment and communities. As yellow crazy ants are often spread by movement of plants and soil, movement restrictions of such material are in place within a five kilometre radius of the Lismore CBD currently until June 2019 unless such material is directed the Lismore Recycling and Recovery Centre. Relevant control measures extending beyond this period will be captured within the proposal Construction Environment Management Plan (CEMP).
Protection of		No Protection of the Environment Policies (PEPs) are relevant to the

Legislation	Section(s)	Comment
the Environment Operations Act 1997		proposal. No licenses would be required pursuant to the *Protection of the Environment Operations Act 1997*. The Roads and Maritime and/or contractors working on behalf of the Roads and Maritime are required to notify OEH when a 'pollution incident' occurs that is likely to impact upon the environment.
Protection of the Environment Operations Act 1997	Section 115	It is an offence to negligently dispose of waste in a manner that harms the environment. Waste would be managed in accordance with the *Waste Avoidance and Resource Recovery Act 2001*. The proposal would aim to reduce the environmental impact of dumping waste and include mechanisms to recover resources and reduce the production of waste where possible.
Protection of the Environment Operations Act 1997	Section 120	It is an offence to pollute any waters of the State. The REF includes safeguard and mitigations measures to ensure that the proposal does not result in pollution of waters.
Protection of the Environment Operations Act 1997	Section 143	A signed s.143 Notice must be submitted prior to transporting waste generated by or for Roads and Maritime to a place that is not owned by Roads and Maritime and is not a licensed landfill or resource recovery facility. The proposal does not require disposal of waste to a place that is not owned by Roads and Maritime or is not a licensed landfill or resource recovery facility.
Biodiversity Conservation Act 2016	Section 7.8	For Part 5 activities, the Biodiversity Offset Scheme (BOS) thresholds of the BC Act do not apply. Proponents must instead apply the test of significance (as required). If this results in a decision that the activity will significantly affect threatened species then: • a Species Impact Statement is required (with concurrence from OEH); or • the proponent may instead 'opt in' to the BOS. Section 7.3 of the BC Act requires a test of significance ('five-part test') for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.
	Schedules 1, 1A, 2 and 3	Schedules of threatened species and communities were reviewed and are unlikely to be significantly impacted upon by the proposal (refer to Section 5.1). An Assessment of Significance (Five-part test) was completed (refer to Appendix F) for relevant species. The proposal would incrementally contribute to the Key Threatening Process (KTP) of Anthropogenic Climate Change, through the generation of carbon dioxide during operation of machinery and vehicles and associated fuel consumption. Additionally, the proposal has potential to contribute to the KTP of 'invasion of the yellow crazy ant'. Safeguards within the REF are required to avoid contributing to this KTP.
Water	Section 91 (2)	Work within water lands or those comprising of extraction or management

Legislation	Section(s)	Comment
Management Act 2000		of water may be subject to approval if they constitute a 'controlled activity'. Roads and Maritime is, however, exempt from the need to obtain a Controlled Activity Approval. The proposal is located within water lands and does not involve the extraction or management of water. Should Roads and Maritime decide to extract water from Leycester Creek or Wilsons River, a permit under s56 of the Act would be required.
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017	Part 2 Authority to clear vegetation in non-rural areas	This SEPP applies (as applicable) to clearing vegetation in non-rural areas/zones of the State, including environmental zones, not associated with a Development Application. Clause 8 outlines clearing that does not require authority under this Policy, including: *(1) An authority to clear vegetation is not required under this Policy if it is clearing of a kind that is authorised under section 60O of the Local Land Services Act 2013 (Clearing authorised under other legislation) or under Part 5B (Private native forestry) of that Act. This subclause does not apply to clearing merely because it is a part of or ancillary to the carrying out of exempt development.* On this basis and according to Clause 60O of the LLS Act (refer below), and given the Proposal is a Part 5 Activity, any vegetation clearing is authorised by way of compliance with that part of the EP&A Act and authority under the Vegetation SEPP is not required.
Local Land Services Act 2013	Part 5A Land Management (native vegetation)	Provisions of the Act apply to clearing native vegetation in rural parts of the State and also contains provisions with regard to clearing that is authorised under other legislation. Pursuant to Section 60O (*Clearing authorised under other legislation*) the following is applicable*:* *(b) Other planning authorisation - The clearing was:* *(ii) an activity carried out by a determining authority within the meaning of Part 5 of that Act after compliance with that Part, or* *(iii) authorised by an approval of a determining authority within the meaning of Part 5 of that Act granted after compliance with that Part.* As the Proposal is a Part 5 Activity, vegetation clearing is authorised by way of compliance with that part of the EP&A Act.

3.3 Commonwealth legislation

3.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed actions that have potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and Chapter 5 of the 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.

Potential impacts to these biodiversity matters are also considered as part of Chapter 5 of the REF and Appendix A.

Findings – matters of national environmental significance (MNES)

Assessment of potential impacts of the proposal on MNES and the environment of Commonwealth land determined there is unlikely to be a significant impact on MNES or Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment and Energy under the EPBC Act.

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

Assessment of the proposal determined there is unlikely to be a significant impact on relevant matters of national environmental significance with regard to biodiversity (threatened species, endangered ecological communities and migratory species). Chapter 6 of the REF describes the safeguards and management measures to be applied to minimise any potential biodiversity impacts.

3.3.2 Native Title Act 1993

Review of the National Native Title Tribunal (NNTT) Online Register (February 2019) indicates that the broader area is subject to an active and registered Native Title Claim NC2013/2018 - Widjabul Wia-bal People. The claim area is described as being located on the Far North Coast of NSW inland from the coast and commencing on the southern boundary of Border Ranges National Park, south to the western boundary of Tuckean Broadwater, east of the towns of Kyogle and Casino. Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an act is to take place. Roads and Maritime is therefore required to issue notification to representatives of the Native Title holders for their consideration and comment prior to undertaking the works. Roads and Maritime have met on-site with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works. In relation to clause 24KA of the Native Title Act 1993, the notification process will be followed, and a letter sent for use of the site compound for consideration and comment a minimum of 28 days prior to undertaking the works.

3.4 Confirmation of statutory position

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

Roads and Maritime is the determining authority for the proposal. This REF fulfils Roads and Maritime’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.

4. Consultation

4.1 Consultation strategy

A communications officer has been appointed to the proposal. A project-specific consultation strategy will be developed and implemented in accordance with the Roads and Maritime Community Involvement - Practice Notes and Resource Manual and Roads and Maritime Minor Project procedure, Communications for minor projects (ILC-MP-TP0-301).

The key aim of the consultation strategy will be:

- To inform the local community and other key stakeholders about the proposal in an effective and timely manner
- To keep the local community and other key stakeholders regularly updated with relevant information
- To encourage participation from the community and other stakeholders, and enable effective feedback on the proposal
- To increase stakeholder understanding of the project and its objectives.

4.2 Community involvement

Roads and Maritime has undertaken initial consultation with local business near Colemans Bridge to inform them of the proposal and gauge their operations with regard to potential bridge closures. Businesses included:

- Youngberry Smash Repairs
- The Op Shop and Serpentine Gallery
- PJ Fletcher Automotive
- Pool fencing business
- Ron Winkler Smash Repairs
- J.A Leu Heavy Vehicle Repairs
- Local Church
- Cottam Auto Repairs
- Pirlos Tyre Centre
- Lismore appliances
- South Lismore Post Office.

As part of early consultation for the proposal Roads and Maritime representatives met with 13 businesses on 2 May 2019, located south of Colemans Bridge in Union Street. The purpose of these meetings was to discuss the initial proposal to close the bridge for up to four months during construction. Six of the business owners objected to the full closure proposal, citing impacts to their business through loss of passing traffic as their key concern. In response to this consultation the proposal has been modified to minimise bridge closures to only some weekends and occasional Mondays following weekend closures.

The following bus service providers were consulted by Roads and Maritime to determine their usage of Colemans Bridge and any potential associated impact due to the proposed works and temporary bridge closure:

- Waller's Bus Company
- Sodhi Bus Service
- Simes Bros Coaches
- Northern Rivers Buslines.

All consulted bus companies advised they do not use Colemans Bridge and would not be impacted by the closure. It is noted that a number of other smaller bus service providers also provide school transportation in the Lismore area, however this is understood to be generally in outer/ rural areas.

4.3 Aboriginal community involvement

The Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI – Stage 1) was undertaken in April 2019 by Roads and Maritime's Aboriginal Cultural and Heritage Officer who advised that the proposal was unlikely to have an impact on Aboriginal cultural heritage (refer to Appendix B).

Review of the National Native Title Tribunal (NNTT) Online Register (February 2019) indicates that the broader area is subject to an active and registered Native Title Claim NC2013/2018 - Widjabul Wia-bal People. The claim area is described as being located on the Far North Coast of NSW inland from the coast and commencing on the southern boundary of Border Ranges National Park, south to the western boundary of Tuckean Broadwater, east of the towns of Kyogle and Casino. Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an act is to take place. Roads and Maritime is therefore required to issue notification to representatives of the Native Title holders for their consideration and comment prior to undertaking the works. Roads and Maritime have met on-site with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works. In relation to clause 24KA of the Native Title Act 1993, the notification process will be followed, and a letter sent for use of the site compound for consideration and comment a minimum of 28 days prior to undertaking the works.

4.4 ISEPP consultation

A statutory consultation checklist is included in Appendix C. As per the requirements of the State Environmental Planning Policy (Infrastructure) 2007, consultation with the following organisations has occurred.

Lismore City Council (LCC) have been consulted as per the requirements of clause 13 and 15 of the ISEPP due to the potential impacts on *'Council related infrastructure or services'* and '*development with impacts on flood liable land'.* Roads and Maritime has also previously met with Lismore City Council (on 7 March 2019) to discuss the proposal and potential implications of the bridge closure temporarily.

Roads and Maritime - Maritime Division have been consulted as per the requirements of clause 16 of the ISEPP due to the possible use of a *fixed or floating structure in or over navigable waters*.

Key findings of the consultation informed the proposal, the potential impacts and required impact avoidance or mitigation measures. A summary of the results of ISEPP consultation is included in Table 4-1 with records of ISEPP consultation included in Appendix J

Table 4-1: Issues raised through ISEPP consultation

Agency	Issue raised	Response/where addressed in REF
LCC	Colemans Bridge is listed as a heritage item under the Lismore LEP 2012. In this regard, Council recommends that a suitably qualified heritage consultant be engaged to consider the effect of the proposed works upon the heritage significance of the bridge.	Addressed in Section 5.7
	As the proposed works includes vegetation removal within eight metres of the bridge, Council requests that a suitably qualified ecological consultant be engaged to address the flora and fauna impacts of the proposed	Addressed in Section 5.1

Agency	Issue raised	Response/where addressed in REF
	works. In relation to the likely ecological impacts of the proposed works, Council provides the following general comments: the river banks on the southern sides of the Coleman bridge (east and west ends) have received bush regeneration in the past. In this regard, Council requests the proposed works minimise disturbance to native vegetation in these areas where possible; and the underside of bridges are commonly used as temporary and maternity roost for various species of micro bats. In this regard, please consider micro bat exclusion, provision of temporary habitat boxes and daily pre-construction checks –training provided as to what to do if microbat is found roosting on-site.	
	The site of the bridge is highly flood prone and is mapped as 'floodway' under the Lismore Floodplain Risk Management Plan. In this regard, Council requires that the proposed works do not adversely impact upon flood behaviour (ie do not additionally impede the flow of flood waters). In addition, it is requested that the siting and design of the site compound have adequate regard to flooding impacts.	Addressed in Section 5.2
	It is recommended that the REF consider the potential impacts on any Aboriginal places of significance or Aboriginal objects.	Addressed in Section 5.6
	Colemans Bridge is located within the Wilsons River Drinking Water Catchment. In this regard, any works disturbing the existing ground are to be managed by appropriate soil and water arrangements/ controls.	Addressed in Section 5.2 and 5.3
	The proposed works are not to compromise the geotechnical stability of the banks of the Wilsons River.	Incorporated into scope of works.
	The REF is to include a Construction Management Plan that appropriately addresses matters such as: traffic control, the timing of work, different work stages and the location of work areas.	To be completed after REF is completed.
	The REF is to ensure that all work areas are appropriately rehabilitated.	Addressed in Section 5.8
	It is requested that the works be preferably scheduled around Council's major events. In this regard, attached is a list of Council's events with the ones highlighted yellow having the biggest impact if Colemans Bridge was closed.	Incorporated into timing of project.
	Council has previously and continues to request the RMS investigate installing lights (both pedestrian and vehicle) on Colemans Bridge.	RMS are currently evaluating lighting requirements. If determined to be feasible and required, lighting on Colemans Bridge may be installed at a later date.

Agency	Issue raised	Response/where addressed in REF
RMS (Maritime)	Leycester Creek and the Wilson River in the vicinity of Colemans Bridge is predominantly used by small powered recreational vessels and passive craft. RMS Maritime require a number of conditions to be met during the construction period of the upgrade works on Colemans Bridge. These are included in Section 5.4 of the REF.	Addressed in Section 5.4 (Traffic)
SES	Given the presence of the project on flood liable land, notification of the proposal is required to be given to the State Emergency Services (SES) email: erm@ses.nsw.gov.au. Any response to the notice that is received from the State Emergency Service within 21 days after the notice is given is to be taken into consideration.	Flooding is addressed in Section 5.2

4.5 Government agency and stakeholder involvement

No government agency or stakeholder consultation beyond the statutory consultation detailed above is required.

4.6 Ongoing or future consultation

As indicated above, ongoing community consultation is proposed regarding the scope of work and proposed bridge closures/ road detours. All submissions received from the exhibition of the proposal will be formally considered and responses provided within a submissions report, which will also be made available to the public.

Bridge closures and traffic disruptions during the proposed work will be advised through advertising using the Roads and Maritime Traffic Alert system, as well as other means identified via the Consultation Strategy developed for the proposal.

Ongoing stakeholder and community consultation would be undertaken in accordance with the *Roads & Maritime Communication Toolkit* during the development and implementation of the project. Consultation would include:

- Lismore City Council
- Residents and businesses surrounding Colemans Bridge, particularly along Union Street
- Emergency services
- Local social and community support organisations
- Affected bus operators
- Local schools.

Roads and Maritime would undertake a media announcement/ release, letterbox drops (notice to the local community and affected parties), place portable and variable message signs in key areas, and post information on the Roads and Maritime website and Facebook page, including updates as works progress. Council's website would also likely be utilised to keep the community informed of the works.

5. Environmental assessment

5.1 Non-Aboriginal heritage

5.1.1 Methodology

A Statement of Heritage Impact (SoHI) has been prepared for the proposal (Tuck 2019; refer to Appendix H). A summary of this assessment is included in the sections below.

Searches were made on 20 March 2019 of relevant Commonwealth, State and local heritage registers on which historical heritage places are entered. Results are as follows:

- Colemans Bridge is listed on the State Heritage Register (Listing Nos. 1463) as a heritage item of State significance and in the Roads and Maritime s170 Heritage and Conservation Register.
- Lismore LEP 2012: Colemans Bridge is listed as a heritage item (Listing No A9). No other heritage items are mapped as occurring in proximity to the site
- Commonwealth Heritage List: no results were returned within the Lismore LGA
- National Trust heritage list: no results were returned within the Lismore municipality.

5.1.2 Existing environment

Colemans Bridge

Colemans Bridge is an elevated, five-span, cross-river bridge with two Dare-type truss spans: each 32 m long and comprising eight, four metre long panels (at spans three and four). The Dare Truss Bridge was the fifth, and last, timber truss road bridge design. Largely attributed to PWD highway bridge designer Harvey Dare, it was a composite truss-type that drew on the American Howe Truss arrangement of the earlier Allan Truss design but substituted a pair of steel channels for the timber bottom chord. The bridge has an overall length of almost 91 m and has two timber beam approach spans at the western end and a single timber beam approach span at the eastern end. The bridge has a twin-cylinder, iron central pier (in-river) with timber trestles accounting for the remaining sub-structure (set on the creek banks).

The bridge was constructed by local bridge builder William Oakes and his team (who also rebuilt Fawcett Bridge). The construction process made use of a temporary bridge that allowed new sections to be erected as old portions were demolished. Though largely a completely new construction, the replacement bridge retained the pre-existing cast iron columns at pier three. Features of the bridge included the Dare-style timber trusses as well as independent footways. The new bridge was completed in 1908 and subsequently named Colemans Bridge: a dip of the hat to the late Member for Rous, Mr John William Coleman M. L. A. Coleman was a local figurehead and notary and the prominence of land on which the bridge was built also bears his appellation.

Since 1908, the bridge has been heavily trafficked and subject to the impacts of flooding, termites, dry rot, wear and tear, fire damage and arson (including a deck fire caused by the dropping of lighted cigarettes in 1936) and vehicle accidents. Consequently, it has been subject to near-continual maintenance and periodic renewal and repair, which has included re-decking of the bridge in the 1920s, 1930s and 1940s, as well as major reconstruction in the 1950s. An extensive rehabilitation program was undertaken in 2000-2001, with emergency truss strengthening works in 2005, and abutment reconstruction in the more recent past.

The significance of the bridge was initially assessed as part of the *Study of the Heritage Significance of All Timber Truss Bridges in NSW* undertaken by McMillan Britton & Kell Pty Ltd (MBK 1998) which is reproduced in the SoHI as follows:

Colemans bridge was completed in 1908 and is an early example of Dare timber truss bridges. In 1998 it was in good condition.

As a timber truss road bridge, it has many associational links with important historical events, trends, and people, including the expansion of the road network and economic activity throughout NSW, and Harvey Dare, the designer of this type of truss. Dare trusses were fifth in the five-stage design evolution of NSW timber truss road bridges. They were similar to Allan trusses, but contain improvements which make them stronger and easier to maintain. This engineering enhancement represents a significant evolution of the design of timber truss bridges, and gives Dare trusses some technical significance. Colemans bridge has particular technical significance, having iron piers, the only two-lane Dare truss, footways, and long spans. In 1998 there were 27 surviving Dare trusses in NSW of the 40 built, and 82 timber truss road bridges survive from the over 400 built. The Colemans bridge is a representative example of Dare timber truss road bridges, and is assessed as being Nationally significant, primarily on the basis of its technical and historical significance.

Colemans Bridge is listed on the State Heritage Register (Listing Nos. 1463) as a heritage item of State significance and in the Roads and Maritime s170 Heritage and Conservation Register.

Colemans Bridge has been identified as one of six Dare Truss bridges to be retained in the Roads and Maritime's *Timber Truss Bridge Conservation Strategy*.

5.1.3 Potential impacts

Aspects of the Proposal that respect or enhance the heritage significance of Colemans Bridge

The restoration proposal will see Colemans Bridge retained and is consistent with the Timber Truss Bridge Overarching CMP (2018) in the following ways:

- The bridge will be retained (policies 1 and 4)
- Use of the bridge as an operational vehicular thoroughfare (once works are completed) will continue (policy 6)
- Works to strengthen and improve the bridge will incorporate new work that will be sympathetic to the overall design and form of the bridge, while making use of contemporary design and modern materials of high strength and durability (policy 8). For instance, repair of the snaking of the top chord bracing (including bowing and lateral movement) will see original truss fabric strengthened and supported by alternate but appropriate materials
- The bridge setting will be returned to a pre-works state (or better) at completion (policy 10).

While the bridge will be modified, both its form (including its distinctive Dare trusses), functionality, and the nature of its semi-suburban setting, will endure and be enhanced.

Furthermore, the use of modern materials to protect and strengthen the bridge trusses, such as steel traffic barriers and sway braces has an historic precedent in the remediation of other significant RMS-controlled bridges. Namely, the highly significant cross-border, Barham-Koondrook Bridge, which features de Burgh timber trusses and a steel lifting span. The use of such fabrics will ensure that the truss elements in particular survive well into the future. In addition, the replacement of the thrie beam crash barrier with a more visually recessive crash barrier, the resurfacing of the bridge deck and walkways, and the black and white repainting, will collectively improve the overall appearance and aesthetic appeal of this notable bridge.

Aspects of the Proposal that could detrimentally impact upon the heritage significance of Colemans Bridge

The strengthening and maintenance of Colemans Bridge will alter the bridge physically, and visually when viewed up close. Notably, the northern trusses will feature improved sway bracing. In addition, some lesser elements, including the approach fencing and the crash barriers will be replaced. The latter with an improved steel barrier that meets modern safety standards.

That said, these alterations are discrete improvements that are in keeping with the overarching CMP and will improve the appearance of the bridge rather than detract from it. They will also ensure the survival of the bridge into the future in a form that is fresh, yet recognisable and consistent with the existing presentation of the structure.

Importantly, the highly significant and defining Dare trusses will remain as operational components of the bridge, as opposed to non-functional decorative adornments, and their future protection will be aided rather than impeded by the new steel traffic barrier.

In addition to the strengthening works, the bridge will also be repainted. At present, the bridge features a failing pseudo-Victorian colour scheme dominated by a dated palette of pinks, crème-yellows and greens. The scheme likely relates to repainting activities in the 1980s/90s. The timber and steel elements will be painted white and black colours respectively which will be consistent with early twentieth century bridge colour schemes and with recent heritage bridge repainting (including Glennies Creek Bridge and Barham Bridge).

Summary

The proposed strengthening and maintenance of Colemans Bridge will see the structure enhanced and its functionality retained. The proposed works respect the heritage significance of the item; will ensure that bridge's most significant elements (the Dare Trusses) are conserved; and are consistent with the modern approach to timber truss bridge management espoused in the NSW Heritage Office-endorsed Timber Truss Bridge Overarching CMP (2018).

The proposed work will enhance rather than devalue the heritage significance of the bridge and is considered a timely and appropriate operational and conservation initiative overall.

5.1.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Non-Aboriginal heritage	Application be made to the NSW Heritage Division (OEH) for a Section 57(2) exemption to facilitate the Project prior to works on bridge: *The appropriate standard exemption type would be Type (7): Minor activities with little or no adverse impact on heritage significance*	RMS Project Manager	Pre-construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	The bridge and its setting will be subject to a pre and post-works archival photographic recording. The recording will be undertaken by a suitably qualified professional and meet NSW Heritage Division (OEH) standards as per: *NSW Heritage Division (OEH). 2005. Photographic Recording of Heritage Items using Film or Digital Capture.* When the archival record is complete, it will be made available to the Clarence River Historical Society; Clarence Valley Council and Library (Local History Collection) and NSW Heritage Office.	RMS Project Manager	Pre-construction	Policy11 of RMS' *Timber Truss Bridge Overarching CMP* (2018),
	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. Work will only re-commence once the requirements of that Procedure have been satisfied.	RMS Project Manager RMS Project Engineer	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*

5.2 Socio-economic

5.2.1 Methodology

The socio-economic impact assessment (refer to Appendix I) was prepared in accordance with *Environmental Impact Assessment Practice Note - socio-economic assessment* (EIA-N05). Given the locality, scale/ scope of the proposal and the likely impacts anticipated, a moderate level of assessment was deemed appropriate (based on the Practice Note's assessment levels of basic, moderate and comprehensive).

The study area for this assessment has been derived based on the local urban context of the locality, the scale/ scope of the proposal and the anticipated impacts. The primary study area focuses on the main area of anticipated impact (generally a local level), including that which intersects with the bridge and the primary area of changed traffic conditions. In addition to this primary study area, this assessment also considers the broader context of the Lismore Urban Centre/ Locality (UCL), Lismore LGA and NSW.

The assessment of social and economic impact included:

1. **Scoping**: identify the range of issues of concern relevant to the social and economic environment of the study area and the nature of the likely impact of the proposal.
2. **Social and economic environment**: describe the existing social and economic environment of the study area to provide an understanding of the potentially affected individual, groups or communities. This can involve both quantitative and qualitative indicators to describe the socio-economic profile.
3. **Assessment**: identify and assess the social and economic benefits or impacts of the proposal, who is affected, to what extent and for how long.
4. **Developing management and mitigation measures**: including measures to enhance the proposal's benefits and avoid, minimise or mitigate its potential adverse impacts.

5.2.2 Existing environment

Regional Context

Colemans Bridge is located in the Lismore LGA which has a dispersed settlement pattern over an area of 1233 km^2. In addition to a number of small villages and rural localities, settlement is based around the City of Lismore, which is the primary focus of commercial, industrial, recreational, institutional and administrative activities.

Lismore is a regional centre providing shopping centres, health services, education (early childhood, primary, secondary, tertiary and trades), recreation facilities and regional government services. Many of Lismore's services are focused in and close to the CBD.

The Lismore area is strongly reliant on road transport, with a road system which radiates out from Lismore and includes the Bruxner Highway and Bangalow Road. The Bruxner Highway links Lismore with other regional cities including Ballina, Casino and Tenterfield and the highway also provides an eastern link to the Pacific Highway at Ballina. Bangalow Road provides a northern link between Lismore and the Pacific Highway and connects significant village settlements and townships including Bexhill, Clunes, Bangalow and Byron Bay.

Lismore is situated on the confluence of the Wilsons River and Leycester Creek. The bridge provides an important link for the crossing of both Leycester Creek and the Wilsons River and forms part of a permeable road network between Lismore's existing business, industrial and recreational lands. The bridge represents a key link between the Bruxner Highway and rural land/ villages to the north of Lismore (including North Lismore Plateau). Union Street and Colemans Bridge is identified as part of Lismore's strategic main road network within various council policy documents including the *Lismore Growth Management Strategy* and *Strategic Road Review*.

Environmental Amenity

The landscape surrounding the Project SA1 study area and that immediate to the proposal is predominantly an urban context, comprising residential areas, the CBD, commercial/ business uses, industrial uses and recreational facilities/ open space. The landscape is relatively flat to gently undulating, with low-lying areas subject to periodic flooding. Vegetation is generally limited to along the edge of watercourses, recreational areas or ornamental street and garden trees.

The surrounding area presents a typical regional city setting within north-eastern NSW. Land immediately around Colemans Bridge is commercial and industrial, with residential also occurring nearby. Union Street is generally industrial in nature and supports various businesses. Leycester Creek and the Wilsons River provide for local amenity values.

Additional details on the existing environment can be found in the Socio-economic Assessment (refer to Appendix I).

5.2.3 Potential impacts

Local access and connectivity

The proposal would temporarily affect access and connectivity for road users, including residents, businesses, tourists and transport. Alternate detours would be available in the order of between approximately 2.8 km and 3.7 km, depending on the route taken, origin and destination. In most instances, the impact would be an inconvenience, with minor additional travel time and fuel cost incurred.

The temporary bridge closure and detour options are not expected to adversely affect disadvantaged people as there is a lack of reliance on alternative modes of transport in the local community which could otherwise be impacted and a walkway across the bridge would be maintained at all times. Most people have access to private vehicles for their transport, meaning most people can effectively use the detours and public transport routes would not be affected. Any closure and detour could generally be tolerated in the short-term. It is largely acknowledged that the works have a long-term benefit for the bridge's longevity and serviceability.

Colemans Bridge would be a designated construction site during the construction phase. Therefore, access to the waterway would be restricted around the bridge during construction. Access under the bridge via watercraft is not expected to be restricted. If this was required, this would need to be communicated to the users of the river as part of the consultation phase of the proposal.

The works are important to maintain the bridge and connectivity for the local community into the future. Not undertaking the works may result in additional degradation and could lead to bridge closure and larger and long-term socio-economic impacts.

Local business, industry and economy

Impacts to businesses stem from reduced transport links across Wilson River and Leycester Creek due to the temporary bridge closure, requiring local traffic to use detours. Subsequent effects of this on business and local economic activity can relate to reduced efficiency, increased travel time, fuel costs and the need for additional logistics planning or resourcing. Additional planning and appropriate notice would enable businesses to adequately plan for the changed road conditions during the works. No long-term or unmanageable impacts are considered likely.

Tourism

The proposal would impact access and change local connectivity during any temporary closure of Colemans bridge. While this may alter the route taken to access a tourist facility or business (eg accommodation or attraction), these places would still be readily accessible via the detours. This would ensure that tourism places and businesses remain accessible. While some inconvenience could be experienced, it is not expected to be significant. People planning to visit a particular place would continue to be able to readily access it.

Local amenity

The local environment and amenity could be adversely impacted by the works. Noise and vibration, air quality, traffic and parking and visual impacts all have the potential to be affected. In most of these contexts, the potential impacts posed by the proposal are not significant and would be of a temporary duration. Noise generated by the works could adversely impact nearby sensitive receivers (dwellings).

However, specific safeguards and management measures would be implemented to minimise and appropriately manage any such impacts.

Property and land use

No property acquisition would be required for the proposal. The site compound would be located on Crown Land, that forms part of a reserve and sits adjacent to informal parkland/ open space. The compound would be shared with proposed concurrent bridge work at Fawcetts Bridge (no impact to traffic will stem from Fawcetts bridge as the project would be done offline to traffic). Siting of the compound on Crown Land and open space, would result in some short-term occupation and restriction to this land however most of this open space would remain unoccupied and accessible. Other land use and property impacts relate to the road closure and detours, as well as construction related amenity impacts, as assessed further in this report.

Social and recreational infrastructure

No key social or recreational infrastructure would be affected. Some short-term restriction on the use of and access along Leycester Creek in the vicinity of the works would be required, however this would only affect particular sections of the river at a time and no significant impact on social/ recreational activity or services is expected. Disadvantaged and homeless members of the community who may frequent the bridge site would need to be moved from the site to facilitate the works and ensure safety. This would be undertaken with the support of relevant agencies. Keeping at least one of the bridge's walkways accessible during the works would ensure that access for pedestrians is maintained and that support services on the opposite side of the bridge remain accessible.

Population and Employment

There may be a minor short-term positive effect on employment and economic stimulus for the local area generated by the work and a small temporary increase in workers in the locality. Given the nature of the works, they would not influence population or employment growth or decline. Population distribution would also not be influenced.

Distribution of social impact and housing affordability

Whilst more disadvantaged members of the community could experience impacts, measures would be in place to inform members of the community and maintain key access via detours, alternative transport or retained pedestrian access. Given the temporary nature of the proposal, and the on-going future operation of the bridge once the works are complete, there would not be any change on the distribution of social impact or housing affordability.

Community values

According to the *Imagine Lismore Community Strategic Plan*, the maintenance of existing roads network is a key value area and aligns with the key objective of ensuring that the city and village services (including road network) are well managed and maintained. In this sense the bridge maintenance is consistent with community value regarding the importance of quality roads and the local built environment.

Cultural values

Although Colemans Bridge is a listed heritage item, the proposal does not present any significant adverse impact to the existing bridge. Its appearance and character would be maintained and there would be no detriment to any associated heritage value. The works would support improved longevity of the bridge.

Cumulative impacts

Although the proposal has the potential to contribute to cumulative impacts such as construction noise, air quality, and traffic, these are not expected to be significant given the context of the site and nature/ scope of works. Mitigation measures within the Review of Environmental Factors (REF) and Construction Environmental Management Plan (CEMP) would ensure any such effects are minimised and managed appropriately.

5.2.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Communication Plan	A Communication Plan (CP) would be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP would include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).	Roads and Maritime/ Contractor	Pre-construction
Notification	All businesses, residential properties and other key stakeholders (eg schools, council, bus operators) affected by the activity would be notified at least 10 working days prior to commencement of the activity. Project/ community updates would be provided throughout the duration of works as relevant. Notification would utilise both digital and conventional (non-digital) modes of communication (eg media release, letter box drops, newsletters and regular updates to a project website). Notification would include an information package, including contact name and number for enquiries or complaints, the expected timeframe of works and any planned or potential disruptions to utilities/ services and changed road and traffic conditions. The package is also to include details on the Colemans Bridge/ road closure, the available detours alternative transport and pedestrian access.	Roads and Maritime project manager and communications officer	Pre-construction and during construction

Impact	Environmental safeguards	Responsibility	Timing
	As part of the notification process, advanced warning signage would be established prior to and during the work to ensure road users are aware of the road closure and detours. Directional signage is to be placed along the detour routes. Additional and immediate notification to all affected stakeholders would also be undertaken if walkway access across the bridge is restricted. As required, Roads and Maritime Services shall issue notification to representatives of the Native Title claim NC2013/2018 - Widjabul Wia-bal People, for their consideration and comment prior to undertaking the works.		
Consultation	Ongoing stakeholder and community consultation would be undertaken in accordance with the *Roads & Maritime Communication Toolkit*. Consultation would include: • Lismore City Council • Residents and businesses within 500 m of the proposal • Businesses at the north-east end of Union Street (between the low railway overpass and Colemans Bridge) who may require heavy/high vehicle access • Fire and Emergency services • Bus operators • Local schools • Recreation waterway users, including Lismore Rowing Club/ Far North Coast Canoe Club • Operators of community services and facilities, including Winsome and Lismore Soup Kitchen • Vulnerable and homeless people that could be directly affected by the works.	Roads and Maritime project manager and communications officer	Pre-construction and during construction
Noise and vibration specific notification and consultation	Implement notification and community consultation measures with regard to airborne noise and ground-borne vibration impacts from the works, including: • Periodic notification of all identified receivers (monthly letterbox drop or equivalent). Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours	Roads and Maritime project manager and communications officer	Pre-construction and during construction

Impact	Environmental safeguards	Responsibility	Timing
	• Website • Project information line • Construction Response Line • Email distribution list.		
Traffic	As per the notification process, advanced warning signage would be established prior to and during the work to ensure road users are made aware of changed traffic conditions and detour directions. Excluding the required detours, where possible, current traffic movements and property accesses would be maintained during the work. Any disturbance would be minimised to prevent unnecessary traffic delays.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction
Pedestrian access	Pedestrian access to, and use of, at least one of the bridge's walkways at any one time is to be maintained and remain accessible during the works.	Roads and Maritime project engineer and works supervisor	Pre-construction and during construction
Waterway	As required, advanced warning signage and/or beacons (appropriate for any applicable day and night time maritime requirements) would be established prior to and during the work to ensure any users of the local waterway(s) are aware of restricted access, changed navigational conditions or hazards within the work area and waterway.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction
School bus services	If a potential impact to a school bus service arises or becomes know, undertake and maintain ongoing consultation and cooperation between Roads and Maritime and any potentially affected school bus service providers prior to and for the duration of the project, to ensure no adverse or unmanageable impact to important services.	Roads and Maritime project manager and communications officer	Pre-construction and during construction
Complaints	A complaint handling procedure and register would be included in the CEMP and would include that all complaints would be responded to within 24 hours.	Roads and Maritime project manager and communications officer	During construction
Health and safety	Suitable site induction relating to site specific hazards would be undertaken for all contractor and Roads and Maritime staff. The work would be undertaken in accordance with all NSW health and safety	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction

Impact	Environmental safeguards	Responsibility	Timing
	legislative requirements and relevant Australian Standards.		
Vulnerable and homeless people	Where appropriate, Roads and Maritime, in consultation and with the support of relevant agencies and community services (eg Family and Community Services; the Winsome and Lismore Soup Kitchen Inc), would consult homeless people that could be directly impacted/ displaced by the works and assist in putting them in touch with a relevant support service.	Roads and Maritime project manager and communications officer in consultation with relevant agencies/ organisations	Pre-construction

5.3 Traffic and transport

5.3.1 Existing environment

Road/ pedestrian traffic

Colemans Bridge is a dual lane extension of Union Street over Leycester Creek, Lismore. The speed limit over the bridge is 50 km/h. Each side of the bridge has a pedestrian walkway with bituminous surfacing, timber post and rail pedestrian fencing.

Traffic would be managed according to the Roads and Maritime's Traffic Control at Work Sites Manual Version 5 (RMS, 2018). A site-specific TMP will be prepared detailing the specifics of the work and any hazards and constraints. Work would not begin until the plan is approved and strategies to manage traffic within and around the work site are in place. During times of traffic disruptions, liaison with local road users would occur through standard Roads and Maritime's communication protocols (eg Roads and Maritime website postings using the Traffic Alert system).

Maritime traffic

Leycester Creek and the Wilsons River in the vicinity of Colemans Bridge is predominantly used by small recreational vessels that are launched from downstream at the boat ramp near the Lismore Canoe Club. The volume of maritime traffic along this section of waterway is relatively low.

5.3.2 Potential impacts

Road/ pedestrian traffic during construction

Temporary closure of Colemans Bridge would be undertaken on some weekends and occasionally on the Monday following weekend closures. This will require detours, with the main detour route being the use of the Ballina Street Bridge to the south, which provides direct access to and from the Lismore CBD, as well as a link to Fawcett Bridge and Bridge Road (that is intersected by the Colemans Bridge). A secondary route is available via Robert White Bridge.

Detours would result in additional traffic utilising local roads. The roads most likely to experience changed and increased traffic volumes include Union Street, the Bruxner Highway, Ballina Street Bridge, Molesworth Street, Wilson and Terania Streets. Whilst there would be an increase, the volume of additional traffic using the detours is not expected to be significant and would primarily be confined to local traffic movements.

Some increased wait times at local intersections and roundabouts are likely; notably for traffic accessing the Bruxner Highway and Ballina Street Bridge at peak times. However, given the limited distance of the diversion and number of properties that front Union Street directly, as well as the temporary period of the closure, such impacts are not expected to be significant or unreasonable.

Some increased traffic volume may also be experienced through the Lismore CBD, including along Molesworth Street. This too may result in some minor traffic delays; however, this is not anticipated to be unreasonable.

Given the locality of the works and nature of the detour, no unreasonable impacts to parking are expected. Where possible public access to one footway of the bridge will be provided at all times.

The sensitivity to traffic and parking impacts is considered to be moderate due to potential minor increases in delays and disruption. The magnitude of impacts would be low due to the short-term nature of the impact. Overall, the level of significance is considered to be moderate-low.

Without the work and associated construction delays being undertaken, necessary bridge maintenance work could not proceed. Should Colemans Bridge become unserviceable, this would have a much more substantial impact on the local community. Consequently, the short-term disruptions are justifiable.

Maritime traffic during construction

Scaffolding would extend two to three metres beneath the bridge, leaving a clearance of 10-11 m allowing most vessels to pass under the scaffold once it is constructed. Two spans would be worked on at a time. The proposal would not require the closure of the channel beneath the bridge.

Operation

The proposal would not result in any negative impacts post-construction. The proposal would result in positive impacts due to reduced future maintenance and therefore reduced delays and detours.

5.3.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime *Traffic Control at Work Sites Manual* (RTA, 2010), Australian Standard 1742.3 *Manual of uniform control devices* and *QA Specification G10 Control of Traffic* (Roads and Maritime, 2008). The TMP will include: • Measures to maintain access to local roads and properties • Site specific traffic control	RMS Project Manager	Detailed design/ Pre-construction	Section 4.8 of QA *G36 Environment Protection*

Impact	Environmental safeguards	Responsibility	Timing	Reference
	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.			
	• All traffic disruptions would be communicated to road users in accordance with Roads and Maritime policy, using the Roads and Maritime traffic alert system, and any other means identified in the Consultation Strategy for the proposal.	RMS Project Engineer	Construction	
	• A project-specific consultation strategy must be developed and implemented in accordance with the RMS *Community Involvement – Practice Notes and Resource Manual* and *RMS Minor Project procedure, Communications for minor projects (ILC-MP-TP0-301).*	RMS Project Manager	Pre-construction	
Pedestrian traffic/ access	Where possible public access to one footway of the bridge is to be provided at all times.	RMS Project Engineer	Construction	
Maritime	All conditions specified by Roads and Maritime – Maritime Division are to be implemented as follows:	RMS Project Manager	Construction	RMS Maritime Navigational Requirements
	Any work vessels involved in the project must comply with the relevant NSW Marine Legislation (ie day shapes, lights etc.).	RMS Project Manager	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Barges, work vessels and crew involved with the project must comply with the *Marine Safety (Domestic Commercial Vessels) National Law Act 2012*.	RMS Project Manager	Construction	
	A minimum of one navigable channel span must be open to navigation at all times unless approved by RMS Maritime.	RMS Project Manager	Construction	
	Any submerged hazards must be marked with yellow aqua buoys sign written “Warning Submerged Hazard”. These aqua buoys must be lit with yellow flashing lights if hazards are present before sunrise and after sunset.	RMS Project Manager	Construction	
	Twenty-Eight (28) days prior to works commencing the applicant must provide Roads and Maritime with a full scope of works including maps noting all obstructions to navigation associated with the proposed works, (vessel/barge anchoring, scaffolding and silt curtain locations etc.) so a Marine Notice can be prepared and advertised.	RMS Project Manager	Pre-construction	
	Channel blocked day shapes and lights to be suspended in the centre of all blocked spans of the bridge ie any works that impact the current bridge navigation channel must be closed. These signals mean vessels will NOT attempt to navigate in that part of the channel: Bridge span blocked or Channel is blocked.	RMS Project Manager	Construction	

5.4 Noise and vibration

5.4.1 Methodology

A noise and vibration impact assessment has been prepared by SoundIN (refer to Appendix G) for the proposal.

This noise and vibration impact assessment considers potential noise and vibration impacts from construction. The works are not anticipated to impact operational noise or vibration levels other than to reduce the levels by tightening the SLT deck and replacing the bridge deck wearing course.

Working hours will be varied throughout the project to minimise the impacts to traffic, local residents and businesses within the surrounding area. Work would generally be undertaken during the hours detailed below:

Monday – Friday (bridge open to traffic) 6:00 am to 6:00 pm

Saturday, Sunday and Monday [Notes 1 & 2] (bridge closed to traffic): 6:00 am to 6:00 pm. Noisy work would be planned from 7.00 am to 5.00 pm

Note 1: Bridge remains closed to traffic from start of closure to finish of closure ie closed overnight.
Note 2: Occasional bridge closures on Monday where necessary.

The bridge would be closed to traffic on some weekends during the extent of the project. There may also be odd occasions where the bridge will need to be closed on Mondays following the weekend closures. One of the footways would be kept open for pedestrian access throughout the project.

This assessment references long-term noise monitoring undertaken at the site in 2016 by Wilkinson Murray (October 2016) as part of an earlier proposal for Colemans Bridge. Long-term noise monitoring was undertaken by Wilkinson Murray between Monday, 10 and Wednesday, 19 October, 2016. Monitoring was conducted at three locations surrounding the site, in locations representative of the potential impacted receivers. Monitoring was also undertaken at a fourth location, on Wilson Street, to determine existing traffic noise levels at receivers likely to be impacted by temporary traffic diversions.

The purpose of the monitoring was to measure the existing levels of traffic and ambient noise, and to identify the Rating Background Levels (RBL).

5.4.2 Existing environment

Table 5-1 presents the Rating Background Levels for monitoring locations 1-3, which have been calculated in accordance with the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017). The calculated night time (10.00pm – 7.00am) RBL was found to be less than 30 dBA at each of the three monitoring locations. The NPfI recommends a minimum RBL of 30 dBA, and therefore, in cases where the RBL is calculated to be less than 30 dBA, it is set to 30 dBA.

Table 5-1: Existing background noise levels

Monitoring Location		**Rating Background Level (dBA)**		
ID	**Address**	**Daytime***	**Evening***	**Night***
1	24 Simmons Street	38	36	30 (29)
2	5 Frank Street	36	34	30 (28)
3	14 Bridge Street	46	35	30 (29)

Notes: 1. Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

Table 5-2 presents the existing ambient L_{Aeq} levels for monitoring locations 1-3. The measured L_{Aeq} at location 1 is influenced by workshop noise.

Table 5-2: Existing L_{Aeq} ambient noise levels

Monitoring Location		Rating Background Level (dBA)		
ID	**Address**	**Daytime[1]**	**Evening[1]**	**Night[1]**
1	24 Simmons Street	56	52	43
2	5 Frank Street	51	49	43
3	14 Bridge Street	61	55	50

Notes: 1. Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

The measured L_{Aeq} at location 4 is considered to be representative of existing traffic noise levels on the alternate traffic route during the bridge closure and are thus presented for typical road traffic noise periods in Table 5-3.

Table 5-3: Existing traffic L_{Aeq} noise levels on alternate traffic route

Monitoring Location		Rating Background Level (dBA)	
ID	**Address**	**Daytime ($L_{Aeq,15hr}$) [1]**	**Night ($L_{Aeq,9hr}$) [1]**
4	46 Wilson Street	61	53

Notes 1. Daytime = 7.00am – 10.00pm, Night = 10.00pm – 7.00am

5.4.3 Criteria

The noise and vibration impact assessment was conducted in general accordance with the following NSW Government guidelines and policies:

- Construction Noise and Vibration Guideline (Roads and Maritime Services, 2016)
- Noise Criteria Guideline (Roads and Maritime Services, 2015)
- Interim Construction Noise Guideline (DECC, 2009)
- Assessing Vibration: a technical guideline (DEC, 2006).

Vibration goals for building damage have been adopted from British Standard BS7385-2:1993, being a relevant international standard.

5.4.4 Potential impacts

Construction-related Traffic

Construction generated traffic would be limited to workers' vehicles and material transport. These movements would make negligible difference to existing traffic noise levels.

The proposed closure of Colemans Bridge would result in some vehicles using alternate routes to the CBD. Additional traffic in the vicinity of Ballina Street Bridge would produce a negligible increase in traffic noise, noting the substantial existing traffic on this route.

Additional traffic using Terania Street, Wilson Street and Casino Street may be noticeable to residents. Based on the measured traffic noise level at location 4 in Wilson Street, and assuming a traffic speed of 60 km/h and approximately five per cent heavy vehicles, an additional 3000 vehicles per day would be

required to use this detour route in order for the traffic noise level to increase by more than 2 dB. Though traffic modelling has not been undertaken to determine the additional traffic which would be expected on the detour route, it is likely to be well below 3000 vehicles.

As construction-related traffic is not anticipated to increase traffic noise by more than 2 dBA, no further assessment is required.

Construction Noise

Construction works associated with the proposal will result in construction activities in close proximity to residential and commercial receivers. Construction noise levels at sensitive receivers have been predicted for a number of typical construction scenarios, and in a number of instances, are likely to exceed the established noise management levels. Noise levels are not predicted to exceed the highly affected level of 75 dBA at nearby residences. This assessment details mitigation and management measures that should be implemented where practical, including specific measures to mitigate noise impacts from the noisiest plant and activities.

Vibration

No significant vibration emitting plant is anticipated to be required and therefore negligible impacts are expected.

Operational Noise and Vibration

The works are not anticipated to impact operational noise or vibration levels other than to reduce the levels by tightening the SLT deck and replacing the bridge deck wearing course.

5.4.5 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Airborne noise/ ground-borne vibration	• In addition to the measures set out in this table, any project specific mitigation measures identified in the environmental impact assessment documentation (eg REF, submissions or representations report) or approval or licence conditions must be implemented.	RMS Project Manager	Pre-construction, construction	
	Periodic notification of all receivers within 200 m of works (monthly letterbox drop or equivalent)[1]. Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours. • Website • Project info line • Construction response line • Email distribution list	RMS Project Manager	Pre-construction, construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures.	RMS Project Manager/RMS Project Engineer	Pre-construction, construction	
	No swearing of unnecessary shouting or loud stereos/ radios on-site. No dropping of materials from height, throwing of metal items and slamming of doors.	Project team	Construction	
	Verification noise monitoring is suggested for noisy activities outside standard construction hours. Monitoring of noise and vibration should be undertaken upon receipt of complaints.	RMS Project Manager	Construction	
	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods. If work is required to occur at night, any highly noise emitting activities should be scheduled to occur in the less sensitive evening period, whenever possible.	RMS Project Manager	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Unless negotiated with the community with consultation documented and approved by Roads and Maritime project manager or permitted under the license there should be no more than: • two consecutive nights per week • three consecutive evenings per week • separated by not less than one week and no more than six evenings or nights per month.			
	In general, the following respite is provided. High noise and vibration generating activities[2] may only be carried out in continuous blocks, not exceeding three hours each, with a minimum respite period of one hour in between each block[3].	RMS Project Engineer/RMS Project Manager	Construction	
	Use quieter and less vibration emitting construction methods where feasible and reasonable.	RMS Project Engineer	Construction	
	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Table F.1 of the CNVG.	RMS Project Engineer	Pre-construction, construction	
	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on-site unless compliant with the criteria in Table F.1 of the CNVG.	RMS Project Engineer	Construction	
	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down when not in use. Noise-emitting plant to be directed away from sensitive receivers.	RMS Project Engineer	Construction	
	Plan traffic flow, parking and loading/ unloading areas to minimise reversing movements within the site.	RMS Project Engineer	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on-site and for any out of hours work.	RMS Project Engineer	Construction	
	Loading and unloading of materials/ deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/ unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.	RMS Project Engineer	Construction	
	Whenever practical, work areas should be screened to reduce noise levels at receivers. Many of the proposed activities would be confined to discreet work areas and are thus suitable for temporary screening. Highly noise emitting activities occurring outside standard construction hours, particularly at night, should be screened. If traffic diversions are necessary to permit temporary screening this should be considered. Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.	RMS Project Engineer/RMS Project Manager	Construction	

5.5 Water quality hydrology and flooding

5.5.1 Existing environment

Colemans Bridge spans over Leycester Creek, approximately 70 m north-west of Wilson's River. The Leycester Creek and Wilson's River sub-catchment forms part of the larger Richmond River catchment of northern NSW and drains to the sea at Ballina.

The Lismore Local Environment Plan (LEP) 2012 Flood Planning Map identifies the proposal to be contained within flood planning area (Sheet FLD_005AA). The objectives of this zone are:

- To minimise the flood risk to life and property associated with the use of land
- To allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change
- To avoid significant adverse impacts on flood behaviour and the environment.

The proposal is consistent with these zoning provisions and Clause 94 of the ISEPP allows for road and road infrastructure facilities on any land without consent.

5.5.2 Potential impacts

Construction

Potential impacts to water quality, hydrology and flooding that could arise from the proposal include:

- Erosion and sedimentation that may affect Leycester Creek (refer to Section 5.2)
- Turbidity and sedimentation of local aquatic habitats and waterways
- Pollution of local water quality from machinery and construction materials and spills and dewatering
- A variety of dispersible liquid materials would be used which pose a potential pollutant threat to local water quality. These liquids include but are not limited to paint, diesel, unleaded petrol, machinery oils and lubricants. The nature of these liquids and their ability to disperse away from the site means that they could have a negative impact on ground or surface water on or adjacent to the site, especially during rain
- Lead flakes (if present) may enter the waterway (refer to Section 5.10). Lead is a naturally occurring heavy metal, often used in industry. It can be dispersed widely in the environment through contamination of water, dust and soil, and is present in some paints. Any lead paint removal would be undertaken in accordance with AS4361.2 *Guide to Lead Paint Management Preventing Lead Poisoning in Australia*
- Flood events within the catchment have the potential to impact the compound site adjacent to Coleman/ Fawcett Bridge, and there is the potential for water entering the compound sites to become contaminated. This is likely to occur if waste, vehicles and machinery and any fuels stored at the compound sites are not removed from the compound site should flood waters breach Leycester Creek and the Wilsons River.

The above impacts have the potential to cause environmental harm. However, with the implementation of the management measures and safeguards contained herein the risk associated with such impacts is considered low.

Hydrological impacts are unlikely as the flow of Leycester Creek would not be altered.

Overall, with the safeguards and management measures described in Section 5.2.3 significant water quality, hydrology and flooding impacts from the proposal are not expected.

Operation

Following completion of the proposal it is not expected that the operation of Colemans Bridge would have any impact on water quality, hydrology or flooding.

5.5.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Hydrological impacts	A CEMP must be prepared in accordance with the specifications set out in the *QA Specification G36 - Environmental Protection (Management) System* to guide the implementation of environmental impact mitigation measures, identify key roles and responsibilities for environmental monitoring and methods of reporting incidents.	RMS Project Manager	Pre-construction	
Erosion sedimentation	A site-specific Erosion and Sediment Control Plan is to be prepared and implemented as part of the CEMP. The plan is to identify detailed measures and controls to be applied to minimise erosion and sediment control risks including (where relevant) but not limited to: runoff, diversion and drainage points, sumps, scour protection; stabilising disturbed areas as soon as possible; check dams, fencing and swales and staged implementation arrangements. The plan is to also 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. Work in areas where soil may be disturbed is to only commence once all relevant erosion and sediment controls have been established. The controls are to be maintained in place until the work is complete and all exposed erodible materials are stable.	RMS Project Manager	Pre-construction, construction	Section 2.2 of QA G38 *Soil and Water Management*

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Erosion and sedimentation controls must be checked and maintained (including clearing of sediment from behind barriers) on a regular basis (including after any precipitation events) and records kept and provided on request.	RMS Project Engineer	Pre-construction, construction	
	Disturbance of natural sediments and vegetation must be minimised.	RMS Project Engineer	Pre-construction, construction	
	Erosion and sediment control measures must not be removed until the work is complete or disturbed areas are stabilised.	RMS Project Engineer	Construction, post-construction	
	Maintenance of site compounds must be in accordance with the RMS Stockpile Site Management Guideline (EMS-TG-10).	RMS Project Engineer	Pre-construction, construction	
	Cleaning of tools and equipment must occur within a designated wash-down bay. The wash-down bay must be bunded and placed so that water does not flow directly into Leycester Creek or the Wilsons River, but is captured and contained.	RMS Project Engineer	Construction	
	Water utilised for cleaning of tools must be minimised and obtained from a licensed location or town water supply.	RMS Project Engineer	Construction	
	Clean equipment and vehicles must be used, with equipment being cleaned down before being brought to the site.	RMS Project Engineer	Pre-construction, construction	
	A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Roads and Maritime *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 Roads and Maritime and EPA officers).	RMS Project Manager	Detailed design/ Pre-construction	Section 4.3 of QA *G36 Environment Protection*

Impact	Environmental safeguards	Responsibility	Timing	Reference
	A spill containment kit for aquatic and terrestrial spills must be available at all times. The spill kit must be appropriately sized for the volume of substances at the work site. All personnel must be made aware of the location of the kit and trained in its effective deployment.	RMS proposal Manager	Pre-construction, construction	
Reduced water quality	If a spill occurs, the Roads and Maritime's Environmental Incident Classification and Reporting Procedure must be followed, and the Roads and Maritime Project Manager notified as soon as practicable.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
	Locate stockpiles of dispersible material away from areas of concentrated overland flow.	RMS Project Manager/ Project Engineer	Construction	
	Required fuels and other liquids must be stored in self-safe chemical storage containers.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
	Unnecessary storage of fuels, lubricants or other compounds on-site must be avoided.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
	Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 m from drainage lines or waterways otherwise a double bund is required.	RMS Project Manager/ Project Engineer	Construction	
	All equipment must be maintained in good working order and operated according to manufacturer's specifications.	RMS Project Engineer	Pre-construction, construction	
	All work must be undertaken according to RMS *Specifications B223 (Management of Lead Chromium and Asbestos in Bridge Maintenance Painting)* and *B220 (Protective treatment of Bridge Steel Work)* and *AS4361.1: Guide to lead paint management, Part 1: Industrial Application.*	RMS Project Engineer	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.	RMS Project Engineer	Construction	
	Prepare an emergency response plan for flood events for the proposed work. Include a procedure for rapid removal in the emergency response plan and location for the material.	RMS Project Manager	Pre-construction	
	Establish the compound site in such a way to limit potential impacts from flooding (eg on as high a ground as possible and that are readily removed in the event of a flood).	RMS Project Manager	Construction	
Flooding	Include a Work Method Statement (WMS) in CEMP on compound site evacuation procedure. Issues to be addressed in the WMS include: • Responsibility for monitoring flood threat/ flood warning information and how it is to be done • Training for staff on evacuation • Demonstrate that specific equipment for evacuation is readily available.	RMS Project Manager	Pre-construction	

5.6 Soils

5.6.1 Methodology

The following methodology was undertaken:

- Review of soil mapping as per Morand (1994)
- Review of the OEH contaminated land database and DPI cattle dip site locator (*www.epa.nsw.gov.au/prclmapp/aboutregister.aspx*) (*https://www.dpi.nsw.gov.au/animals-and-livestock/beef-cattle/health-and-disease/parasititic-and-protozoal-diseases/ticks/cattle-dip-site-locator*) (both accessed 6 March 2019)
- Review of Council's acid sulfate soil (ASS) mapping in the LEP.

5.6.2 Existing environment

The proposal occurs on the Leycester (el) landscape of the Alluvial Soil Landscape comprising moderately well-drained alluvial Black Earths (Morand, 1994). No records of contaminated land or cattle dip sites occur within close proximity to the site; consequently, the proposal is not expected to impact on contaminated land. No ASS occur in proximity to the site.

5.6.3 Potential impacts

Construction

Potential erosion and sedimentation impacts from these features include:

- Erosion of exposed soil during the construction process
- Erosion and sedimentation impacts which could affect receiving environments such as Leycester Creek/ Wilsons River.

Operation

Once operational there is no likelihood of soil erosion or other negative impacts.

5.6.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Contaminated land	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 Roads and Maritime Environment Manager and/or EPA.	RMS Project Manager	Detailed design/Pre-construction	Section 4.2 of QA *G36 Environment Protection*
Soils	Imported site compound/ stockpile base materials must be sourced as clean-fill from a licensed quarry or approved site (if required).	RMS Project Manager	Pre-construction	
	Upon completion of the work and usage of the site compound, these areas must be re-established to similar existing conditions.	RMS Project Manager	Post-construction	

5.7 Landscape character and visual impacts

5.7.1 Existing environment

The locality comprises mostly of commercial infrastructure typical of a central business district (including roads and footpaths). The proposed compound site would be sited on a large portion of a rarely used parkland in Lismore, Pritchard Park.

Colemans Bridge currently features a failing pseudo-Victorian colour scheme dominated by a dated palette of pinks, crème-yellows and greens. The scheme likely relates to repainting activities in the 1980s/90s.

5.7.2 Potential impacts

Construction

The site would have reduced aesthetic values during the proposal (due to the presence of machinery, temporary site compound within Pritchard Park, etc.), however this would only be minor and affect a localised area. Businesses adjacent to the compound area would have minor reduction in landscape character for the duration of the proposal.

Some minor amenity impacts to adjoining properties are possible during construction. These could include:

- Noise and vibration
- Air quality
- Water quality
- Habitat/vegetation removal
- Visual impacts.

Operation

The aesthetic qualities or value of the locality are not expected to be negatively impacted by the proposal. Proposed repainting of the bridge would improve the aesthetic quality of the bridge and surrounds. The timber and steel elements of Colemans Bridge will be painted white and black colours respectively which will be consistent with early twentieth century bridge colour schemes and with recent heritage bridge repainting (including Glennies Creek Bridge and Barham Bridge). The paint scheme represents a more heritage sympathetic colour selection for bridge and overall will improve the aesthetic of the structure.

Table 5-4: Visual impact checklist

Criteria	Yes	No	N/A
Is the proposal adjacent to an important physical or cultural element or landscape? (heritage items and areas, distinctive or historic built form, National Parks, conservation areas, scenic highways etc). *Colemans Bridge is listed as an archaeological item (A9) in the Heritage Schedule of the Lismore LEP 2012. It is also listed as heritage item of State significance in the RMS s170 Register and on the State Heritage Register and the Register of the National Estate.* *The SoHI has assessed the significance of the proposal and concluded that: "The proposed work will enhance rather than devalue the heritage*	√		

Criteria	Yes	No	N/A
significance of the bridge and is considered a timely and appropriate operational and conservation initiative overall".			
Does the proposal obstruct or intrude upon the character or views of a valued landscape or urban area? For example, local significant topography, a rural landscape or a park, a river lake or the ocean or a historic or distinctive townscape or landmark? *The proposed work on Colemans Bridge over Leycester Creek would not obstruct or intrude upon the character or views of a valued landscape in the long-term. Minor, short-term impacts upon the visual landscape would be changes to the visual amenity of the site associated with presence of compound sites and machinery/ construction works associated with the project.*		√	
Does the proposal require the removal of mature trees or other significant stands of vegetation, either native or introduced? *A number of native saplings previously planted on the western abutment of the bridge (southern side) will require clearing to facilitate access to the underside work areas of the bridge. Trees that would require removal include:* • *Blush Macaranga (Macaranga tanarius) – two saplings* • *Red Kamala (Mallotus philippensis) – one sapling* • *Creek Sandpaper Fig (Ficus coronata) – one sapling).* *Areas within three metres of the bridge would not be replanted in order to allow future bridge maintenance access. Any future regrowth within three metres of the bridge may be subject to clearing to maintain access.* *Other areas that would require clearing within eight metres of the bridge, including the proposed bridge access on the eastern abutment (southern side) comprise dense infestations of weeds including Castor Oil Plant (Ricinus communis), Mulberry, Cockscomb Coral Tree, Balloon Vine, Morning Glory Vines (Ipomoea spp).* *Vegetation removal for the proposal is minor and unlikely to affect the visual amenity of the site substantially in the long-term.*		√	
Does the proposal result in large areas of shotcrete visible from the road or adjacent properties?		√	
Does the proposal involve new noise walls or visible changes to existing noise walls?		√	
Does the proposal involve the removal or reuse of large areas of road corridor landscape, either verges or medians?		√	
Does the proposal involve significant changes to the appearance of a bridge (including piers, girders, abutments and parapets) that are visible from the road or residential areas? *The proposal does not involve significant changes to the appearance of the bridge except for the repainting of the bridge in heritage sympathetic colours (black and white) which will improve the aesthetic value of the structure.*		√	
If involving lighting, will the proposal create unwanted light spillage on residential properties at night?		√	

Criteria	Yes	No	N/A
Would any new structures or features being constructed result in over shadowing to adjoining properties or areas?		√	

5.7.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Landscape character and visual impact	All working areas will be maintained, kept free of rubbish and cleaned up at the end of each working day.	RMS Project Engineer	Construction	
	Soil disturbance will be minimised where possible.	RMS Project Engineer	Construction	
	The bridge will be re-painted with the timber truss elements in white and steel elements in black.	RMS Project Engineer	Construction	
	Any temporary site lighting is to be installed and operated in accordance with AS4282:1997 *Control of the Obtrusive Effect of Outdoor Lighting*.	RMS Project Engineer	Construction	
	Bridge works are to be managed in accordance with Roads and Maritime *Bridge Aesthetics guidelines, 2012.*	RMS Project Manager	Construction	
	At the completion of works all areas including compound areas will be rehabilitated.	RMS Project Manager	Construction	

5.8 Biodiversity

5.8.1 Methodology

The methodology used for the biodiversity assessment included:

- Searches of relevant databases
- Literature review
- Field surveys of the study area including compound sites utilising the following methodology:
  - Random meander searching for threatened flora and completing a general flora inventory
  - Targeted survey for Threatened Ecological Communities (TECs)
  - Recording the occurrence and extent of any priority weeds listed in the *Biosecurity Act 2016* (Lismore Shire Local Control Area)
  - Opportunistic survey of all fauna based on visual or aural observations.

Given the lack of vegetation/ habitat at the site and the highly disturbed/ modified environment the level of investigation is considered adequate.

5.8.2 Existing Environment

Vegetation associated with the site comprises highly modified and disturbed riparian vegetation which has mostly been planted as part of recent bush regeneration activities. This vegetation is dominated by River Oak (*Casuarina cunninghamiana*) with other tree species including River Bottlebrush (*Callistemon viminalis*), Silky Oak (*Grevillea robusta*), Black Bean (*Castanospermum australe*) and Foambark (*Jagera pseudorhus*). This vegetation represents an amalgam of the following Plant Community Types (PCTs):

- PCT 1106 River Oak riparian woodland of the NSW North Coast Bioregion and Northern Sydney Basin Bioregion
- PCT 1302 White Booyong – Fig subtropical rainforest of the NSW North Coast Bioregion

Native riparian vegetation occurring adjacent to the site is representative of the Threatened Ecological Community (TEC) of *Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*. A few planted saplings require removal on the edge of this community. Areas of TEC would not be impacted by the proposal or use of the compound sites.

Sections of the riparian corridor lacking native vegetation are heavily weed infested with species including Cockscomb Coral Tree (*Erythrina crista-galli*), Mulberry (*Morus* sp) and Balloon Vine (*Cardiospermum grandiflorum*).

Large mown grassland areas are present within the ancillary site associated with Pritchard Park and Fawcetts Bridge comprising a mixture of mostly exotic grass species dominated by Rhodes Grass (*Chloris gayana*), Kikuyu Grass (*Cenchrus clandestinum*) and Broad-leaved Paspalum (*Paspalum mandiocanum*).

No threatened flora or fauna species were observed at the site. The bridge was assessed as not providing suitable habitat for roosting microbats due to its structure not affording suitable gaps in concrete or timber substrates. Database searches identified 26 threatened flora species and 23 threatened fauna species previously detected within a 10 km x 10 km search area centred on the site (refer to Appendix D).

The proposal being within the Lismore CBD occurs within a designated yellow crazy ant infestation area. Yellow crazy ants, although not a direct threat to humans, are serious and classified as a prohibited matter event under the *Biosecurity Act 2015* as they are a serious environmental pest which pose a risk to our economy, environment and communities. As yellow crazy ants are often spread by movement of plants and soil, movement restrictions of such material are in place within a five kilometre radius of the Lismore CBD currently until June 2019 unless such material is directed the Lismore Recycling and Recovery Centre. Relevant control measures extending beyond this period will be captured within the proposal Construction Environment Management Plan (CEMP).

5.8.3 Potential Impacts

Construction

A number of native saplings previously planted on the western abutment of the bridge (southern side) will require clearing to facilitate access to the underside work areas of the bridge. Trees that would require removal include:

- Blush Macaranga (*Macaranga tanarius*) – two saplings
- Red Kamala (*Mallotus philippensis*) – one sapling
- Creek Sandpaper Fig (*Ficus coronata*) – one sapling).

Other areas that would require clearing within eight metres of the bridge, including the proposed bridge access on the eastern abutment (southern side) comprise dense infestations of weeds including Castor Oil Plant (*Ricinus communis*), Mulberry, Cockscomb Coral Tree, Balloon Vine, Morning Glory Vines (*Ipomoea* spp). Areas within eight metres of the bridge would not be replanted in order to allow future bridge

maintenance access. Any future regrowth within eight metres of the bridge may be subject to clearing to maintain access.

The proposal has the potential to contribute to the spread of weeds and yellow crazy ants. Safeguards are required to avoid/ mitigate such impacts.

The proposal including the identified vegetation removal (above) is not considered likely to negatively impact biodiversity at the site.

Table 5-5: Native planted sapling proposed for removal for access

Table 5-6: Example of weedy vegetation adjacent to the bridge which may require clearing within eight metres of the bridge

Operation

The site is a disturbed and modified environment with limited conservation values. The work would not result in any changed outcomes during operations to that which occur currently.

Assessment of significance of impacts

A habitat assessment for threatened flora and fauna identified by the BioNet database search was undertaken and is included in Appendix E. Based on this assessment the following species/ communities were considered to have some (albeit minor) potential to be impacted by the proposal:

- Grey-headed Flying Fox
- Little Bentwing Bat
- Eastern Bentwing Bat
- Lowland rainforest on floodplains in the North Coast (a TEC)

For the above species/ TEC, Assessments of Significance (Five part test) were completed (refer to Appendix F).

The tests concluded that the proposal would be unlikely to significantly increase the risk of extinction for any fauna species, and hence a Species Impact Statement (SIS) is not required.

The proposal is not likely to significantly impact threatened species, communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: DGH Date: 22/03/2019
Source of base data: DFS&I

LEGEND

- Colemans Bridge
- Proposed compound site
- Vegetation to be removed
- PCT 1106 and PCT 1302
- Access track

0 40

Vegetation Map

GeoLINK

Colemans Bridge Strengthening and Maintenance
Review of Environmental Factors
3276-1020 - Rev A

Figure 5-1

5.8.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Removal of native vegetation	Native vegetation removal will be minimised through detailed design.	RMS Project Manager RMS Project Engineer	Detailed design
	The footprint of the site (including site compound, accesses and construction areas) will be clearly delineated in accordance with *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Exclusion zones will include tree protection zones around trees to be retained in proximity to the proposed work (such as at the site compounds) in accordance with the *Australian Standard 4970-2009 Protection of trees on development sites*.	RMS Project Engineer	Construction
	Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). These guidelines cover the felling of both non-habitat and habitat trees and the rescue and relocation of fauna. An experienced, licensed ecologist or appropriately trained Roads and Maritime staff is to undertake pre-clearing surveys prior to vegetation removal to inspect trees for the presence of fauna. If fauna is identified, a licensed ecologist is to be engaged to perform any spotter catcher duties required.	RMS Project Engineer RMS Environmental Officer Ecologist	Prior to construction
	Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Manual removal of vegetation is preferred to avoid mulch entering the river.	RMS Project Engineer	During construction
	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Manager RMS Project Engineer	During construction

Impact	Environmental safeguards	Responsibility	Timing
Removal of threatened species habitat and habitat features	Habitat removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction
	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Manager RMS Project Engineer	During construction
Removal of threatened plants	Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager	During construction
	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened flora species, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Engineer	During construction
Aquatic impacts	Aquatic habitat will be protected in accordance with *Guide 10: Aquatic habitats and riparian zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (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 (Fisheries NSW) 2013).	RMS Project Manager RMS Project Engineer	During construction
	Stumps of trees cleared are to be left in situ to protect creek bank stability.	RMS Project Manager RMS Project Engineer	During construction
	Controls (such as drop nets and shade cloths) will be used when required during overwater activities to prevent entry of construction sourced debris entering Leycester Creek.	RMS Project Manager RMS Project Engineer	During construction
Groundwater dependent ecosystems	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	RMS Project Manager	Detailed design

Impact	Environmental safeguards	Responsibility	Timing
Fragmentation of identified habitat corridors	Exclusion zones will be set up at the limit of clearing in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).	RMS Project Manager	During construction
Edge effects on adjacent native vegetation and habitat	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction
Injury and mortality of fauna	Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Should injured fauna be located on the site during the work, local wildlife care groups and/or local veterinarians must be contacted immediately, and arrangements made for the immediate welfare of the animal. The phone number of the local fauna rescue group must be known to the project foreman.	RMS Project Engineer Ecologist	During construction
Invasion and spread of weeds	Weed species will be managed in accordance with *Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction
Invasion and spread of pests	Pest species will be managed in accordance with the *Biosecurity Act 2015*.	RMS Project Manager RMS Project Engineer	During construction
Invasion of yellow crazy ants	Any plant or soil material to be removed from the site would be taken the Lismore Recycling and Recovery Centre in accordance with the General Biosecurity Direction issued under the *Biosecurity Act 2015*. Relevant control measures extending beyond this period will be captured within the proposal Construction Environment Management Plan (CEMP).	RMS Project Manager RMS Project Engineer	During construction
Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction

5.8.5 Biodiversity offsets

Roads and Maritime will provide biodiversity offsets or where offsets are not reasonable or feasible, supplementary measures for impacts that exceed the following thresholds:

a) *any amount of a national or NSW listed critically endangered ecological community in moderate to good condition (except for vegetation planted as part of a road corridor landscaping program); or*

b) *greater than one hectare of any national or NSW listed endangered ecological community in moderate to good condition (except for vegetation planted as part of a road corridor landscaping program); or*

c) *national or NSW listed threatened species habitat (except for vegetation planted as part of a road corridor landscaping program) where either the species is a species credit species or an ecosystem credit species under the Office of Environment and Heritage's (OEH's) Threatened Species Profile Database (TSPD) and where:*

   i. *the species is confirmed or (in the absence of survey) assumed to be present; and*

   ii. *the expected losses exceed the number considered to be negligible under the TSPD; or where expected losses cannot be reliably estimated, where the habitat to be impacted exceeds one hectare.*

d) *net loss of key fish habitats (as defined in Appendix 3 of the Department of Primary Industries Policy and guidelines for fish habitat conservation and management: Update 2013).*

The proposal would not exceed these thresholds and hence biodiversity offsets are not required.

5.9 Aboriginal heritage

5.9.1 Existing environment

The Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) was undertaken by Roads and Maritime's Aboriginal Cultural and Heritage Officer (refer to Appendix B). The PACHCI included a search of the Aboriginal Heritage Information System database (AHIMS). The results of the PACHCI are summarised as follows:

The project, as described in the Project REF was assessed as being unlikely to have an impact on Aboriginal cultural heritage.

The assessment is based on the following due diligence considerations:

- *The project is unlikely to harm known Aboriginal objects or places.*
- *The AHIMS search did not identify moderate to high concentrations of Aboriginal objects and places inside the study area. (Ref AHIMS Report, attached)*
- *The study area does contain landscape features (River Banks and Waterways) that could indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's Due diligence Code of Practice for the Protection of Aboriginal objects in NSW and the Roads and Maritime Services' procedure.*
- *The cultural heritage potential of the study area appears to be reduced due to past disturbance. (Bridge Construction and Maintenance).*

Review of the National Native Title Tribunal (NNTT) Online Register (February 2019) indicates that the broader area is subject to an active and registered Native Title Claim NC2013/2018 - Widjabul Wia-bal People. The claim area is described as being located on the Far North Coast of NSW inland from the coast and commencing on the southern boundary of Border Ranges National Park, south to the western boundary of Tuckean Broadwater, east of the towns of Kyogle and Casino. Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an act is to take place. Roads and Maritime is therefore required to issue notification to representatives of the Native Title holders for their consideration and comment prior to undertaking the works. Roads and Maritime have met on-site

with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works and provided written notification of the project. In relation to clause 24KA of the Native Title Act 1993, the notification process has been followed, and a letter sent for use of the site compound for consideration and comment.

5.9.2 Potential impacts

Construction

Minor excavation required at the site has potential to uncover unexpected Aboriginal objects (including skeletal remains). Safeguards are provided.

Operation

It is not expected that following completion of the proposal the operation of Colemans Bridge would have any impact on Aboriginal heritage.

5.9.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Aboriginal heritage	• *The Standard Management Procedure - Unexpected Heritage Items* (Roads and Maritime,) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime 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 • All works in the vicinity of the find must cease and the Roads and Maritime Services Aboriginal cultural heritage officer and regional environment manager contacted immediately • Work will only re-commence once the requirements of that Procedure have been satisfied.	Contactor	Detailed design/pre-construction	Section 4.9 of QA *G36 Environment Protection*
	All personnel working on-site must be advised of their responsibilities under the NPW Act.	All personnel on-site	Pre-construction	

5.10 Other impacts

5.10.1 Existing environment and potential impacts

Environmental factor	Existing environment	Potential impacts
Air quality	There are no OEH air quality records for northern NSW; however, given` the site comprises a relatively low usage bridge, it would be expected that low volumes of vehicle emissions would occur on a regular ongoing basis and dust emissions are likely to be very low.	The works would result in minor elevated emissions during construction from plant and equipment; however, it is unlikely this would be significant when compared to background emissions from regular vehicle movements. The proposal has potential for minor emissions associated with lead paint flakes from Colemans Bridge. Safeguards for the management of lead paint flakes are included in Section 5.10.2.
Waste and resource use	The works site occurs on the Leycester Creek and in proximity to the Wilsons River which have potential to be polluted and transport pollution to areas away from the site.	Waste generated from the proposal is expected to include: • Redundant bridge materials • Lead-based paint flakes • Packaging materials (eg machinery oil/lubricant packaging etc), off-cuts etc • Potential chromated copper arsenate (CCA) timber offcuts and saw dust associated with parts of the timber trestle piers to be removed. • Liquid waste from portable toilets. Uncontained waste has the potential to disperse into the surrounding environment and cause visual impacts and potential harm to aquatic flora and fauna. Waste products may also transport contaminants that may degrade local water quality (eg fuels and oils). The proposal would be undertaken to ensure minimal impacts are generated from waste material produced on-site by ensuring that all waste is collected and disposed of or recycled in accordance with Roads and Maritime waste disposal protocols and OEH guidelines. No materials would be used in a manner that poses a risk to public safety. Hazardous waste would be separated from other waste on-site which would subsequently reduce the risk of contamination of non-hazardous waste streams. Separation on-site also reduces the volume of waste to be stored on-site and assists with secure storage of waste, which in-turn reduces the risk of contamination of the surrounding environment due to loss of containment of waste. To further reduce risks associated with waste, the volume of waste stored on-site would be limited to an amount which could be removed from site within a short timeframe; thereby allowing for complete removal of all waste in the event of a flood warning.

Environmental factor	Existing environment	Potential impacts
Utilities	There is an attached sewer main (exterior of the upstream walkway) and an attached water main (downstream walkway). A powerline is located on the downstream side of the bridge which also traverses part of the compound site at Pritchard Park. The proposal does not require any utility adjustments and poses minimal risk to these utilities.	Damage to utilities in the vicinity of the proposal.

5.10.2 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Reference
Air quality	Vegetation or other materials are not to be burnt on-site.	RMS Project Engineer	Construction	
	Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.	RMS Project Engineer	Construction	
	Stockpiles or areas that may generate dust are to be managed to suppress dust emissions in accordance with the Roads and Maritime Services *Stockpile Site Management Guideline (EMS-TG-10).*	RMS Project Engineer	Construction	
Waste	Any plant or soil material to be removed from the site would be taken the Lismore Recycling and Recovery Centre in accordance with the General Biosecurity Direction for yellow crazy ant invasion in the Lismore LGA issued under the *Biosecurity Act 2015*.	RMS Project Engineer	Construction	
	Potentially contaminated waste/ hazardous waste is to be stored separately from other waste streams generated at the site.	RMS Project Engineer	Construction	
	To minimise the risk of impacts from flooding, the quantity of waste stored on-site is not to exceed the volume of waste that can be removed in one to two days.	RMS Project Engineer	Construction	
	Potentially contaminated waste/ hazardous waste is to be stored separately from other waste streams generated at the site.	RMS Project Engineer	Construction	
	To minimise the risk of impacts from flooding, the quantity of waste stored on-site is not to exceed the volume of waste that can be removed in a short timeframe.	RMS Project Engineer	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	Resource management hierarchy principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is undertaken as a last resort. (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).	RMS Project Engineer	Pre-construction, construction.	
	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.	RMS Project Engineer	Construction	
	There is to be no disposal or re-use of construction waste on to other land.	RMS Project Engineer	Construction	
	Waste is not to be burnt on-site.	RMS Project Engineer	Construction	
	Waste material is not to be left on-site once the work has been completed.	RMS Project Engineer	Construction	
	Non-recyclable wastes are to be collected and disposed of at licenced waste facilities only.	RMS Project Engineer	Construction	
	Temporary storage of contaminated waste at the site compound is to be in sealed containers within a self-safe storage container and double bunded and sign posted as contaminated waste.	RMS Project Engineer	Construction	
	Storage of hazardous waste (ie removed lead paint flakes and dust), restricted solid waste or liquid waste (or a combination of these) on-site at any time is not to exceed five tonnes otherwise an Environment Protection Licence under the POEO Act is required.	RMS Project Engineer	Construction	
	Any contaminated waste generated by the proposal is to be disposed of in accordance with the EPA approved methods of waste disposal.	RMS Project Engineer	Construction	
	Bulk project waste (eg fill) sent to a site not owned by Roads and Maritime (excluding Office and Environment and Heritage licensed landfills) for land disposal is to have prior formal written approval from the landowner, in accordance with *Environmental Direction No. 20 – Legal Off-site disposal of Bulk RTA Project Wastes.*	RMS Project Engineer	Construction	
	Any CCA treated off cuts and saw dust will be stored in a dedicated storage area in the site compound for as short a duration as possible. Where possible, CCA timber will be stacked clear of the ground and preferably covered to avoid an increase in moisture content as a result of contact	RMS Project Engineer	Construction	

Impact	Environmental safeguards	Responsibility	Timing	Reference
	and to lessen any possibility of leaching of substances to the ground. Disposal of off-cuts and waste treated timber will follow OEH's Protocols for Recycling Redundant Utility Poles and Bridge Timbers in New South Wales. For CCA and /or creosote preservative treated offcuts, the disposal facility is a lined landfill with an appropriate leachate management system with license conditions to receive waste.			
	All work will be undertaken according to *Roads and Maritime Specifications B223 (Management of Lead Chromium and Asbestos in Bridge Maintenance Painting) and B220 (Protective treatment of Bridge Steel Work)* and *AS4361.1: Guide to lead paint management, Part 1: Industrial Application.*	RMS Project Engineer	Construction	
Utilities	Prior to the commencement of works: • the location of existing utilities and relocation details will be confirmed prior to the commencement of the project.	RMS Project Manager	Detailed design/pre-construction	

5.11 Cumulative impacts

Under Clause 228 of the EP&A Regulation 2000, any cumulative environmental effect with other existing or likely future activities must be taken into account when assessing the impact of an activity for the purposes of Part 5 of the EP&A Act.

5.11.1 Broader program of work

Timber Truss Conservation Strategy (2012)

Colemans Bridge is one of 26 bridges identified for conservation in the *Roads and Maritime Timber Truss Bridge Conservation Strategy*, which was developed in consultation with the Heritage Council of NSW. The strategy was developed to address the long-term management of these structures and aims to establish a balance between infrastructure provision and heritage conservation. In accordance with the strategy, RMS is required to:

- Retain a minimum of 26 timber truss road bridges until 2032 (and retain a minimum of 20 beyond 2032)
- Use traditional methods and materials where possible and where upgrading is not required
- Upgrade bridges for strength and safety as required in order to ensure their ongoing safety and operability
- The Strategy mentions the need to make use of modern materials to achieve required load capacities, with all design solutions developed on a case-by-case basis
- Continue to improve conservation knowledge and skills through training
- Continue to improve engineering knowledge and understanding through research.

Timber Truss Bridges: Overarching Conservation Management Plan (2018)

The purpose of this Conservation Management Plan (CMP) – recently endorsed by the NSW Heritage Office - is to guide the conservation and management of the bridges to be retained under the Timber Truss Bridges Conservation Strategy into the future, with a continuing role and use in the life of communities. It states that:

- For each individual bridge a more detailed bridge specific CMP will be written by RMS (informed by this overarching CMP)
- The CMP is intended to inform all decision making for the conservation and management of each State-listed timber truss bridge until bridge specific CMPs are endorsed.

While the CMP details the importance of heritage management in the treatment of significant bridges, it acknowledges that it is but one of a number of agency priorities that include:

- Making safety paramount while delivering services and an effective infrastructure program
- Meeting customer and community needs and enhancing economic and social outcomes.

It is noted that although a bridge-specific CMP is planned for Colemans Bridge, it is yet to be completed. This means that the Overarching CMP is the main decision-making document in relation to heritage management and planning for the bridge at present.

5.11.2 Other projects and developments

The proposal has the potential to have cumulative environmental impacts with other existing or likely future activities in the locality. Minor upgrade works involving painting and maintenance will be undertaken concurrently on the nearby Fawcetts Bridge which will contribute to minor cumulative impacts. No other local projects are considered likely to contribute to cumulative impacts.

It is considered that other impacts from the works associated with Fawcetts Bridge would not substantially contribute to negative cumulative impacts in the locality. Any potential impacts on the environment from the proposal would also be minimised with the implementation of safeguards provided in the REF for the project. When finished the project would result in social, economic and safety benefits for the local and broader community.

5.11.3 Potential impacts

The proposal is expected to add to a number of cumulative impacts during construction including resource consumption, disruption to traffic, noise impacts and generation of greenhouse gas emissions (eg through operation of vehicles and equipment). However, the extensive mitigation measures stated within Section 6 aim to minimise the extent to which the proposal contributes to cumulative adverse environmental impacts.

6. Environmental management

6.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in the REF 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 approved by the Roads and Maritime Environment Officer, Northern Region 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 *G10 – Traffic Management.*

6.2 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 6-1.

Table 6-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
1.	Non-Aboriginal heritage	Application be made to the NSW Heritage Division (OEH) for a Section 57(2) exemption to facilitate the Project prior to works on bridge: *The appropriate standard exemption type would be Type (7): Minor activities with little or no adverse impact on heritage significance*	RMS Project Manager	Pre-construction	
2.		The bridge and its setting will be subject to a pre and post-works archival photographic recording. The recording will be undertaken by a suitably qualified professional and meet NSW Heritage Office standards as per: *NSW Heritage Division (OEH). 2005. Photographic Recording of Heritage Items using Film or Digital Capture.* When the archival record is complete, it will be made available to the Richmond River Historical Society; Richmond Valley Council & Library (Local History Collection) and NSW Heritage Office.	RMS Project Manager	Pre-construction	Policy11 of RMS' *Timber Truss Bridge Overarching CMP* (2018),
3.		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. Work will only re-commence once the requirements of that Procedure have been satisfied.	RMS Project Manager RMS Project Engineer	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
4.	Communication Plan	A Communication Plan (CP) would be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP would include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).	Roads and Maritime/ Contractor	Pre-construction	
5.	Notification	All businesses, residential properties and other key stakeholders (eg schools, council, bus operators) affected by the activity would be notified at least 10 working days prior to commencement of the activity. Project/ community updates would be provided throughout the duration of works as relevant. Notification would utilise both digital and conventional (non-digital) modes of communication (eg media release, letter box drops, newsletters and regular updates to a project website). Notification would include an information package, including contact name and number for enquiries or complaints, the expected timeframe of works and any planned or potential disruptions to utilities/ services and changed road and traffic conditions. The package is also to include details on the Colemans Bridge/ road closure, the available detours alternative transport and pedestrian access. As part of the notification process, advanced warning signage would be established prior to and during the work to ensure road users are aware of the road closure and detours. Directional signage is to be placed along the detour routes.	Roads and Maritime project manager and communications officer	Pre-construction and during construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Additional and immediate notification to all affected stakeholders would also be undertaken if walkway access across the bridge is restricted. As required, Roads and Maritime Services shall issue notification to representatives of the Native Title claim NC2013/2018 - Widjabul Wia-bal People, for their consideration and comment prior to undertaking the works.			
6.	Consultation	Ongoing stakeholder and community consultation would be undertaken in accordance with the *Roads & Maritime Communication Toolkit*. Consultation would include: • Lismore City Council • Residents and businesses within 500 m of the proposal • Businesses at the north-east end of Union Street (between the low railway overpass and Colemans Bridge) who may require heavy/high vehicle access • Fire and Emergency services • Bus operators • Local schools • Recreation waterway users, including Lismore Rowing Club/ Far North Coast Canoe Club • Operators of community services and facilities, including Winsome and Lismore Soup Kitchen • Vulnerable and homeless people that could be directly affected by the works.	Roads and Maritime project manager and communications officer	Pre-construction and during construction	
7.	Noise and vibration specific notification and consultation	Implement notification and community consultation measures with regard to airborne noise and ground-borne vibration impacts from the works, including: • Periodic notification of all identified receivers (monthly letterbox drop or equivalent). Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours	Roads and Maritime project manager and communications officer	Pre-construction and during construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Website • Project information line • Construction Response Line • Email distribution list.			
8.	Traffic	As per the notification process, advanced warning signage would be established prior to and during the work to ensure road users are made aware of changed traffic conditions and detour directions. Excluding the required detours, where possible, current traffic movements and property accesses would be maintained during the work. Any disturbance would be minimised to prevent unnecessary traffic delays.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction	
9.	Pedestrian access	Pedestrian access to, and use of, at least one of the bridge's walkways at any one time is to be maintained and remain accessible during the works.	Roads and Maritime project engineer and works supervisor	Pre-construction and during construction	
10.	Waterway	As required, advanced warning signage and/or beacons (appropriate for any applicable day and night time maritime requirements) would be established prior to and during the work to ensure any users of the local waterway(s) are aware of restricted access, changed navigational conditions or hazards within the work area and waterway.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction	
11.	School bus services	If a potential impact to a school bus service arises or becomes know, undertake and maintain ongoing consultation and cooperation between Roads and Maritime and any potentially affected school bus service providers prior to and for the duration of the project, to ensure no adverse or unmanageable impact to important services.	Roads and Maritime project manager and communications officer	Pre-construction and during construction	
12.	Complaints	A complaint handling procedure and register would be included in the CEMP and would include that all complaints would be responded to within 24 hours.	Roads and Maritime project manager and communications officer	During construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
13.	Health and safety	Suitable site induction relating to site specific hazards would be undertaken for all contractor and Roads and Maritime staff. The work would be undertaken in accordance with all NSW health and safety legislative requirements and relevant Australian Standards.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction	
14.	Vulnerable and homeless people	Where appropriate, Roads and Maritime, in consultation and with the support of relevant agencies and community services (eg Family and Community Services; the Winsome and Lismore Soup Kitchen Inc), would consult homeless people that could be directly impacted/ displaced by the works and assist in putting them in touch with a relevant support service.	Roads and Maritime project manager and communications officer in consultation with relevant agencies/ organisations	Pre-construction	
15.	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime *Traffic Control at Work Sites Manual* (RTA, 2010), Australian Standard 1742.3 *Manual of uniform control devices* and *QA Specification G10 Control of Traffic* (Roads and Maritime, 2008). The TMP will include: • 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.	RMS Project Manager	Detailed design/ Pre-construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
16.		• All traffic disruptions would be communicated to road users in accordance with Roads and Maritime policy, using the Roads and Maritime traffic alert system, and any other means identified in the Consultation Strategy for the proposal.	RMS Project Engineer	Construction	
17.		• A project-specific consultation strategy must be developed and implemented in accordance with the RMS *Community Involvement – Practice Notes and Resource Manual* and *RMS Minor Project procedure, Communications for minor projects (ILC-MP-TP0-301)*.	RMS Project Manager	Pre-construction	
18.	Pedestrian traffic/ access	Where possible public access to one footway of the bridge is to be provided at all times.	RMS Project Engineer	Construction	
19.	Maritime	All conditions specified by Roads and Maritime – Maritime Division are to be implemented as follows:	RMS Project Manager	Construction	RMS Maritime Navigational Requirements
20.		Any work vessels involved in the project must comply with the relevant NSW Marine Legislation (ie day shapes, lights etc.).	RMS Project Manager	Construction	
21.		Barges, work vessels and crew involved with the project must comply with the *Marine Safety (Domestic Commercial Vessels) National Law Act 2012*.	RMS Project Manager	Construction	
22.		A minimum of one navigable channel span must be open to navigation at all times unless approved by RMS Maritime.	RMS Project Manager	Construction	
23.		Any submerged hazards must be marked with yellow aqua buoys sign written “Warning Submerged Hazard”. These aqua buoys must be lit with yellow flashing lights if hazards are present before sunrise and after sunset.	RMS Project Manager	Construction	
24.		Twenty-Eight (28) days prior to works commencing the applicant must provide Roads and Maritime with a full scope of works including maps noting all obstructions to navigation associated with the proposed works, (vessel/barge anchoring, scaffolding and silt curtain locations etc.) so a Marine Notice	RMS Project Manager	Pre-construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		can be prepared and advertised.			
25.		Channel blocked day shapes and lights to be suspended in the centre of all blocked spans of the bridge ie any works that impact the current bridge navigation channel must be closed. These signals mean vessels will NOT attempt to navigate in that part of the channel: Bridge span blocked or Channel is blocked.	RMS Project Manager	Construction	
26.	Airborne noise/ ground-borne vibration	• In addition to the measures set out in this table, any project specific mitigation measures identified in the environmental impact assessment documentation (eg REF, submissions or representations report) or approval or licence conditions must be implemented.	RMS Project Manager	Pre-construction, construction	
27.		Periodic notification of all receivers within 200 m of works (monthly letterbox drop or equivalent)[1]. Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours. • Website • Project info line • Construction response line • Email distribution list	RMS Project Manager	Pre-construction, construction	
28.		All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers	RMS Project Manager/RMS Project Engineer	Pre-construction, construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures.			
29.		No swearing of unnecessary shouting or loud stereos/ radios on-site. No dropping of materials from height, throwing of metal items and slamming of doors.	Project team	Construction	
30.		Verification noise monitoring is suggested for noisy activities outside standard construction hours. Monitoring of noise and vibration should be undertaken upon receipt of complaints.	RMS Project Manager	Construction	
31.		Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods. If work is required to occur at night, any highly noise emitting activities should be scheduled to occur in the less sensitive evening period, whenever possible. Unless negotiated with the community with consultation documented and approved by Roads and Maritime project manager or permitted under the license there should be no more than: • two consecutive nights per week • three consecutive evenings per week • separated by not less than one week and no more than six evenings or nights per month.	RMS Project Manager	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
32.		In general, the following respite is provided. High noise and vibration generating activities[2] may only be carried out in continuous blocks, not exceeding three hours each, with a minimum respite period of one hour in between each block[3].	RMS Project Engineer/RMS Project Manager	Construction	
33.		Use quieter and less vibration emitting construction methods where feasible and reasonable.	RMS Project Engineer	Construction	
34.		The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Table F.1 of the CNVG.	RMS Project Engineer	Pre-construction, construction	
35.		The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on-site unless compliant with the criteria in Table F.1 of the CNVG.	RMS Project Engineer	Construction	
36.		Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down when not in use. Noise-emitting plant to be directed away from sensitive receivers.	RMS Project Engineer	Construction	
37.		Plan traffic flow, parking and loading/ unloading areas to minimise reversing movements within the site.	RMS Project Engineer	Construction	
38.		Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on-site and for any out of hours work.	RMS Project Engineer	Construction	
39.		Loading and unloading of materials/ deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away	RMS Project Engineer	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		from sensitive receivers. Dedicated loading/ unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.			
40.		Whenever practical, work areas should be screened to reduce noise levels at receivers. Many of the proposed activities would be confined to discreet work areas and are thus suitable for temporary screening. Highly noise emitting activities occurring outside standard construction hours, particularly at night, should be screened. If traffic diversions are necessary to permit temporary screening this should be considered. Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.	RMS Project Engineer/RMS Project Manager	Construction	
41.	Hydrological impacts	A CEMP must be prepared in accordance with the specifications set out in the *QA Specification G36 - Environmental Protection (Management) System* to guide the implementation of environmental impact mitigation measures, identify key roles and responsibilities for environmental monitoring and methods of reporting incidents.	RMS Project Manager	Pre-construction	
42.	Erosion sedimentation	A site-specific Erosion and Sediment Control Plan is to be prepared and implemented as part of the CEMP. The plan is to identify detailed measures and controls to be applied to minimise erosion and sediment control risks including (where relevant) but not limited to: runoff, diversion and drainage points, sumps, scour protection; stabilising disturbed areas as soon as possible; check dams, fencing and swales and staged implementation arrangements.	RMS Project Manager	Pre-construction, construction	Section 2.2 of QA G38 *Soil and Water Management*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		The plan is to also 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. Work in areas where soil may be disturbed is to only commence once all relevant erosion and sediment controls have been established. The controls are to be maintained in place until the work is complete and all exposed erodible materials are stable.			
43.		Erosion and sedimentation controls must be checked and maintained (including clearing of sediment from behind barriers) on a regular basis (including after any precipitation events) and records kept and provided on request.	RMS Project Engineer	Pre-construction, construction	
44.		Disturbance of natural sediments and vegetation must be minimised.	RMS Project Engineer	Pre-construction, construction	
45.		Erosion and sediment control measures must not be removed until the work is complete or disturbed areas are stabilised.	RMS Project Engineer	Construction, post-construction	
46.		Maintenance of site compounds must be in accordance with the RMS Stockpile Site Management Guideline (EMS-TG-10).	RMS Project Engineer	Pre-construction, construction	
47.		Cleaning of tools and equipment must occur within a designated wash-down bay. The wash-down bay must be bunded and placed so that water does not flow directly into Leycester Creek or the Wilsons River, but is captured and contained.	RMS Project Engineer	Construction	
48.		Water utilised for cleaning of tools must be minimised and obtained from a licensed location or town water supply.	RMS Project Engineer	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
49.		Clean equipment and vehicles must be used, with equipment being cleaned down before being brought to the site.	RMS Project Engineer	Pre-construction, construction	
50.		A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Roads and Maritime *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 Roads and Maritime and EPA officers).	RMS Project Manager	Detailed design/ Pre-construction	Section 4.3 of QA *G36 Environment Protection*
51.		A spill containment kit for aquatic and terrestrial spills must be available at all times. The spill kit must be appropriately sized for the volume of substances at the work site. All personnel must be made aware of the location of the kit and trained in its effective deployment.	RMS proposal Manager	Pre-construction, construction	
52.	Reduced water quality	If a spill occurs, the Roads and Maritime's Environmental Incident Classification and Reporting Procedure must be followed, and the Roads and Maritime Project Manager notified as soon as practicable.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
53.		Locate stockpiles of dispersible material away from areas of concentrated overland flow.	RMS Project Manager/ Project Engineer	Construction	
54.		Required fuels and other liquids must be stored in self-safe chemical storage containers.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
55.		Unnecessary storage of fuels, lubricants or other compounds on-site must be avoided.	RMS Project Manager/ Project Engineer	Pre-construction, construction	
56.		Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 m from drainage lines or waterways otherwise a double bund is required.	RMS Project Manager/ Project Engineer	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
57.		All equipment must be maintained in good working order and operated according to manufacturer's specifications.	RMS Project Engineer	Pre-construction, construction	
58.		All work must be undertaken according to RMS *Specifications B223 (Management of Lead Chromium and Asbestos in Bridge Maintenance Painting)* and *B220 (Protective treatment of Bridge Steel Work)* and *AS4361.1: Guide to lead paint management, Part 1: Industrial Application.*	RMS Project Engineer	Construction	
59.		Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.	RMS Project Engineer	Construction	
60.		Prepare an emergency response plan for flood events for the proposed work. Include a procedure for rapid removal in the emergency response plan and location for the material.	RMS Project Manager	Pre-construction	
61.		Establish the compound site in such a way to limit potential impacts from flooding (eg on as high a ground as possible and that are readily removed in the event of a flood).	RMS Project Manager	Construction	
62.	Flooding	Include a Work Method Statement (WMS) in CEMP on compound site evacuation procedure. Issues to be addressed in the WMS include: • Responsibility for monitoring flood threat/ flood warning information and how it is to be done • Training for staff on evacuation • Demonstrate that specific equipment for evacuation is readily available.	RMS Project Manager	Pre-construction	
63.	Contaminated land	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	RMS Project Manager	Detailed design/Pre-construction	Section 4.2 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or EPA.			
64.	Soils	Imported site compound/ stockpile base materials must be sourced as clean-fill from a licensed quarry or approved site (if required).	RMS Project Manager	Pre-construction	
65.		Upon completion of the work and usage of the site compound, these areas must be re-established to similar existing conditions.	RMS Project Manager	Post-construction	
66.	Landscape character and visual impact	All working areas will be maintained, kept free of rubbish and cleaned up at the end of each working day.	RMS Project Engineer	Construction	
67.		Soil disturbance will be minimised where possible.	RMS Project Engineer	Construction	
68.		The bridge will be re-painted with the timber truss elements in white and steel elements in black.	RMS Project Engineer	Construction	
69.		Any temporary site lighting is to be installed and operated in accordance with AS4282:1997 *Control of the Obtrusive Effect of Outdoor Lighting*.	RMS Project Engineer	Construction	
70.		Bridge works are to be managed in accordance with Roads and Maritime *Bridge Aesthetics guidelines, 2012.*	RMS Project Manager	Construction	
71.		At the completion of works all areas including compound areas will be rehabilitated.	RMS Project Manager	Construction	
72.	Removal of native vegetation	Native vegetation removal will be minimised through detailed design.	RMS Project Manager RMS Project Engineer	Detailed design	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
73.		The footprint of the site (including site compound, accesses and construction areas) will be clearly delineated in accordance with *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Exclusion zones will include tree protection zones around trees to be retained in proximity to the proposed work (such as at the site compounds) in accordance with the *Australian Standard 4970-2009 Protection of trees on development sites*.	RMS Project Engineer	Construction	
74.		Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). These guidelines cover the felling of both non-habitat and habitat trees and the rescue and relocation of fauna. An experienced, licensed ecologist or appropriately trained Roads and Maritime staff is to undertake pre-clearing surveys prior to vegetation removal to inspect trees for the presence of fauna. If fauna is identified, a licensed ecologist is to be engaged to perform any spotter catcher duties required.	RMS Project Engineer RMS Environmental Officer Ecologist	Prior to construction	
75.		Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Manual removal of vegetation is preferred to avoid mulch entering the river.	RMS Project Engineer	During construction	
76.		The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Manager RMS Project Engineer	During construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
77.	Removal of threatened species habitat and habitat features	Habitat removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction	
78.		The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Manager RMS Project Engineer	During construction	
79.	Removal of threatened plants	Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager	During construction	
80.		The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened flora species, not assessed in the biodiversity assessment, are identified in the proposal site.	RMS Project Engineer	During construction	
81.	Aquatic impacts	Aquatic habitat will be protected in accordance with *Guide 10: Aquatic habitats and riparian zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (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 (Fisheries NSW) 2013).	RMS Project Manager RMS Project Engineer	During construction	
82.		Stumps of trees cleared are to be left in situ to protect creek bank stability.	RMS Project Manager RMS Project Engineer	During construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
83.		Controls (such as drop nets and shade cloths) will be used when required during overwater activities to prevent entry of construction sourced debris entering Leycester Creek.	RMS Project Manager RMS Project Engineer	During construction	
84.	Groundwater dependent ecosystems	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	RMS Project Manager	Detailed design	
85.	Fragmentation of identified habitat corridors	Exclusion zones will be set up at the limit of clearing in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).	RMS Project Manager	During construction	
86.	Edge effects on adjacent native vegetation and habitat	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction	
87.	Injury and mortality of fauna	Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). Should injured fauna be located on the site during the work, local wildlife care groups and/or local veterinarians must be contacted immediately, and arrangements made for the immediate welfare of the animal. The phone number of the local fauna rescue group must be known to the project foreman.	RMS Project Engineer Ecologist	During construction	
88.	Invasion and spread of weeds	Weed species will be managed in accordance with *Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction	
89.	Invasion and spread of pests	Pest species will be managed in accordance with the *Biosecurity Act 2015*.	RMS Project Manager RMS Project Engineer	During construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
90.	Invasion of yellow crazy ants	Any plant or soil material to be removed from the site would be taken the Lismore Recycling and Recovery Centre in accordance with the General Biosecurity Direction issued under the *Biosecurity Act 2015*. Relevant control measures extending beyond this period will be captured within the proposal Construction Environment Management Plan (CEMP).	RMS Project Manager RMS Project Engineer	During construction	
91.	Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	RMS Project Manager RMS Project Engineer	During construction	
92.	Aboriginal heritage	• *The Standard Management Procedure - Unexpected Heritage Items* (Roads and Maritime,) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime 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 • All works in the vicinity of the find must cease and the Roads and Maritime Services Aboriginal cultural heritage officer and regional environment manager contacted immediately • Work will only re-commence once the requirements of that Procedure have been satisfied.	Contactor	Detailed design/pre-construction	Section 4.9 of QA *G36 Environment Protection*
93.		All personnel working on-site must be advised of their responsibilities under the NPW Act.	All personnel on-site	Pre-construction	
94.	Air quality	Vegetation or other materials are not to be burnt on-site.	RMS Project Engineer	Construction	
95.		Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.	RMS Project Engineer	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
96.		Stockpiles or areas that may generate dust are to be managed to suppress dust emissions in accordance with the Roads and Maritime Services *Stockpile Site Management Guideline (EMS-TG-10)*.	RMS Project Engineer	Construction	
97.	Waste	Any plant or soil material to be removed from the site would be taken the Lismore Recycling and Recovery Centre in accordance with the General Biosecurity Direction for yellow crazy ant invasion in the Lismore LGA issued under the *Biosecurity Act 2015*.	RMS Project Engineer	Construction	
98.		Potentially contaminated waste/ hazardous waste is to be stored separately from other waste streams generated at the site.	RMS Project Engineer	Construction	
99.		To minimise the risk of impacts from flooding, the quantity of waste stored on-site is not to exceed the volume of waste that can be removed in one to two days.	RMS Project Engineer	Construction	
100.		Potentially contaminated waste/ hazardous waste is to be stored separately from other waste streams generated at the site.	RMS Project Engineer	Construction	
101.		To minimise the risk of impacts from flooding, the quantity of waste stored on-site is not to exceed the volume of waste that can be removed in a short timeframe.	RMS Project Engineer	Construction	
102.		Resource management hierarchy principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is undertaken as a last resort. (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).	RMS Project Engineer	Pre-construction, construction.	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
103.		Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.	RMS Project Engineer	Construction	
104.		There is to be no disposal or re-use of construction waste on to other land.	RMS Project Engineer	Construction	
105.		Waste is not to be burnt on-site.	RMS Project Engineer	Construction	
106.		Waste material is not to be left on-site once the work has been completed.	RMS Project Engineer	Construction	
107.		Non-recyclable wastes are to be collected and disposed of at licenced waste facilities only.	RMS Project Engineer	Construction	
108.		Temporary storage of contaminated waste at the site compound is to be in sealed containers within a self-safe storage container and double bunded and sign posted as contaminated waste.	RMS Project Engineer	Construction	
109.		Storage of hazardous waste (ie removed lead paint flakes and dust), restricted solid waste or liquid waste (or a combination of these) on-site at any time is not to exceed five tonnes otherwise an Environment Protection Licence under the POEO Act is required.	RMS Project Engineer	Construction	
110.		Any contaminated waste generated by the proposal is to be disposed of in accordance with the EPA approved methods of waste disposal.	RMS Project Engineer	Construction	
111.		Bulk project waste (eg fill) sent to a site not owned by Roads and Maritime (excluding Office and Environment and Heritage licensed landfills) for land disposal is to have prior formal written approval from the landowner, in accordance with *Environmental Direction No. 20 – Legal Off-site disposal of Bulk RTA Project Wastes.*	RMS Project Engineer	Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
112.		Any CCA treated off cuts and saw dust will be stored in a dedicated storage area in the site compound for as short a duration as possible. Where possible, CCA timber will be stacked clear of the ground and preferably covered to avoid an increase in moisture content as a result of contact and to lessen any possibility of leaching of substances to the ground. Disposal of off-cuts and waste treated timber will follow OEH's Protocols for Recycling Redundant Utility Poles and Bridge Timbers in New South Wales. For CCA and /or creosote preservative treated offcuts, the disposal facility is a lined landfill with an appropriate leachate management system with license conditions to receive waste.	RMS Project Engineer	Construction	
113.		All work will be undertaken according to *Roads and Maritime Specifications B223 (Management of Lead Chromium and Asbestos in Bridge Maintenance Painting) and B220 (Protective treatment of Bridge Steel Work)* and *AS4361.1: Guide to lead paint management, Part 1: Industrial Application.*	RMS Project Engineer	Construction	
114.	Utilities	Prior to the commencement of works: • the location of existing utilities and relocation details will be confirmed prior to the commencement of the project.	RMS Project Manager	Detailed design/pre-construction	

6.3 Licensing and approvals

Roads and Maritime do not require a licence from *Department of Primary Industries – Lands* to access Colemans Bridge (which is located within Crown land). Access by Roads and Maritime would be under s158 of the *Roads Act 1993*. Roads and Maritime however require consent of the owner of any land under s158 of the *Roads Act 1993* (rather than a licence) to access Leycester Creek which is Crown land.

Licensing and approvals for the proposal are summarised in Table 6-2.

Table 6-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
Crown Land Management Act 2016	RMS' use and occupation of Crown land within the project footprint can proceed with notification to the department under s175 Roads Act. Notification should include environmental approvals/ the determined REF, prior to commencement of works. It appears that there are no other parties with an interest in the impacted Crown land that would also require notification. Crown Lands have concurred this is the most appropriate method to access the site for the proposal.	Prior to construction
Native Title Act 1993	Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an act is to take place. Roads and Maritime is therefore required to issue notification to representatives of the Native Title holders for their consideration and comment prior to undertaking the works. Roads and Maritime have met on-site with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works. In relation to clause 24KA of the *Native Title Act 1993*, the notification process will be followed, and a letter sent for use of the site compound.	A minimum of 28 days prior to undertaking the works.
Infrastructure SEPP (ISEPP)	Given the presence of the project on flood liable land, notification of the proposal is required to the local branch of the State Emergency Services (SES), email: erm@ses.nsw.gov.au.	Prior to construction and take into consideration any response to the notice that is received from the State Emergency Service within 21 days after the notice is given.
Protection of the Environment Operations Act 1997	A signed s.143 Notice must be submitted prior to transporting waste generated by or for Roads and Maritime to a place that is not owned by Roads and Maritime and is not a licensed landfill or resource recovery facility.	Prior to transporting waste.

7. 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 EP&A Regulation 2000.

7.1 Justification

Strengthening and maintenance works are required on Colemans Bridge to improve safety and increase the service life of the bridge whilst retaining its heritage value.

The objective of the proposal are to:

- Improve the structural capacity of the bridge through strengthening
- To support bridge longevity and maintain a safe connected road network
- To reduce future maintenance.

With effective implementation of the safeguards and management measures of this REF, environmental impacts associated with undertaking the work would be minor. Unavoidable impacts required for the work are not substantial and would not significantly affect the local environment or community. Overall the environment and community would benefit from the proposal as road safety would be improved.

7.2 Objects of the EP&A Act

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.	Factored into the design of the proposal.
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 considered in Sections 7.21 - 7.24 below.
1.3(c) To promote the orderly and economic use and development of land.	Not relevant to the proposal.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the proposal.
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.	This REF provides a thorough assessment of the environment and recommends extensive safeguards to minimise impacts to the environment with a focus on reducing the impacts of the project.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	This REF provides a thorough assessment of the environment and recommends extensive safeguards to minimise impacts to the environment.
1.3(g) To promote good design and amenity of the built environment.	Factored into the design of the proposal.

Object	Comment
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the proposal.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the proposal.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	The public will be consulted about the proposal.

7.2.1 The precautionary principle

Schedule 2 of the EP&A Regulation 2000 states that "the 'precautionary principle', namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

i. *'Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment.*
ii. *An assessment of the risk-weighted consequences of various options'.*

The precautionary principle has been applied as part the Environmental Assessment (Section 5) undertaken for the proposal. Potential environmental impacts of the proposal will be minimised by the implementation of mitigation measures provided in Section 6.

7.2.2 Intergenerational equity

Schedule 2 of the EP&A Regulation 2000 defines inter-generational equity as "the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations".

The proposal would not significantly affect the viability of local or threatened species or any TECs. Therefore, local biodiversity values would not be substantially adversely affected by the proposal and would be maintained for future generations. Without the works proceeding, traffic safety and efficiency would rapidly decline. Overall, the socio-economic, safety and environmental safety benefits of the proposal would occur only at limited minimal potential environmental expense.

7.2.3 Conservation of biological diversity and ecological integrity

Schedule 2 of the EP&A Regulation 2000 requires the *"conservation of biological diversity and ecological integrity",* namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

The impacts to ecological integrity and conservation of biological diversity at the site have been thoroughly assessed as part of this REF. No threatened species or communities are likely to be significantly affected by the proposal. No populations of native species are likely to be made locally rare or unviable as a result of the proposal. Consequently, the ecological integrity and biological diversity would be maintained at the site.

7.2.4 Improved valuation, pricing and incentive mechanisms

The following principles of valuation, pricing and incentive as per Schedule 2 of the EP&A Regulation 2000 are acknowledged as part of this review:

i. *Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement.*
ii. *The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.*
iii. *Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

It is difficult, however, to assign a monetary value to the environment of a locality or to environmental resources not considered for commercial use. Roads and Maritime has taken an approach to manage the potential environmental impacts of the proposal by identifying appropriate safeguards (this REF) to mitigate adverse environmental effects with financial support for implementation.

7.3 Conclusion

The proposed strengthening and maintenance of Colemans Bridge, Lismore 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. The REF 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 heritage and socio-economic factors. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would in the long-term improve the traffic safety and amenity of Colemans Bridge and reduce ongoing maintenance requirements. 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 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 the Environment and Energy is not required.

8. 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.

David Havilah

Senior Ecologist

GeoLINK

Date: 28 June 2019

I have examined this review of environmental factors and accept it on behalf of Roads and Maritime Services.

Russell Leong

Project Engineer

Regional Maintenance Delivery, Bridge Works Northern

Date:

9. References

Department of Urban Affairs and Planning [DUAP] (1995/1996). *Is an EIS required?* Department of Urban Affairs and Planning.

GeoLINK (2019). *Colemans Bridge Strengthening and Maintenance; Socio-economic impact assessment.* Report for Roads and Maritime.

NSW Roads and Maritime Services (2012). *Timber Truss Bridge Conservation Strategy: Submissions Report and Revised Conservation Strategy.* Prepared by Futurepast Heritage Consulting Pty Ltd & NSW Roads and Maritime Services.

SoundIN (2019). *Colemans Bridge, Lismore: Noise and Vibration Impact Assessment.* Report for Roads and Maritime.

Tuck, D. (2019). *Statement of Heritage Impact: Colemans Bridge Strengthening and Maintenance*. Report to Roads and Maritime.

Terms and acronyms used in this REF

Term / Acronym	Description
AusLink	Mechanism to facilitate cooperative transport planning and funding by Commonwealth and state and territory jurisdictions
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CEMP	Construction environmental management plan
EIA	Environmental impact assessment
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
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.
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
MNES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
Roads and Maritime	NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act
QA Specifications	Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by Roads and Maritime Services

Appendix A

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

Clause 228(2) checklist

In addition to the requirements of the *Is an EIS required?* 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
a) Any environmental impact on a community? The community would not be affected through declines in the local environment as a result of the proposal. Extensive mitigation measures have been designed to reduce environmental impacts on the community to negligible levels (refer to **Section 6**).	Negligible
b) Any transformation of a locality? Temporary transformations of the locality are restricted to the site and comprise of: • Construction and operation of site compound/ stockpile. • Presence and operation of heavy machinery. After completion of the work, permanent transformations would be restricted to Colemans Bridge, including new paintwork. No significant transformation of the locality would occur as a result of the proposal.	Negligible
c) Any environmental impact on the ecosystems of the locality? The ecosystems of the locality would not be affected through declines in local environmental values (eg biodiversity, physical environment) as a result of the proposal. Extensive mitigation measures have been designed to reduce environmental impacts (refer to **Section 6**).	Negligible
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The aesthetic, recreational, scientific or other environmental qualities or value of the locality are not expected to be impacted by the proposal. The character of the general area would largely remain the same post-construction and no significant visual impact or recreational impediment is expected. No reduction in the quality of environmental values associated with noise, water, soil and air quality or significant decreases in biodiversity are likely to occur due to the mitigation measures provided in **Section 6** of this REF. No significant changes to the locality are expected to occur.	Negligible
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The proposal would increase the longevity of Colemans Bridge which has identified special value (heritage) for present or future generations. No other long-term changes in the character or nature of Colemans Bridge or its immediate environs are expected as a result of the proposal.	Negligible

Factor	Impact
f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974)?* With effective implementation of the safeguards provided in **Section 6** of this REF, the proposal is not considered likely to have a significant negative impact on the habitat of any other protected fauna.	Negligible
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? With effective implementation of the safeguards provided in **Section 6** of this REF, the proposal is not considered likely to significantly endanger any species of animal, plant or other form of life.	Negligible
h) Any long-term effects on the environment? No significant negative long-term impacts are considered likely with effective implementation of the proposed mitigation measures in **Section 6** of this REF.	Negligible
i) Any degradation of the quality of the environment? No significant degradation of the quality of the environment is expected with effective implementation of the safeguards in **Section 6** of this REF.	Negligible
j) Any risk to the safety of the environment? The objective of the proposal is to improve safety and increase the service life of Colemans Bridge whilst retaining its heritage value. The proposal is unlikely to pose any significant risk to the safety of the environmental attributes outlined in **Section 6**. Any possible impacts would be minimised with the implementation of the safeguards in **Section 6** of this REF.	Negligible
k) Any reduction in the range of beneficial uses of the environment? The proposal is not likely to result in any reduction in the range of beneficial uses of the environment.	Negligible
l) Any pollution of the environment? Waste materials, lead based paint flakes, fuel spills and sediment have the potential to cause pollution to the environment. However, given the proposed safeguards detailed in **Section 6** of this REF, pollution to the environment is unlikely to occur.	Negligible
m) Any environmental problems associated with the disposal of waste? All waste generated by the proposal would be disposed of in a manner which would not damage or disturb any native flora or fauna or the physical environment. The disposal of waste would be in accordance with Roads and Maritime and EPA approved methods of waste disposal. Safeguards detailed in **Section 6** of this REF would protect the environment from problems associated with all waste disposal.	Negligible

Factor	Impact
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The proposal does not create any demand for resources that are in short supply nor is it likely to result in an increased demand on any natural resources that are likely to become in short supply. Roads and Maritime would attempt to draw supplies and resources from established suppliers having appropriate environmental approvals and standards.	Negligible
o) Any cumulative environmental effect with other existing or likely future activities? The proposal would have minor cumulative impacts (eg resource consumption) but is unlikely to significantly contribute to any cumulative impacts.	Negligible
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The proposal is not expected to have any impacts to coastal processes and coastal hazards, including those under projected climate change conditions.	Negligible

Matters of national environmental significance

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

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? The proposal is not in proximity (10 km search radius) to any World Heritage Properties and as such the proposal is not expected to impact on any World Heritage Properties.	Nil
b) Any impact on a National Heritage place? The proposal is not in proximity (10 km search radius) to any National Heritage places and as such the proposal is not expected to impact on any National Heritage places.	Nil
c) Any impact on a wetland of international importance? The proposal is not in proximity (10 km search radius) to any Wetlands of International Importance, and as such the proposal is not expected to impact on any Wetlands of International Importance.	Nil
d) Any impact on a listed threatened species or communities? Two threatened ecological communities and 52 listed threatened species are listed as occurring within 10 km of Colemans Bridge. No commonwealth listed threatened flora, fauna or ecological communities however are likely to be significantly affected by the proposal (refer to **Section 5.1**).	Nil
e) Any impacts on listed migratory species? Sixteen listed migratory species are listed as occurring within 10 km of Colemans Bridge. No commonwealth listed migratory species however are likely to be significantly affected by the proposal (refer to **Section 5.1**).	Nil
f) Any impact on a Commonwealth marine area? The proposal is not in proximity (10 km search radius) to any Commonwealth marine areas and as such the proposal is not expected to impact upon any Commonwealth marine areas.	Nil
g) Does the proposal involve a nuclear action (including uranium mining)? The proposal does not involve a nuclear action.	Nil

Factor	Impact
h) Additionally, any impact (direct or indirect) on Commonwealth land? Eight Commonwealth lands being Australian Broadcasting Corporation, Australian Telecommunications Commission, Commonwealth Bank of Australia, Commonwealth Trading Bank of Australia, Defence Housing Authority, Defence Service Homes Corporation, Director of War Services Homes, and Defence Lismore GRES depot are listed as occurring within 10 km of Colemans Bridge. The proposal however is not expected to impact upon these lands as the work is restricted to the bridge, site compound and mitigation measures would be implemented to minimise indirect impacts.	Nil

Appendix B

Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI)

Russell Leong **01/04/2019**
Project Engineer
Regional Maintenance Delivery – Bridge Works Northern

Dear Russell

Preliminary assessment results for the Coleman's Bridge (B2594) over Leycester Creek Strengthening and Maintenance (Northern Region)
Based on Stage 1 of the *Procedure for Aboriginal cultural heritage consultation and investigation* (PACHCI).
The project, as described in the Project REF was assessed as being unlikely to have an impact on Aboriginal cultural heritage.

The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search **did not** moderate to high concentrations of Aboriginal objects and places inside the study area. (Ref AHIMS Report, attached)
- The study area **does** contain landscape features (River Banks and Waterways) that could indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Roads and Maritime Services' procedure.
- The cultural heritage potential of the study area appears to be reduced due to past disturbance. (Bridge Construction and Maintenance)

Safe Guards: Please be vigilant for further potential Aboriginal objects once the project commences.
Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional environmental staff to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Roads and Maritime Services' **Unexpected Heritage Item Procedure**.

For further assistance in this matter do not hesitate to contact me.

Yours sincerely

Aboriginal Cultural Heritage Advisor – Western Region

Appendix C

ISEPP consultation checklist

Infrastructure SEPP

Table C1: Council related infrastructure or services

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a *substantial* impact on the stormwater management services which are provided by council?	No	-	ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will *strain* the capacity of the existing road system in a local government area?	No	-	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 *substantial* impact on the capacity of any part of the system?	No	-	ISEPP cl.13(1)(c)
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a *substantial* volume of water?	No	-	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 *minor* or *inconsequential* disruption to pedestrian or vehicular flow?	No	-	ISEPP cl.13(1)(e)
Road and footpath excavation	Will the works involve more than *minor* or *inconsequential* excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No	-	ISEPP cl.13(1)(f)

Table C2: 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 *minor* or *inconsequential?*	No	Colemans Bridge is listed on Roads and Maritime's s170 Heritage and Conservation Register as representative an example of Dare timber truss road bridges, and is regionally significant, primarily on the basis of its technical and historical significance. A Statement of Heritage Impact (SOHI) has been prepared for the proposal including recommended safeguards to avoid any adverse heritage impacts.	ISEPP cl.14

Table C3: Flood liable land and coastal vulnerability

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Flood liable land (Council)	Are the works located on flood liable land? If so, will the works change flood patterns to more than a *minor* extent?	Yes. The works would be unlikely to change flood patterns	Lismore Council has been consulted.	ISEPP cl.15
Flood liable land (SES)	Are the works located on flood liable land (Probable Maximum Flood) and fall under a listed relevant provision (refer 15AA(2))?	Yes. The works are listed under a relevant provision (roads and traffic) and occur on flood liable land.	Notice of the development is to be given to the SES and any response to the notice that is received from the State Emergency Service within 21 days after the notice is given is to be taken into consideration.	ISEPP cl.15AA
Consultation with councils—development with impacts on certain land within the coastal zone	Clause 15A is not triggered as the works do not occur in an area of mapped coastal vulnerability.	No		ISEPP cl.15A

Table C4: 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 *National Parks and Wildlife Act 1974*, or on land acquired under that Act*?*	No	Office of Environment and Heritage	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	Office of Environment and Heritage	ISEPP cl. 16(2)(b)
Aquatic reserves	Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	No	Department of Industry	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998?*	No	Sydney Harbour Foreshore Authority	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 *[Refer to the NSW Rural Fire Service publication Planning for Bush Fire Protection (2006)]*	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 km 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 *Mine Subsidence Compensation Act 1961*?	No	Mine Subsidence Board	ISEPP cl. 16(2)(i)

Appendix D
Database Searches

Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Licensed Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Animals in selected area [North: -28.75 West: 153.23 East: 153.33 South: -28.85] returned a total of 1,150 records of 23 species.
Report generated on 22/03/2019 10:31 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Reptilia	Elapidae	2645	*Cacophis harriettae*		White-crowned Snake	V,P		2	
Animalia	Aves	Anatidae	0214	*Stictonetta naevosa*		Freckled Duck	V,P		3	
Animalia	Aves	Phaethontidae	0107	*Phaethon rubricauda*		Red-tailed Tropicbird	V,P	C	1	
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		6	
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*		Rose-crowned Fruit-Dove	V,P		12	
Animalia	Aves	Podargidae	0314	*Podargus ocellatus*		Marbled Frogmouth	V,P		10	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		25	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		1	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P	C	4	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		1	
Animalia	Aves	Rallidae	0053	*Amaurornis moluccana*		Pale-vented Bush-hen	V,P		1	
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*		Comb-crested Jacana	V,P		5	
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*		Sooty Owl	V,P,3		1	
Animalia	Aves	Monarchidae	0376	*Carterornis leucotis*		White-eared Monarch	V,P		1	
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*		Common Planigale	V,P		1	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	354	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*		Squirrel Glider	V,P		2	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	694	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		1	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*		Little Bentwing-bat	V,P		14	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*		Eastern Bentwing-bat	V,P		4	
Animalia	Mammalia	Vespertilionidae	1336	*Nyctophilus bifax*		Eastern Long-eared Bat	V,P		5	
Animalia	Insecta	Carabidae	I010	*Nurus brevis*		Shorter Rainforest Ground-beetle	E1,3		2	

Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Licensed Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Plants in selected area [North: -28.75 West: 153.23 East: 153.33 South: -28.85] returned a total of 577 records of 26 species.
Report generated on 22/03/2019 10:28 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Apocynaceae	1176	*Ochrosia moorei*		Southern Ochrosia	E1	E	11	
Plantae	Flora	Doryanthaceae	1020	*Doryanthes palmeri*		Giant Spear Lily	V,P		1	
Plantae	Flora	Fabaceae (Caesalpinioideae)	8772	*Senna acclinis*		Rainforest Cassia	E1		1	
Plantae	Flora	Fabaceae (Faboideae)	2833	*Desmodium acanthocladum*		Thorny Pea	V	V	125	
Plantae	Flora	Fabaceae (Faboideae)	9217	*Rhynchosia acuminatissima*		Pointed Trefoil	V		3	
Plantae	Flora	Lauraceae	3491	*Endiandra hayesii*		Rusty Rose Walnut	V	V	1	
Plantae	Flora	Meliaceae	3682	*Owenia cepiodora*		Onion Cedar	V	V	1	
Plantae	Flora	Menispermaceae	7167	*Tinospora smilacina*		Tinospora Vine	E1		2	
Plantae	Flora	Menispermaceae	3691	*Tinospora tinosporoides*		Arrow-head Vine	V		17	
Plantae	Flora	Myrtaceae	11894	*Gossia fragrantissima*		Sweet Myrtle	E1	E	34	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*		Scrub Turpentine	E4A		6	
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*		Native Guava	E4A		1	
Plantae	Flora	Myrtaceae	4290	*Syzygium hodgkinsoniae*		Red Lilly Pilly	V	V	3	
Plantae	Flora	Orchidaceae	6990	^^*Oberonia complanata*		Yellow-flowered King of the Fairies	E1,P,2		3	
Plantae	Flora	Orchidaceae	4581	^^*Sarcochilus dilatatus*		Brown Butterfly Orchid	E1,P,2		2	
Plantae	Flora	Poaceae	4776	*Arthraxon hispidus*		Hairy Jointgrass	V	V	312	
Plantae	Flora	Primulaceae	11951	*Myrsine richmondensis*		Ripple-leaf Muttonwood	E1	E	2	
Plantae	Flora	Proteaceae	5354	*Floydia praealta*		Ball Nut	V	V	7	
Plantae	Flora	Proteaceae	5432	*Hicksbeachia pinnatifolia*		Red Boppel Nut	V	V	2	
Plantae	Flora	Proteaceae	5446	*Macadamia tetraphylla*		Rough-shelled Bush Nut	V	V	2	
Plantae	Flora	Ranunculaceae	5494	*Clematis fawcettii*		Northern Clematis	V	V	13	
Plantae	Flora	Rubiaceae	8297	*Randia moorei*		Spiny Gardenia	E1	E	4	
Plantae	Flora	Rubiaceae	13561	*Triflorensia cameronii*		Cameron's Tarenna	E1		4	
Plantae	Flora	Rutaceae	12433	*Coatesia paniculata*		Axe-Breaker	E1		11	
Plantae	Flora	Santalaceae	5871	*Thesium australe*		Austral Toadflax	V	V	3	
Plantae	Flora	Tiliaceae	6198	*Corchorus cunninghamii*		Native Jute	E1	E	6	

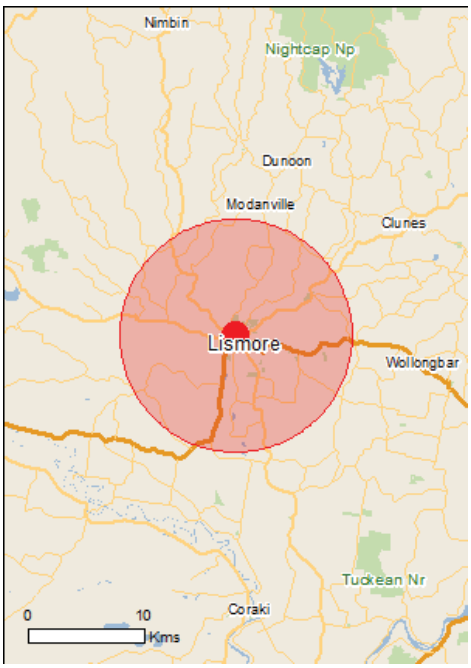
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

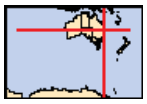
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 22/03/19 09:56:02



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	52
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	8
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	39
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat likely to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Fish		
Maccullochella ikei Clarence River Cod, Eastern Freshwater Cod [26170]	Endangered	Species or species habitat may occur within area
Frogs		
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Breeding may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Amyema plicatula [81879]	Endangered	Species or species habitat likely to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat known to occur within area
Baloghia marmorata Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
Clematis fawcettii Stream Clematis [4311]	Vulnerable	Species or species habitat likely to occur within area
Corchorus cunninghamii Native Jute [14659]	Endangered	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Desmodium acanthocladum Thorny Pea [17972]	Vulnerable	Species or species habitat known to occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat likely to occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Floydia praealta Ball Nut, Possum Nut, Big Nut, Beefwood [15762]	Vulnerable	Species or species habitat likely to occur within area
Gossia fragrantissima Sweet Myrtle, Small-leaved Myrtle [78867]	Endangered	Species or species habitat likely to occur within area
Hicksbeachia pinnatifolia Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak [21189]	Vulnerable	Species or species habitat known to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat known to occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Myrsine richmondensis Purple-leaf Muttonwood, Lismore Muttonwood [83888]	Endangered	Species or species habitat known to occur within area
Ochrosia moorei Southern Ochrosia [11350]	Endangered	Species or species habitat known to occur within area
Owenia cepiodora Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Randia moorei Spiny Gardenia [10577]	Endangered	Species or species habitat likely to occur within area
Sarcochilus hartmannii Waxy Sarcochilus, Blue Knob Orchid [4124]	Vulnerable	Species or species habitat likely to occur within area
Sophora fraseri [8836]	Vulnerable	Species or species habitat likely to occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Broadcasting Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Defence - LISMORE GRES DEPOT ; 41 RNSWR LISMORE

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Boatharbour	NSW
Wilson	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-28.80549 153.27493

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix E

Threatened Species Habitat Assessment

Table E1: Likelihood of occurrence criteria

Likelihood	Criteria
Recorded	The species was observed in the study area during the current survey
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (ie for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10 km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (ie for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10 km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (ie for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area. Based on a field assessment of the habitat constraints or microhabitats on the study area , the habitat is identified as being substantially degraded such that the species is unlikely to utilise the study area (or specific vegetation zones), or an expert report that is prepared that states the species is unlikely to be present on the study area or specific vegetation zones.

Table E2: Threatened flora habitat assessment table

Scientific name	Common name	BC Act	EPBC Act	Habitat requirements (Source: EPBC Act SPRAT and/or OEH threatened species profiles websites)	Number of records (BioNet)	Likelihood of occurrence
Arthraxon hispidus	Hairy-joint Grass	V	V	Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	312	None
Clematis fawcettii	Northern Clematis	V	V	Drier rainforest, usually near streams.	13	None
Coatesia paniculata	Axebreaker	E	-	In NSW known distribution is restricted to the north-east in the Tweed, Lismore and Wardell areas. Found in dry subtropical rainforest and vine scrub, often along rivers.	11	None
Corchorus cunninghamii	Native Jute	E	E	Areas where rainforest and moist eucalypt forest meet, and areas which formerly supported this vegetation but have been converted to plantation.	6	None
Desmodium acanthocladum	Thorny Pea	V	V	Fringes of riverine subtropical and dry rainforest on basalt-derived soils at low elevations.	125	Low
Doryanthes palmeri	Giant Spear Lily	V	-	Grows in a narrow band of vegetation along the cliff-tops and on steep cliff-faces or rocky ledges in montane heath next to subtropical rainforest, warm temperate rainforest or wet eucalypt forest. Occurs on exposed rocky outcrops on infertile soils or on bare rock, in far north-east NSW and south-east Queensland.	1	None
Endiandra hayesii	Rusty Rose Walnut	V		Sheltered moist gullies in subtropical and warm temperate rainforest on alluvium or basalt.	1	None
Floydia praealta	Ball Nut	V	V	Riverine and subtropical rainforest, usually soils derived from basalt.	7	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat requirements (Source: EPBC Act SPRAT and/or OEH threatened species profiles websites)	Number of records (BioNet)	Likelihood of occurrence
Gossia fragrantissima	Sweet Myrtle	E	E	Dry subtropical and riverine rainforest, isolated plants can be found in paddocks from regrowth mostly on basalt-derived soils. Occurs in south-east Queensland and in north-east NSW south to the Richmond River.	34	Low
Hicksbeachia pinnatifolia	Red Boppel Nut	V	V	Subtropical rainforest, moist eucalypt forest and Brush Box forest.	2	None
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V	Subtropical rainforest usually near the coast.	2	None
Myrsine richmondensis	Ripple-leaf Muttonwood	E	E	Subtropical and dry rainforest and swamp forest on creek flats and slopes on basalt derived soil.	2	None
Oberonia complanata	Yellow-flowered King of the Fairies	V	-	Grows on trees and rocks in littoral rainforest, subtropical rainforest, dry rainforest, wet or dry eucalypt forests, dunes (including stabilised sands), stream-side areas, swampy forests and mangroves.	3	None
Ochrosia moorei	Southern Ochrosia	E	E	Riverine and lowland subtropical rainforest.	11	None
Owenia cepiodora	Onion Cedar	V	V	Subtropical and dry rainforest. In NSW, from Bangalow to the Macpherson Range.	1	None
Randia moorei	Spiny Gardenia	E	E	Subtropical, riverine, littoral and dry rainforest, with Hoop Pine and Brush Box canopy.	4	None
Rhynchosia acuminatissima	Pointed Trefoil	V	-	In or near dry rainforest dominated by Hoop Pine (*Araucaria cunninghamii*). Other associated species include Brush Box (*Lophostemon confertus*), Grey Ironbark (*Eucalyptus siderophloia*), Rough-leaved Elm (*Aphananthe philippinensis*) and Native Holly (*Alchornea ilicifolia*).	3	None

Scientific name	Common name	BC Act	EPBC Act	Habitat requirements (Source: EPBC Act SPRAT and/or OEH threatened species profiles websites)	Number of records (BioNet)	Likelihood of occurrence
Rhodamnia rubecens	Scrub Turpentine	CE	-	Subtropical rainforests, warm temperate rainforests, littoral rainforests, and wet sclerophyll forests. It may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations.	6	None
Rhodomyrtus psidiodes	Native Guava	CE	-	Rainforest and its margins with sclerophyll vegetation, often near creeks and drainage lines. Pioneer species in disturbed environments such as regrowth and rainforest margins.	1	None
Sarcochilus dilatatus	Brown Butterfly Orchid	V	-	Littoral rainforest, subtropical rainforest, dry rainforest and streamside forests, mainly at low to medium (up to 500m) altitudes.	2	None
Senna acclinis	Rainforest Cassia	E	-	Edges of subtropical and dry rainforest.	1	None
Syzygium hodgkinsoniae	Red Lilly Pilly	V	V	Riverine and subtropical rainforest on rich alluvial or basaltic soils.	3	None
Thesium australe	Austral Toadflax	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	3	None
Tinospora smilacina	Tinospora Vine	E	-	Dry rainforest and along the boundaries of dry rainforest and dry eucalypt forest.	2	None
Tinospora tinosporoides	Arrow-head Vine	V	-	Wetter subtropical rainforest, including littoral rainforest, on fertile, basalt-derived soils.	17	None
Triflorensia cameronii	Cameron's Tarenna	E	-	Understorey of dry rainforest, on rocky basalt-derived soils.	4	None

Table E3: Threatened fauna habitat assessment table

Common name	Scientific name	BC Act	EPBC Act	Habitat requirements	Number of records (source)	Likelihood of occurrence
Reptilia						
Cacophis harriettae	White-crowned Snake	V	-	Low to mid-elevation dry eucalypt forest and woodland with well-developed litter layer.	2	None
Aves						
Amaurornis moluccana	Pale-vented Bush-hen	V	-	Variety of coastal wetlands from wetlands, mangroves, lagoons and swamps to river margins and creeks running through rainforest.	1	Low
Carterornis leucotis	White-eared Monarch	V	-	Coastal rainforest, swamp forest and wet eucalypt forest, prefers edges where trees frequently covered with vines.	1	None
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. They build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation.	25	Low
Haliaeetus leucogaster	White-bellied Sea-eagle	V	-	Coastal habitats and around terrestrial wetlands characterised by the presence of large areas of open water (larger rivers, swamps, lakes, ocean). Habitats may include freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds in addition to bays and inlets, beaches, reefs, lagoons, estuaries and mangroves.	4	Low
Hieraaetus morphnoides	Little Eagle	V	-	Open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	1	None
Irediparra gallinacea	Comb-crested Jacana	V	-	Among vegetation floating on slow-moving rivers and permanent lagoons, swamps, lakes and dams.	5	None

Common name	Scientific name	BC Act	EPBC Act	Habitat requirements	Number of records (source)	Likelihood of occurrence
Ixobrychus flavicollis	Black Bittern	V	-	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	1	None
Phaethon rubricauda	Red-tailed Tropicbird	V	-	Marine, coastal cliffs and under bushes in tropical Australia.	1	None
Podargus ocellatus	Marbled Frogmouth	V	-	Subtropical rainforest spending most time is deep, wet sheltered gullies.	10	None
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests. Most often seen in mature forests, but also found in remnant and regenerating rainforest.	6	Low
Ptilinopus regina	Rose-crowned Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	12	Low
Stictonetta naevosa	Freckled Duck	V	-	Permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. In drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	3	None
Tyto tenebricosa	Sooty Owl	V	-	Dry, subtropical and warm temperate rainforests and wet eucalypt forests. Nest in large tree hollows.	1	None
Mammalia						
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Moist and dry eucalypt forest and rainforest, particularly at high elevations.	1	Low
Miniopterus australis	Little Bentwing-bat	V	-	Moist eucalypt forest, rainforest and dense coastal scrub.	14	Moderate

Common name	Scientific name	BC Act	EPBC Act	Habitat requirements	Number of records (source)	Likelihood of occurrence
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	Forest or woodland, roost in caves, old mines and stormwater channels.	4	Moderate
Nyctophilus bifax	Eastern Long-eared Bat	V	-	Lowland subtropical rainforest and wet and swamp eucalypt forest, extending to adjacent moist eucalypt forest.	5	Low
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum forest inland.	2	Low
Phascolarctos cinereus	Koala	V	V	Appropriate food trees in forests and woodlands, and treed urban areas.	354	Low
Planigale maculata	Common Planigale	V	-	Rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas with surface cover close to water.	1	Low
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	694	Moderate
Insecta						
Nurus brevis	Shorter Rainforest Ground-beetle	E	-	Low elevation rainforest, predominantly drier rainforests.	2	Low

Appendix F

Threatened Species Assessments of Significance (5 Part Tests)

Tests of significance

From **Appendix E** and the survey results, assessments of significance are required for the following threatened species/communities:

TECs:

- Lowland rainforest on floodplain in the NSW north coast bioregion

Mammals:

- Grey-headed Flying Fox.

Microbats:

- Eastern Bentwing-bat
- Little Bentwing-bat

Separate five-part tests have therefore been prepared for the TEC, Grey-headed Flying Fox and microbats.

Five-part test for Lowland rainforest on floodplain forest of the NSW North Coast Bioregion

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No consideration under this part of the assessment is required.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The proposal involves strengthening and maintenance work to be undertaken on Colemans Bridge which would require clearing of some vegetation within eight metres of the bridge. The works would involve clearing of a number of native saplings previously planted on the western abutment of the bridge (southern side) including:

- Blush Macaranga (*Macaranga tanarius*) – two saplings.
- Red Kamala (*Mallotus philippensis*) – one sapling
- Creek Sandpaper Fig (*Ficus coronata*) – one sapling).

Other areas that would require clearing within eight metres of the bridge, including the proposed bridge access on the eastern abutment (southern side) comprise dense infestations of weeds including Castor Oil Plant (*Ricinus communis*), Mulberry, Cockscomb Coral Tree, Balloon Vine, Morning Glory Vines (*Ipomoea* spp). No native vegetation would require removal within these areas.

Removal of the above-mentioned saplings would affect a very small area of planted vegetation occurring as part of the broader occurrence of TEC. The removal of these sapling would have a very minor impact on the extent and composition of this TEC.

c) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity,

The proposal would result in negligible vegetation loss from the TEC representing several planted native saplings.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The landscape around Colemans Bridge is already significantly fragmented and disturbed. The proposal would not result in further fragmentation or isolation of this ecological community.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The habitat to be removed is of little value with regard to this TEC in the locality given it is already modified and fragmented in the area.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No declared areas of outstanding biodiversity value would be directly or indirectly impacted by the proposal.

e) whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A key threatening process (KTP) is a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under the BC Act, and whether the proposal is recognised as a KTP is shown in Table F1.

Table F1: Key threatening processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	**Is the development or activity of a class of development or activity that is recognised as a threatening process?**		
	Likely	**Possible**	**Unlikely**
Alteration of habitat following subsidence due to longwall mining			✓
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bush rock removal			✓
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	Is the development or activity of a class of development or activity that is recognised as a threatening process?		
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of *Lantana camara*			✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)			✓
Predation by the European red fox (*Vulpes vulpes*)			✓
Predation by the feral cat (*Felis catus*)			✓
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	Is the development or activity of a class of development or activity that is recognised as a threatening process?		
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees			✓

The proposal may contribute to the KTP 'clearing of native vegetation'. Clearing is defined under the TSC Act as '*the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands'*. On this basis, the removal of several individual saplings from a highly modified riparian environment would not result in the loss of any ecological function of the adjacent subtropical coastal floodplain forest community.

Conclusion

It is considered unlikely that the local extent of Lowland Rainforest on Floodplain would be placed at significant risk of extinction as a result of the proposal.

Five-part test for Grey-headed Flying Fox

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The proposal involves strengthening and maintenance work to be undertaken on Colemans Bridge which would require clearing of some vegetation within eight metres of the bridge. The works would involve clearing of a number of native saplings previously planted on the western abutment of the bridge (southern side) including:

- Blush Macaranga (*Macaranga tanarius*) – two saplings
- Red Kamala (*Mallotus philippensis*) – one sapling
- Creek Sandpaper Fig (*Ficus coronata*) – one sapling).

Other areas that would require clearing within eight metres of the bridge, including the proposed bridge access on the eastern abutment (southern side) comprise dense infestations of weeds including Castor Oil Plant (*Ricinus communis*), Mulberry, Cockscomb Coral Tree, Balloon Vine, Morning Glory Vines (*Ipomoea* spp). No native vegetation would require removal within these areas.

Grey-headed Flying Fox

Grey-headed Flying-foxes (GHFF) have a distribution that typically extends approximately 200 km from the coast of Eastern Australia, from Rockhampton in Queensland to Adelaide in South Australia. Foraging areas include subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. GHFF feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines, as well as from cultivated gardens and orchards. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF may travel up to 50 km from the camp to forage; commuting distances are more often <20 km.

Threatening processes for this species include:

- Clearing of woodlands for agriculture
- Loss of roosting and foraging sites
- Electrocution on powerlines, entanglement in netting and on barbed-wire
- Heat stress
- Conflict with humans
- Incomplete knowledge of abundance and distribution across the species' range.

Potential Impacts from the proposal

The proposal would remove a number of small saplings which represent a future foraging resource for the species which would for a very small proportion of the locally occurring habitat for the species locally.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No consideration under this part of the assessment is required.

c) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity,

The proposal would remove a number of small saplings which represent a future foraging resource for the species which would for a very small proportion of the locally occurring habitat for the species locally.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The landscape around Colemans Bridge is already significantly fragmented and disturbed. Areas of habitat are unlikely to become further fragmented or isolated from other areas of habitat as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The habitat to be removed is of little value to the Grey-headed Flying Fox and would have no impact to these species in the locality.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No declared areas of outstanding biodiversity value would be directly or indirectly impacted by the proposal.

e) whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A KTP is a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under the BC Act, and whether the proposal is recognised as a KTP is shown in Table F4.

Table F4: Key threatening processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	**Is the development or activity of a class of development or activity that is recognised as a threatening process?**		
	Likely	**Possible**	**Unlikely**
Alteration of habitat following subsidence due to longwall mining			✓
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bush rock removal			✓
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	Is the development or activity of a class of development or activity that is recognised as a threatening process?		
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of *Lantana camara*			✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	Is the development or activity of a class of development or activity that is recognised as a threatening process?		
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)			✓
Predation by the European red fox (*Vulpes vulpes*)			✓
Predation by the feral cat (*Felis catus*)			✓
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees			✓

The proposal may contribute to the KTP 'clearing of native vegetation'. Clearing is defined under the TSC Act as '*the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands'*. On this basis, the removal of several individual trees from a highly modified riparian environment would not result in the loss of any ecological function of the adjacent subtropical coastal floodplain forest community. The works as proposed would not result in any significant habitat loss for the Grey-headed Flying Fox.

Conclusion

It is considered unlikely that a local population of the Grey-headed Flying Fox would be placed at significant risk of extinction as a result of the proposal.

Five-part test for threatened microbats (Eastern and Little Bentwing-bat)

Potential impacts from the proposal on microbats include:

- Foraging habitat degradation. Vegetation removal would be minimal and water quality impacts would be managed through implementation of the safeguards of the REF. Significant foraging habitat degradation is unlikely
- Roosting habitat removal. Given the construction style and components of Colemans Bridge, roosting habitat for microbats is considered to be unlikely to occur on the bridge.

Eastern and Little Bentwing-bat

Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day (OEH, 2012). Maternity colonies form in caves during spring. Only five maternity caves are known in Australia (OEH, 2012).

The Little Bentwing-bat forages at night for small insects beneath the canopy of densely vegetated habitats. They forage in a broad range of habitats ranging including moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub (OEH, 2012).

The Eastern Bentwing-bats roost in caves, derelict mines, culverts, bridges tunnels, buildings and other man-made structures. They form discrete populations centred on maternity caves, used annually in spring and summer (OEH, 2012; Dwyer, 2008b). At other times of the year, populations disperse within about 300 km range of maternity caves. The Eastern Bentwing-bats forage for flying insects above the tree tops. They forage in a broad range of habitats, including rainforest, dry, wet and swamp sclerophyll forests, heath, forested wetlands and water bodies (OEH, 2012).

Threatening processes for these species include:

- Disturbance of colonies, especially in nursery or hibernating caves, may be catastrophic
- Destruction of caves that provide seasonal or potential roosting sites
- Changes to habitat, especially surrounding maternity/nursery caves and winter roosts
- Pesticides on insects and in water consumed by bats bio accumulates, resulting in poisoning of individuals
- Predation from foxes, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges
- Predation from feral cats, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges
- Introduction of exotic pathogens such as the White-nosed fungus
- Hazard reduction and wildfire fires during the breeding season
- Large scale wildfire or hazard reduction can impact on foraging resources
- Poor knowledge of reproductive success and population dynamics.

Potential Impacts from the proposal

The proposal is unlikely to have impacts on roosting habitat for Bentwing-bats and foraging habitat for the species would be unaffected. On this basis, it is considered that the proposal would be unlikely to have an adverse effect on the life cycle of Bentwing-bats such that a viable local population of these species are placed at risk of extinction.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

No maternity sites for the subject species would be affected by the proposal.

The proposal is unlikely to have impacts on roosting habitat for Bentwing-bats and foraging habitat for the species would be unaffected. On this basis, it is considered that the proposal would be unlikely to have an adverse effect on the life cycle of Bentwing-bats such that a viable local population of these species are placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(iii) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(iv) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No consideration under this part of the assessment is required for the subject threatened species.

(c) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity,

The proposal would result in minor loss of potential foraging habitat and general disruption around the bridge structure during the construction period.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The landscape around Colemans Bridge is already significantly fragmented and disturbed. The proposal would not result in further fragmentation to this landscape and no permanent barriers to dispersal would result from the works.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The structure of Fawcett Bridge provides no suitable roosting habitat for the subject microbats. No significant foraging habitat would be affected by the proposal; thus no habitat important for the long-term survival of the Bentwing-bats in the locality would be affected by the proposal.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No declared areas of outstanding biodiversity value would be directly or indirectly impacted by the proposal.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A KTP is defined under the BC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in Table D1.

The proposal would contribute to the KTPs ‘clearing of native vegetation’. Clearing is defined under the BC Act as ‘the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands’.

The proposal is not considered likely to contribute significantly towards any other listed KTP. Use of equipment and heavy machinery would contribute to a minor extent to anthropogenic climate change, particularly when viewed in conjunction with other carbon emitting/ fossil fuel burning/ greenhouse gas emitting activities in the locality. The incremental extent to which the proposal may contribute to anthropogenic climate change is unlikely to put the local occurrence of the subject species at significant risk of extinction. The mitigation measures of this report and the corresponding REF would ensure the risk of the proposal contributing to other KTPs is minimised.

Conclusion

It is considered unlikely that local populations of the Eastern and Little Bentwing-bat would be placed at significant risk of extinction as a result of the proposal.

References

Dwyer, P. (2008a). Little Bentwing-bat *Miniopterus australis* in T*he Mammals of Australia*, edited by S. Van Dyke & R. Strahan. Reed New Holland, Sydney.

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Appendix G

Noise and vibration assessment

Colemans Bridge, Lismore

Noise and Vibration Assessment

Roads and Maritime Services | May 2019

NSW GOVERNMENT

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Contents

Introduction

Roads and Maritime Services propose to undertake bridge truss strengthening and maintenance on Coleman's Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area.

The location of the site is shown in Figure 1.

SoundIN Pty Ltd (SoundIN) has been contracted to undertake a noise and vibration impact assessment for the proposed works. This noise and vibration impact assessment considers potential noise and vibration impacts from construction. The works are not anticipated to impact operational noise or vibration levels.

This noise and vibration impact assessment was conducted in general accordance with the following NSW Government guidelines and policies:

- Construction Noise and Vibration Guideline (Roads and Maritime Services, 2016);
- Noise Criteria Guideline (Roads and Maritime Services, 2015);
- Interim Construction Noise Guideline (DECC, 2009); and,
- Assessing Vibration: a technical guideline (DEC, 2006).

Vibration goals for building damage have been adopted from British Standard BS7385-2:1993, being a relevant international standard.

Colemans Bridge, Lismore

0 250 500 750 1000 m

SITE LOCALITY

LEGEND

★ Colemans Bridge

Note: Locations of features are indicative only and are shown solely to demonstrate features pertinent to the noise assessment.

Figure 1 Site Location

The Proposal

Proposal Description

The proposal is to undertake bridge truss strengthening and maintenance on Coleman's Bridge. The work is required to improve the structural capacity of the bridge in order to keep Coleman's Bridge serviceable. Coleman's Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore CBD and South Lismore (as well as allied townships and farmland to the south and west). The bridge is listed on the Roads and Maritime Services Section170 Heritage Register.

The general arrangement of the proposal is shown in Figure 2.

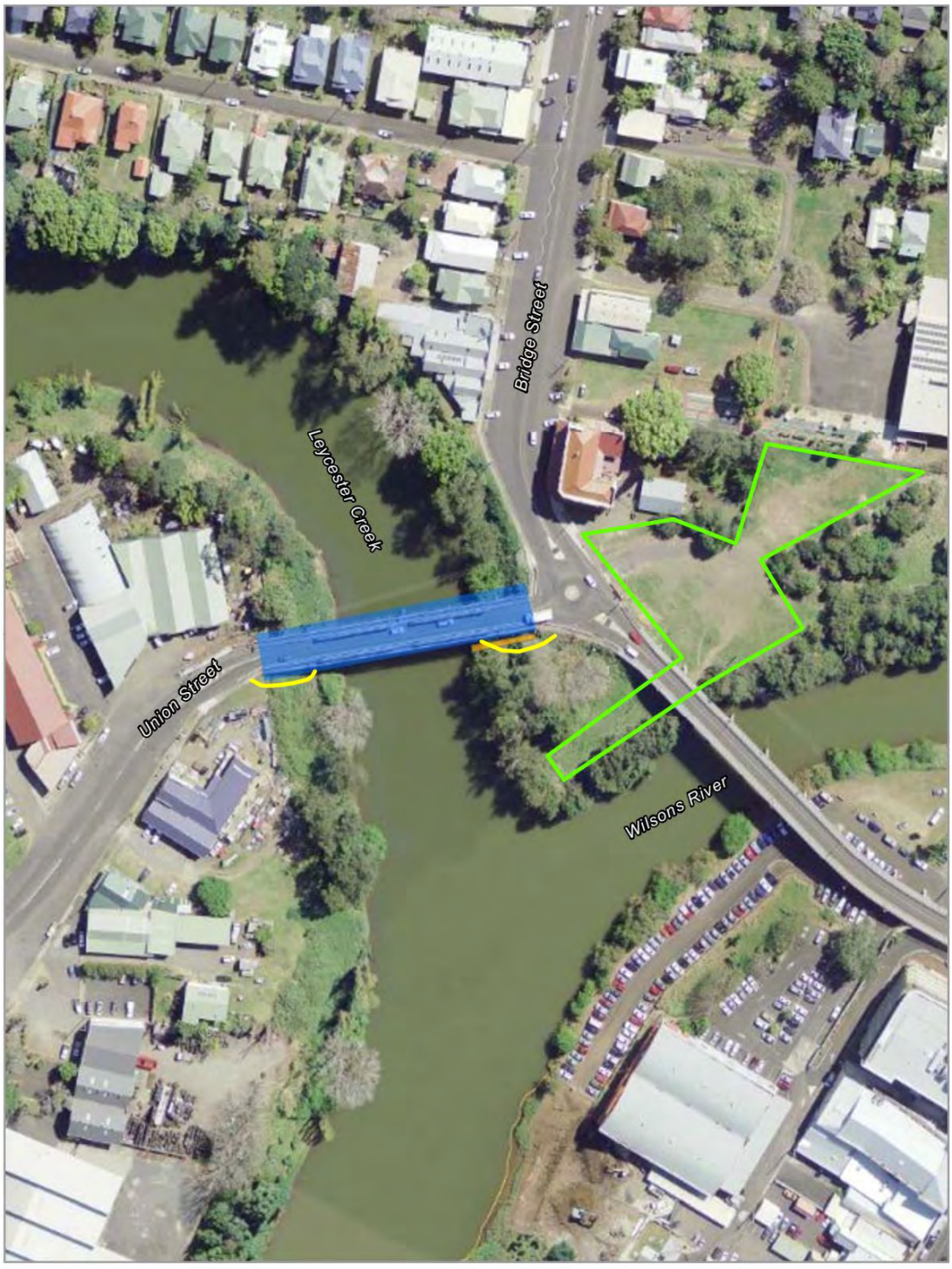
The proposal will include the following aspects:

- Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage.
- Construction activities will be required above and below the deck and on the embankment three metres either side of the bridge. Access may be required via the water however no construction is required within the water.
- Minor vegetation clearing within three metres of the bridge.
- Minor earthworks.
- Elevated (hung) scaffolding will be required to facilitate some activities.

Construction is expected to commence mid-2019. In order to minimise the period of disruption to the public, the bridge would be closed to traffic for the extent of works which would take approximately three months to complete. Alternate detours would be available in the order of approximately 2.5 km and four kilometres, depending on the route taken, origin and destination. During the project pedestrian access on one side of the bridge would be maintained.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: JTS Date: 12/02/2019
Source of base data: DFS&I



LEGEND

- Coleman's Bridge
- Proposed compound site
- Vegetation to be removed
- Access track

0 40

The Site and Surrounds

Figure 2 Site and Surrounds [Source: GeoLINK]

Construction Activities

Construction activities are required above and below the deck and on the embankment three metres either side of the bridge. Access may be required via the water however no construction is required within the water.

The following construction activities are proposed.

- Construction activities above the deck include:
  - Re-stressing of the stress laminated timber (SLT) deck.
  - Strengthening of the top chord of the dare trusses.
  - Replacement of the existing traffic barrier.
  - Replacement of the bridge wearing course.
  - Minor footway repairs.
  - Full repaint of truss.
- Construction activities below the deck include:
  - Localised steel bottom chord corrosion repairs and repaint.
  - Timber trestle pier repairs.
  - Minor localised painting.
- Minor vegetation clearing within three metres of the bridge will be required to facilitate works around timber trestle piers.
- Minor earthworks will be required to provide access to timber trestle piers and below deck work areas.
- Elevated (hung) scaffolding will be required to conduct work for the SLT deck re-stressing and localised repairs to the steel bottom chord and girders

Work Methodology

Table 1 outlines the general work methodology that would be followed for the work. It should be noted that the actual staging plan would be developed by the principal contractor, and that the phases presented in Table 1 are presented for the purpose of assessment and should only be regarded as indicative.

Construction Hours and Duration

Working hours are and anticipated durations of each work phase are indicated in Table 1.

We note that the periods from 6.00am to 8.00am, 1.00pm onwards on Saturday, and all work on Sunday, are outside the Environmental Protection Authority's (EPA) and Roads and Maritime's standard construction hours.

Outside the bridge closure, any minor work requiring traffic control would be undertaken at night, or on the weekend.

Table 1 General Construction Phases and Activities

Construction Phase	Activities	Working Hours	Anticipated Duration
Early work	• Survey the construction site • Issue resident notification about proposed construction activities • Fence the site boundaries and areas to be used for stockpile sites and compound areas • Fence the sensitive environmental and heritage areas • Installation of temporary erosion, sedimentation and drainage controls • Undertake other activities determined by the environmental representative (construction contractor or Roads and Maritime) to have minimal environmental impact.	Monday to Friday 7am-6pm	1 week
Site preparation	• Remove vegetation • Establish access tracks and crane pads • Establishment of construction phase traffic control which includes temporary traffic signs, safety barriers, line marking changes and similar.	Monday to Friday 7am-6pm	1 week
Full bridge weekend closure	• Re-stressing of the stress laminated timber (SLT) deck. • Strengthening of the top chord of the dare trusses. • Replacement of the existing traffic barrier. • Replacement of the bridge wearing course. • Minor footway repairs. • Minor localised painting of the bridge. • Localised steel bottom chord corrosion repairs and repaint. • Timber trestle pier repairs.	Saturday 6am-6pm Sunday 6am-6pm Occasional bridge closure on Monday as necessary	7 months
Finishing	Remove site compounds Rehabilitate site	Monday to Friday 7am-6pm	1 week

Notes: 1. Only one bridge closure option will be used.

Plant and Equipment

An indicative list of plant and equipment that would typically be required is provided below.

- Mobile cranes
- Franna crane
- Excavator
- Elevated work platform
- Power tools (grinder, drill, etc.)
- Hand tools (hammer, saw, etc.)
- Delivery trucks
- Generators
- Spray seal truck
- Bobcat
- Roller
- Boat.

Site Description

This chapter describes the study area and identifies sensitive receptors.

The area is urban with a mixture of commercial and residential land-uses surrounding the proposal. The topography is generally flat aside from the river/ creek banks. Sensitive receiver locations are illustrated in Figure 3.

The nearest noise-sensitive receiver to the works is the Winsome Hotel, which is adjacent to the proposed compound in Bridge Street. The hotel has temporary accommodation on the second storey.

The majority of other buildings immediately surrounding the site are commercial.

The nearest residential receiver is located 85m north of the bridge, on Bridge Street. Other residences are located approximately 150-200m north of the bridge in Wotherspoon Street, 120m north-west along Leycester Creek (Simmons Street), and 170m to the south-west in Union and Frank Streets.

Noise predictions have been undertaken for noise catchment areas (NCAs) representing these receivers. Potential impacts to more distant receivers, where applicable, are described generally by predictions at various distances from the work.

Note: Locations of features are indicative only and are shown solely to demonstrate features pertinent to the noise assessment.

Figure 3 Sensitive Receivers and Noise Catchment Areas

Existing Noise Environment

Long term noise monitoring was undertaken by Wilkinson Murray between Monday, 10 and Wednesday, 19 October, 2016. Monitoring was conducted at three locations surrounding the site, in locations representative of the potential impacted receivers. Monitoring was also undertaken at a fourth location, on Wilson Street, to determine existing traffic noise levels at receivers likely to be impacted by temporary traffic diversions. The monitoring locations are described in Table 2 and illustrated in Figure 4.

The purpose of the monitoring was to measure the existing levels of traffic and ambient noise, and to identify the Rating Background Levels (RBL).

Table 2 Noise Monitoring Locations

Monitoring Location	Address	Notes
1	24 Simmons Street	At the rear of the property fronting Leycester Creek.
2	5 Frank Street	On the second storey balcony.
3	14 Bridge Street	At the rear of the smash repair workshop, likely affected by workshop noise during business hours.
4	46 Wilson Street	Façade level. Located on the front porch.

Noise Monitoring Methodology

The noise monitoring equipment used for the measurements consisted of environmental noise loggers set to A-weighted, fast response, continuously monitoring over 15-minute sampling periods. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey, and no significant drift was noted.

The loggers determine L_{A1}, L_{A10}, L_{A90}, and L_{Aeq} levels of ambient noise. L_{A1}, L_{A10}, and L_{A90} are the levels exceeded for one per cent, 10 per cent, and 90 per cent of the sample time, respectively. The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional pass-by of a heavy vehicle. The L_{A90} level is typically taken as the background noise level during the sample period.

Periods of rain and high winds have been excluded from the logging results, using data from the Bureau of Meteorology monitoring station at Lismore Airport, and periods influenced by extraneous noise have been excluded based on engineering judgement. Plots of the logging data are presented in Appendix A.

Figure 4 Noise Monitoring Locations

Noise Monitoring Results

Table 3 presents the Rating Background Levels for monitoring locations 1-3, which have been calculated in accordance with the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017). The calculated night time (10.00pm – 7.00am) RBL was found to be less than 30 dBA at each of the three monitoring locations. The NPfI recommends a minimum RBL of 30 dBA, and therefore, in cases where the RBL is calculated to be less than 30 dBA, it is set to 30 dBA.

Table 3 Existing Background Noise Levels

Monitoring Location		Rating Background Level (dBA)		
ID	**Address**	**Daytime***	**Evening***	**Night***
1	24 Simmons Street	38	36	30 (29)
2	5 Frank Street	36	34	30 (28)
3	14 Bridge Street	46	35	30 (29)

Notes: 1. Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

Table 4 presents the existing ambient L_{Aeq} levels for monitoring locations 1-3. The measured L_{Aeq} at location 1 is influenced by workshop noise.

Table 4 Existing Ambient L_{Aeq} Noise Levels

Monitoring Location		Existing Ambient Noise Level, L_{Aeq} (dBA)		
ID	**Address**	**Daytime[1]**	**Evening[1]**	**Night[1]**
1	24 Simmons Street	56	52	43
2	5 Frank Street	51	49	43
3	14 Bridge Street	61	55	50

Notes: 1. Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

The measured L_{Aeq} at location 4 is considered to be representative of existing traffic noise levels on the alternate traffic route during the bridge closure and are thus presented for typical road traffic noise periods in Table 5.

Table 5 Existing Traffic L_{Aeq} Noise Levels on Alternate Traffic Route

Monitoring Location		Existing Traffic Noise Level, L_{Aeq} (dBA)	
ID	**Address**	**Daytime ($L_{Aeq,15hr}$) [1]**	**Night ($L_{Aeq,9hr}$) [1]**
4	46 Wilson Street	61	53

Notes 1. Daytime = 7.00am – 10.00pm, Night = 10.00pm – 7.00am

Assessment of Construction Noise Impacts

This section of the report presents an assessment of construction noise.

Construction Noise Management Levels

The *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) recommends noise management levels (NML) to reduce the likelihood of noise impacts arising from construction activities. The ICNG NML for residential receivers are shown in Table 6.

Table 6 ICNG Noise Management Levels for residential receivers

Time of Day	Management Level $L_{Aeq,15min}$	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences; if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community.

The proposal specific construction NML for residential receivers are presented in Table 7.

Table 7 Construction NML – Residential Receivers

NCA	Acceptable $L_{Aeq, 15\ min}$ Noise Level				Highly Affected Level
	Standard Construction Hours RBL + 10 (dBA)	Outside Standard Construction Hours RBL + 5 (dBA)			
		Day	Evening	Night	
1	48	43	41	35	75
2	46	41	39	35	75
3 & 4	56	51	40	35	75

Notes: 1. Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

The ICNG provides the following noise management levels for commercial and industrial premises.

- Industrial premises: external $L_{Aeq\ (15\ min)}$ 75 dBA.
- Offices, retail outlets: external $L_{Aeq\ (15\ min)}$ 70 dBA.

Sleep Disturbance

Significant work is not expected to be scheduled at night time. However, outside the bridge closure periods, some minor work requiring traffic control may be undertaken at night.

Though it is unlikely that significant night works will be required, sleep disturbance has been considered. Regarding sleep disturbance, the ICNG states:

> *"Where construction works are planned to extend over more than two consecutive nights, and a quantitative assessment method is used, the analysis should cover the maximum noise level, and the extent and the number of times that the maximum noise levels exceeds the RBL…"*

All out of hours works would be conducted in accordance with the CNVG; and therefore, residential receivers would not be exposed to significant construction noise levels for more than two consecutive nights. Accordingly, a detailed assessment of sleep disturbance is not warranted.

Notwithstanding the above, it is prudent to establish criteria for the assessment of sleep disturbance.

Noise sources that operate over short durations at night have the potential to cause sleep disturbance despite complying with criteria based upon the L_{Aeq} noise descriptor. For this reason, the NPfI suggests that a screening test be applied such that if the L_{Amax} noise levels do not exceed 52 dBA and exceed the background noise level by more than 15 dBA, then it is unlikely that the development has the potential to cause sleep disturbance.

The night time RBL for all NCAs is 30 dBA. Therefore, the sleep disturbance screening criterion becomes 52 dBA (i.e. the greater of 52 dBA and RBL + 15 dBA).

The *NSW Road Noise Policy* states that from the research on sleep disturbance to date it can be concluded that:

- Maximum internal noise levels below 50-55 dBA are unlikely to cause awakening reactions; and,
- One or two noise events per night, with maximum internal noise levels of 65-70dBA, are not likely to affect health and wellbeing significantly.

Assuming that the typical noise reduction through a bedroom facade with normally open windows is 10dBA, then an external noise level of 60-65 dBA is unlikely to cause sleep disturbance. Noting this, the adopted sleep disturbance screening criterion is considered to be conservative.

The sleep disturbance criterion is only applicable to night time (10.00pm to 7.00am) work.

Construction Plant Sound Power Levels

Sound levels of typical equipment are listed in Table 8. The table gives both Sound Power Level (SWL) and Sound Pressure Level (SPL) at seven metres for the equipment. SWL is independent of measurement position. Verification of plant noise is typically done by measuring the SPL at seven metres.

Based on the information in Table 8, source noise levels for a number of sample construction phases have been calculated, and are presented in Table 9.

While noise levels have not been predicted for every activity outlined in Table 1, the stages assessed herein are considered representative of the majority of activities and will allow the range of potential construction noise impacts to be adequately identified.

Table 8 Typical Construction Plant Sound Levels

Plant	**Sound Power Level $L_{Aeq,15min}$ (dBA)**	**Sound Power Level L_{Amax} (dBA)**
Mobile crane	113	116
Franna crane	104	108
Excavator	110	115
Power tools (grinder, drill, etc.)	95-110	117
Hand tools (hammer, chain block, etc.)	95	115
Delivery trucks	107	110
Spray seal truck	108	111
Bobcat	104	109
Roller	107	109
Generators	100	100
Boat	100	105

Table 9 Construction Phase Sound Power Levels

Code	Activity	Typical Equipment Used	Total $L_{Aeq,15min}$ Sound Power Level (SWL) used for Calculations
E	Site establishment	Franna crane Delivery trucks Hand tools	108
CR	Craning items to/from bridge	Mobile crane	113
F	Fabrication and removal/ reinstatement of bridge elements	Power/air tools (drill, power wrench etc.) Hand tools (hammer, saw, etc.)	110
R	Resurfacing wearing surface	Excavator Delivery trucks Spray seal truck Bobcat Roller	112

Predicted Construction Noise Levels

Table 10 presents the predicted construction noise levels at the identified receivers. These predictions consider attenuation due to distance, air absorption and a conservative estimate of ground attenuation.

Table 11 presents the predicted $L_{Aeq,15min}$ noise levels for each scenario at various distances.

Table 10 Predicted Construction $L_{Aeq,15min}$ Noise Levels (dBA)

			NCA				Commercial / Industrial
			1	2	3	4	
Acceptable $L_{Aeq,15min}$ Noise Level (dBA)	**Standard Construction Hours**		48	46	56	56	70 / 75
	Outside Standard Construction Hours	**Day**	43	41	51	51	N/A
		Evening	41	39	40	40	N/A
		Night	35	35	35	35	N/A
Scenario							
E	Site establishment		55	54	61	55	59-76
CR	Craning items to/from bridge		60	59	66	60	64-81
F	Fabrication and removal/reinstatement of bridge elements		57	56	63	57	61-78
R	Resurfacing		59	58	65	59	63-80

Table 11 Predicted $L_{Aeq,15min}$ Noise Levels at Various Distances

Code	Activity	Predicted Construction $L_{Aeq,15min}$ Noise Levels (dBA)					
		10m	20m	50m	100m	200m	500m
E	Site establishment	80	72	63	59	54	45
CR	Craning items to/from bridge	85	77	69	64	57	51
F	Fabrication and removal/reinstatement of bridge elements	67-82	59-74	51-66	46-61	39-54	33-48
R	Resurfacing	84	76	67	63	58	49

Review of Table 10 indicates the potential for construction noise levels to exceed the acceptable NMLs during all scenarios. During the loudest works, the L_{Aeq} noise level at the nearest residences is predicted to be 66 dBA. The predicted noise levels exceed the NMLs, during daytime work outside standard construction hours (e.g. Saturday 7.00am-8.00am and 1.00pm-6.00pm, and 8.00am onwards Sunday) by up to 18 dBA.

The periods Saturday 6.00am to 7.00am and Sunday 6.00am to 8.00am are considered to be part of the night period. During these periods, construction is predicted to exceed the NMLs by up to 31 dBA.

The highly noise affected level ($L_{Aeq,15min}$ 75dBA) is not expected to be exceeded.

Noise levels at the nearest commercial premises, being industrial premises on the western bank of Leycester Creek, have the potential to exceed noise management levels. These exceedances would only be expected when work is undertaken in close proximity.

Noise levels at Winsome Hotel would generally by within appropriate noise management levels during standard construction hours (being those for commercial premises). It is noted that accommodation is available on the second storey and thus the residential noise management levels are more appropriate at night, however, significant night works are not anticipated as part of the project.

Note that the presented levels account for the loudest plant operating at the closest point to each receiver. Lower noise levels would be expected for much of the works.

As the various noise management levels are expected to be exceeded by various stages of the works, the predicted noise levels should be considered in the determination of works that may be undertaken outside standard construction hours, especially at night.

Noise from the general compound would be generated by localised sources within the compound, such as a delivery truck or item of mobile plant. Noting the scale of the works, these sources would be infrequent and generally have a limited duration.

Assessment of Construction Vibration Impacts

This section of the report presents an assessment of construction vibration.

Construction Vibration Criteria

Impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance with the building damage objectives will be achieved.

Human Comfort

The EPA's *Assessing Vibration: A Technical Guideline* (DEC, 2006) provides acceptable values for continuous and impulsive vibration in the range 1-80 Hz. Both preferred and maximum vibration limits are defined for various locations and are shown in Table 12.

Table 12 Preferred and Maximum Peak Particle Velocity (PPV) Values for Continuous and Impulsive Vibration

Location	Assessment Period [1]	Preferred Values	Maximum Values
Continuous Vibration			
Critical areas	Day or night time	0.14	0.28
Receivers	Daytime	0.28	0.56
	Night time	0.20	0.40
Offices, schools, educational institutions and places of worship	Day or night time	0.56	1.1
Workshops	Day or night time	1.1	2.2
Impulsive Vibration			
Critical areas	Day or night time	0.14	0.28
Receivers	Daytime	8.6	17.0
	Night time	2.8	5.6
Offices, schools, educational institutions and places of worship	Day or night time	18.0	36.0
Workshops	Day or night time	18.0	36.0

Note: 1. Daytime is 7.00am to 10.00pm and night time is 10.00pm to 7.00am.

These limits relate to a long-term (15 hours for daytime), continuous exposure to vibration sources. Where vibration is intermittent, a vibration dose is calculated and acceptable values are shown in Table 13.

Table 13 Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)

Location	Daytime (1)		Night Time (1)	
	Preferred Value	Maximum Values	Preferred Value	Maximum Value
Critical areas	0.10	0.20	0.10	0.20
Receivers	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

Note: 1. Daytime is 7.00am to 10.00pm and night time is 10.00pm to 7.00am.

The vibration criterion adopted for the assessment of human comfort is 0.4 mm/s PPV (component), and is applicable to assessment of potential impacts during the hours of 7:00am to 10:00pm. This criterion assumes that vibration would persist for a considerable portion of the day. As this is unlikely to be the case, the criterion is inherently conservative.

Building Damage

There are currently no Australian Standards or guidelines to provide guidance on assessing the potential for building damage from vibration. It is common practice to derive goal levels from international standards such as British Standard BS7385:1993

The recommended limits (guide values from BS7385) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented in Table 14.

Table 14 Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4 Hz and above	N/A
Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above

For general construction vibration, the dominant frequency of vibration is typically in the range 31.5-100 Hz. Because the dominant frequency of vibration cannot be determined with certainty, this assessment has adopted a conservative goal of 20 mm/s for residential buildings.

Recommended Minimum Working Distances for Vibration

None of the plant anticipated to be used for the works are significant emitters of vibration. Should vibration emitting plant be required the safe working distances specified in the CNVG should be considered before commencing such activities.

Assessment of Construction Traffic Noise

This chapter examines the potential for noise impacts due to changes in traffic noise during the construction of the proposal.

Construction-related Traffic Noise Goals

Appendix A of the CNVG recommends that a screening criterion be applied to evaluate whether construction-related traffic noise warrants assessment against noise goals detailed in the NCG. Appendix A states that where traffic noise levels are not predicted to increase by more than 2 dBA from construction traffic or a temporary reroute, due to a road closure, further assessment is not required.

Construction-related Traffic Noise Assessment

Construction generated traffic would be limited to workers' vehicles and material transport. These movements would make negligible difference to existing traffic noise levels.

The proposed closure of Colemans Bridge would result in some vehicles using alternate routes to the CBD. The proposed detour routes are indicated in Figure 5. The primary detour route has been identified to the east of the site, via Ballina Street Bridge and the CBD. A secondary detour route, west of the site, would utilise Terania, Wilson and Casino Streets.

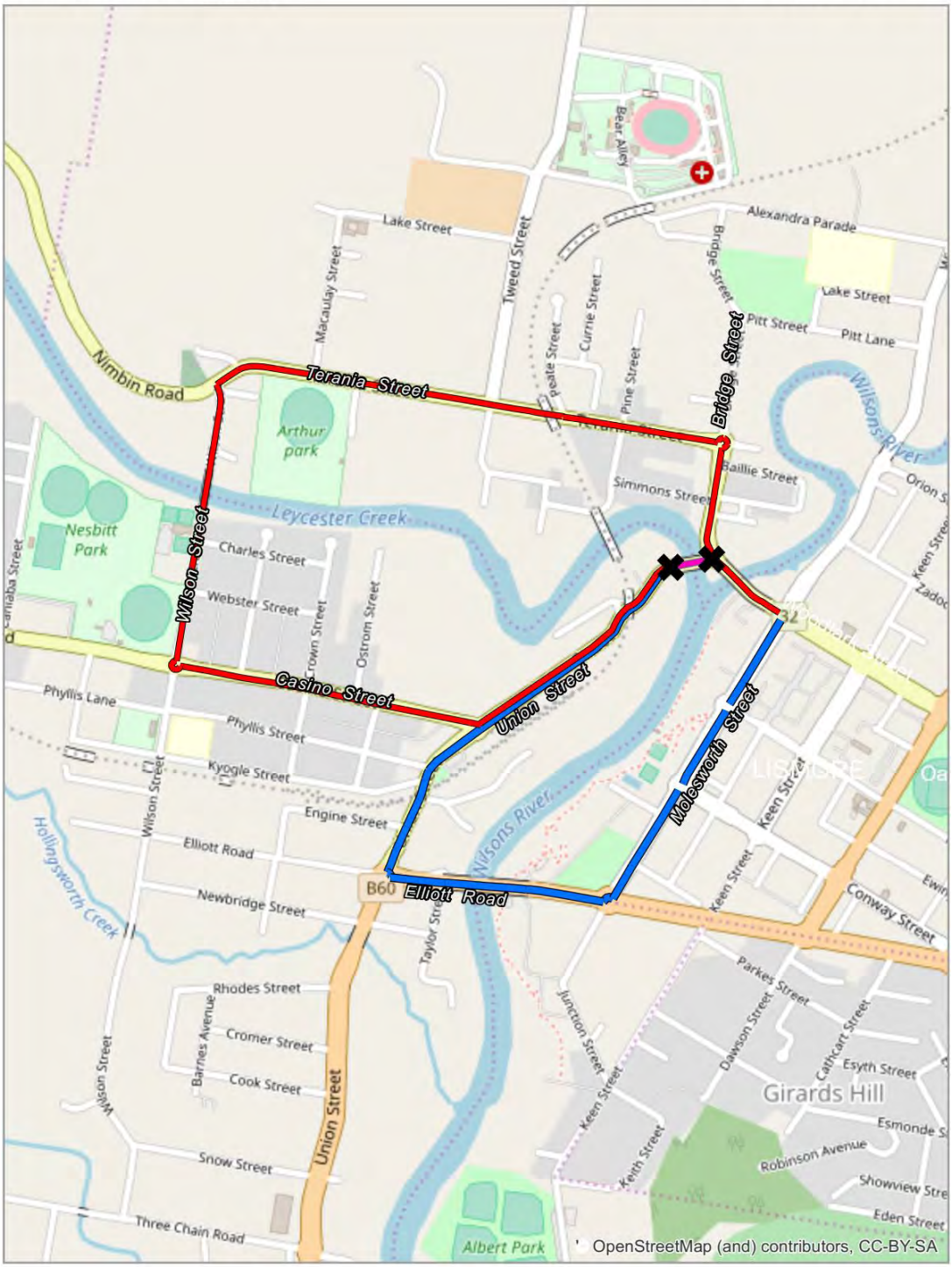
Additional traffic in the vicinity of Ballina Street Bridge and the CBD would produce a negligible increase in traffic noise, noting the substantial existing traffic on this route.

Additional traffic using Terania Street, Wilson Street and Casino Street may be noticeable to residents. Based on the measured traffic noise level at location 4 in Wilson Street, and assuming a traffic speed of 60 km/h and approximately five per cent heavy vehicles, an additional 3000 vehicles per day would be required to use this detour route in order for the traffic noise level to increase by more than 2 dB. Though traffic modelling has not been undertaken to determine the additional traffic which would be expected on the detour route, it is likely to be well below 3000 vehicles.

As construction-related traffic is not anticipated to increase traffic noise by more than 2 dBA, no further assessment is required.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: JTS Date: 12/02/2019
Source of base data: OpenStreetMap



LEGEND

- Coleman's Bridge
- Primary route: 2.5 km, 5 minutes - approx. travel time by car (without heavy traffic)
- Secondary route: 4 km, 7 minutes - approx. travel time by car (without heavy traffic)
- ✖ Road closure

0 300

Detour Routes

Figure 5 Detour Routes [Source: GeoLINK]

Construction Noise Mitigation

Best practice mitigation and management measures should be implemented to minimise construction noise and vibration at noise-sensitive receivers.

Mitigation measures have been developed in accordance with the *Construction Noise and Vibration Guideline* (CNVG) and the *Interim Construction Noise Guideline* (ICNG).

The following mitigation measures are reproduced from CNVG Appendix B and C. Relevant “standard mitigation measures” are presented in Table 15. Where applicable, items have been modified or omitted to suit the current project, based on the exposure and duration.

Appendix C of the CNVG details additional mitigation measures based on the predicted construction noise levels and the magnitude of exceedances above the NMLs. The predicted noise levels do not warrant any additional mitigation measures during standard construction hours.

The predicted noise levels exceed the NMLs, during daytime work outside standard construction hours (e.g. Saturday 1.00pm-6.00pm and Sunday) by up to 18 dBA. This level of exceedance triggers the need for the following additional mitigation measures.

- Periodic notification of all receivers within 200m of works (monthly letterbox drop or equivalent). Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours.
- Verification noise monitoring is suggested for noisy activities outside standard construction hours.

Table 15 Standard Mitigation Measures

Action Required	Applies to	Details
Management Measures		
Implementation of any project specific mitigation measures required.	Airborne noise. Ground-borne vibration.	In addition to the measures set out in this table, any project specific mitigation measures identified in the environmental impact assessment documentation (eg REF, submissions or representations report) or approval or licence conditions must be implemented.
Implement community consultation measures.	Airborne noise. Ground-borne vibration.	• Periodic notification of all receivers within 200m of works (monthly letterbox drop or equivalent)[1]. Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours. • Website • Project info line • Construction response line • Email distribution list
Site inductions.	Airborne noise. Ground-borne vibration.	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures.
Behavioural practices.	Airborne noise.	No swearing of unnecessary shouting or loud stereos/ radios on site. No Dropping of materials from height, throwing of metal items and slamming of doors.
Monitoring.	Airborne noise. Ground-borne vibration.	Verification noise monitoring is suggested for noisy activities outside standard construction hours. Monitoring of noise and vibration should be undertaken upon receipt of complaints

Action Required	Applies to	Details
Source Controls		
Construction hours and scheduling.	Airborne noise. Ground-borne vibration.	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods. If work is required to occur at night, any highly noise emitting activities should be scheduled to occur in the less sensitive evening period, whenever possible. Unless negotiated with the community with consultation documented and approved by Roads and Maritime project manager or permitted under the license there should be no more than: • two consecutive nights per week; • three consecutive evenings per week; and • separated by not less than one week and no more than six evenings or nights per month.
Construction respite period.	Airborne noise. Ground-borne vibration.	In general, the following respite is provided. High noise and vibration generating activities[2] may only be carried out in continuous blocks, not exceeding three hours each, with a minimum respite period of one hour in between each block[3].
Equipment selection.	Airborne noise. Ground-borne vibration.	Use quieter and less vibration emitting construction methods where feasible and reasonable.
Maximum noise levels.	Airborne noise.	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Table F.1 of the CNVG.
Rental plant and equipment.	Airborne noise.	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table F.1 of the CNVG.
Use and siting of plant.	Airborne noise.	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down when not in use. Noise-emitting plant to be directed away from sensitive receivers.
Plan worksites and activities to minimise noise and vibration.	Airborne noise. Ground-borne vibration.	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.

Action Required	Applies to	Details
Non-tonal reversing alarms.	Airborne noise.	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Minimise disturbance arising from delivery of goods to construction sites.	Airborne noise.	Loading and unloading of materials/ deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/ unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.
Path Controls		
Shield stationary or localised noise sources such as pumps, compressors, fans etc.	Airborne noise.	Whenever practical, work areas should be screened to reduce noise levels at receivers. Many of the proposed activities would be confined to discreet work areas and are thus suitable for temporary screening. Highly noise emitting activities occurring outside standard construction hours, particularly at night, should be screened. If traffic diversions are necessary to permit temporary screening this should be considered. Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.

Notes:
1. Detailing all upcoming construction activities at least 5 working days prior to commencement of relevant works.
2. Includes jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling.
3. "Continuous" includes and period during where there is less than 60 minutes respite between ceasing and recommencing any of the work.

For convenience of identifying noise-sensitive receivers requiring notifications, Figure 6 shows the nominal distances from the works. Furthermore, it would be sensible to provide the same notification to all receivers in a potentially impacted noise catchment area.

Note: Locations of features are indicative only and are shown solely to demonstrate features pertinent to the noise assessment.

Figure 6 Notification Area

Conclusion

NSW Roads and Maritime Services propose to undertake truss strengthening and maintenance on Colemans Bridge on Union Street in Lismore.

SoundIN has undertaken an assessment of noise and vibration impact for the proposed works. This noise and vibration impact assessment considers impacts from construction.

This noise and vibration impact assessment was conducted in accordance with relevant NSW Government guidelines and policies.

Construction works associated with the proposal will result in construction activities in close proximity to residential and commercial receivers. Construction noise levels at sensitive receivers have been predicted for a number of typical construction scenarios, and in a number of instances, are likely to exceed the established noise management levels. Noise levels are not predicted to exceed the highly affected level of 75 dBA at nearby residences. This assessment details mitigation and management measures that should be implemented where practical, including specific measures to mitigate noise impacts from the noisiest plant and activities.

No significant vibration emitting plant is anticipated to be required and therefore negligible impacts are expected.

References

Roads and Maritime Services 2015, *Noise Criteria Guideline,* Roads and Maritime Services, Sydney.

Roads and Maritime Services 2016, *Construction Noise and Vibration Guideline*, Roads and Maritime Services, Sydney.

DECCW 2011, *NSW Road Noise Policy*, Department of Environment, Climate Change and Water NSW, Sydney.

EPA 2017, Noise Policy for Industry, Environmental Protection Authority, Sydney.

DECC 2009, *Interim Construction Noise Guideline*, Department of Environment and Climate Change NSW, Sydney.

DEC 2006, *Assessing Vibration: a technical guideline*, Department of Environment and Conservation NSW, Sydney.

Appendix A

Noise Monitoring Results

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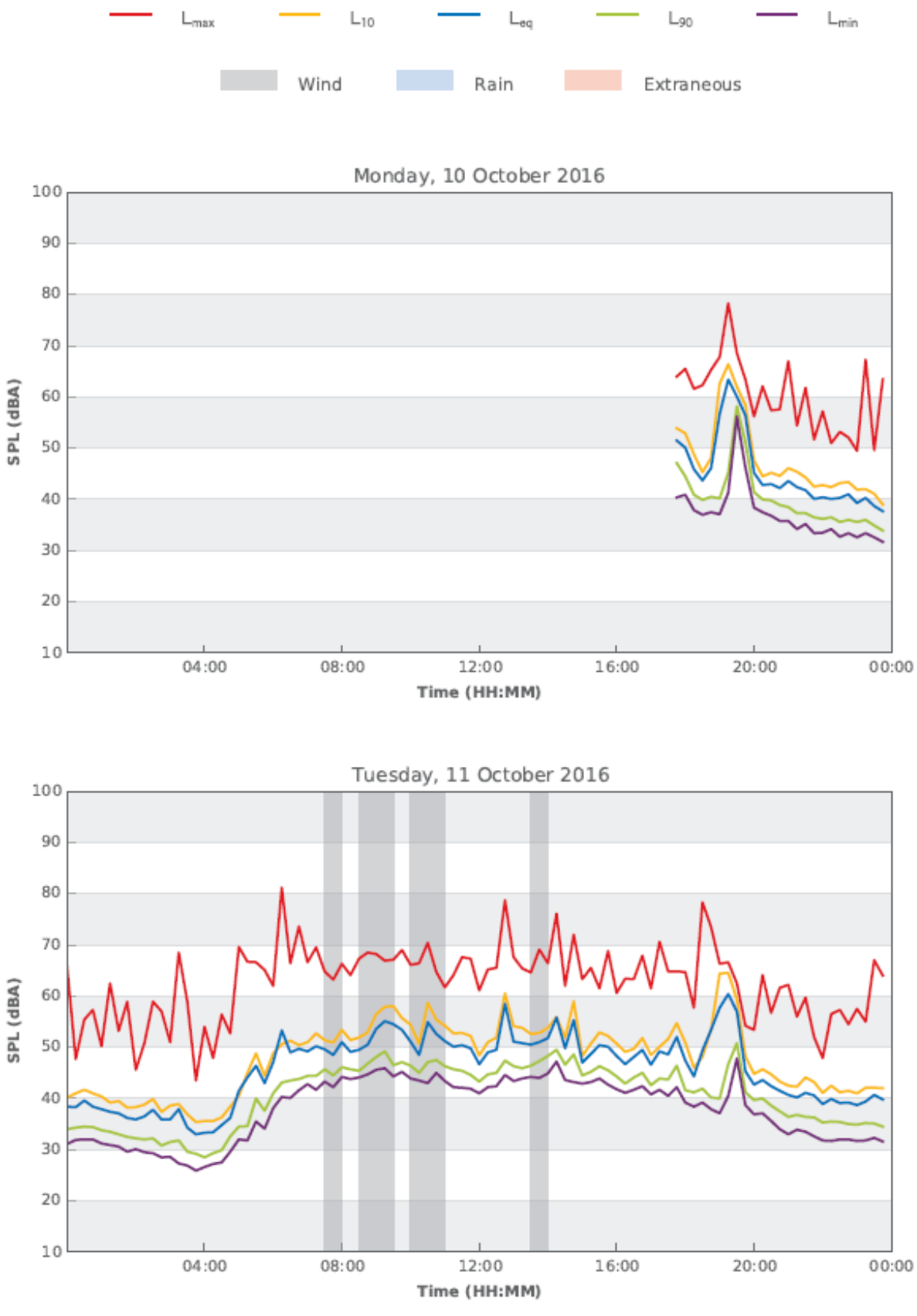

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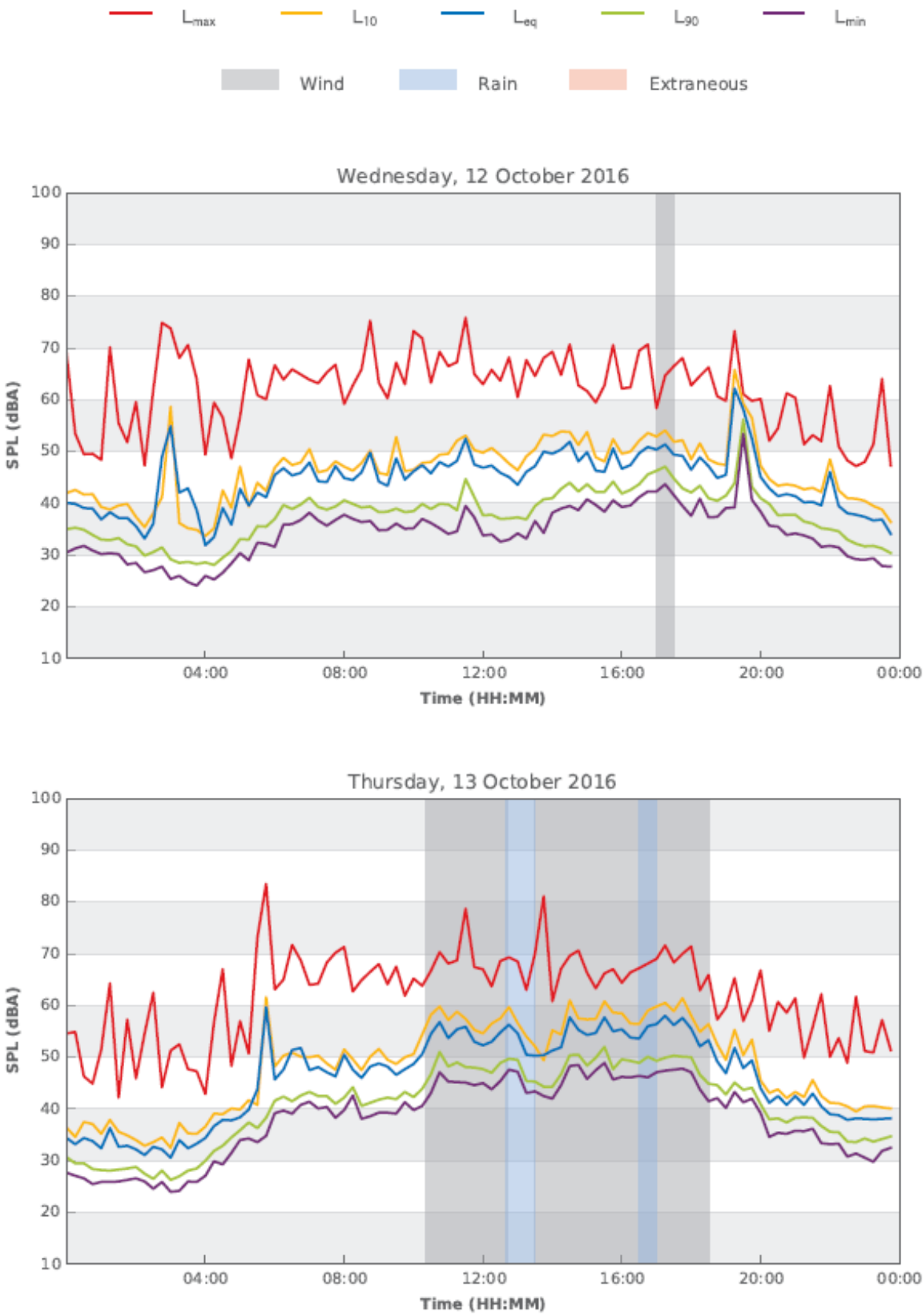

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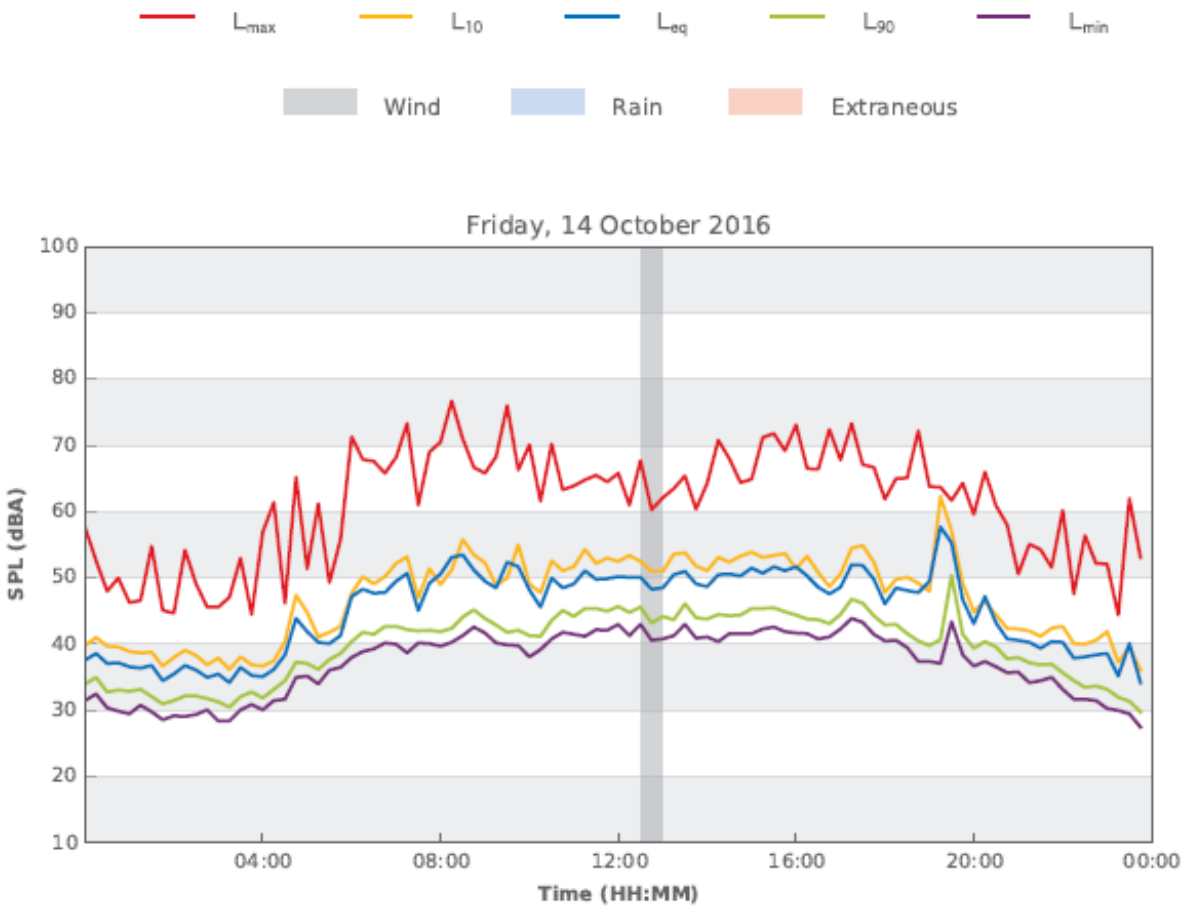

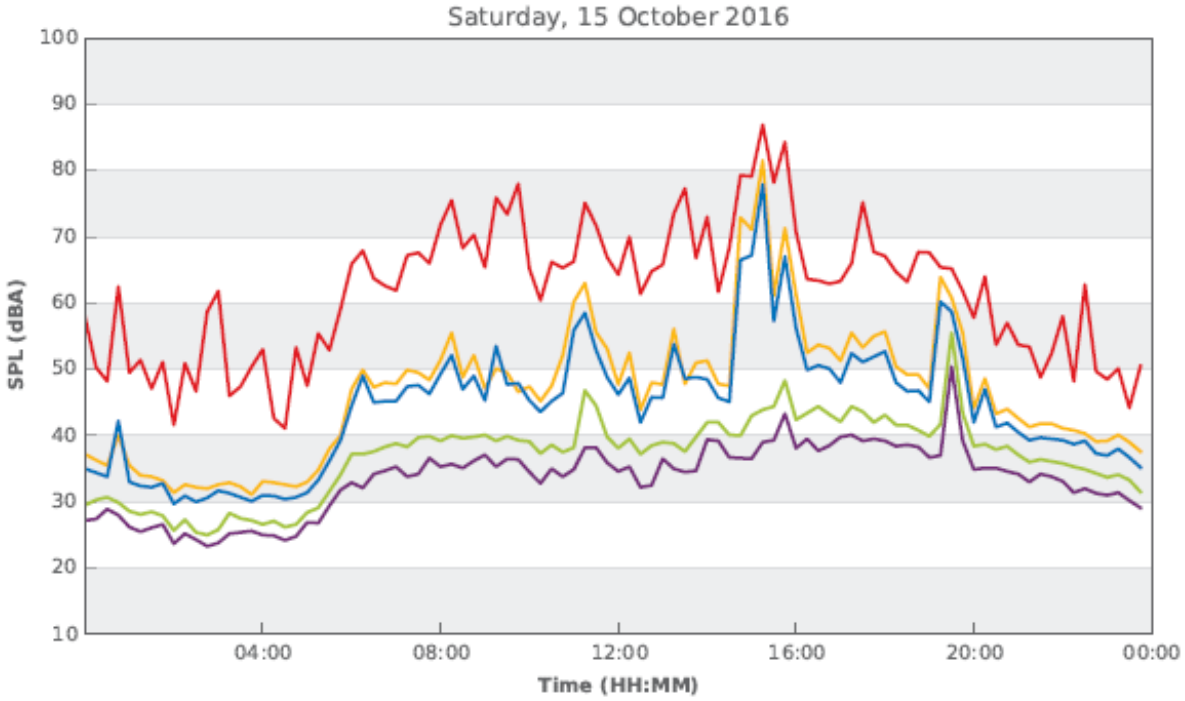

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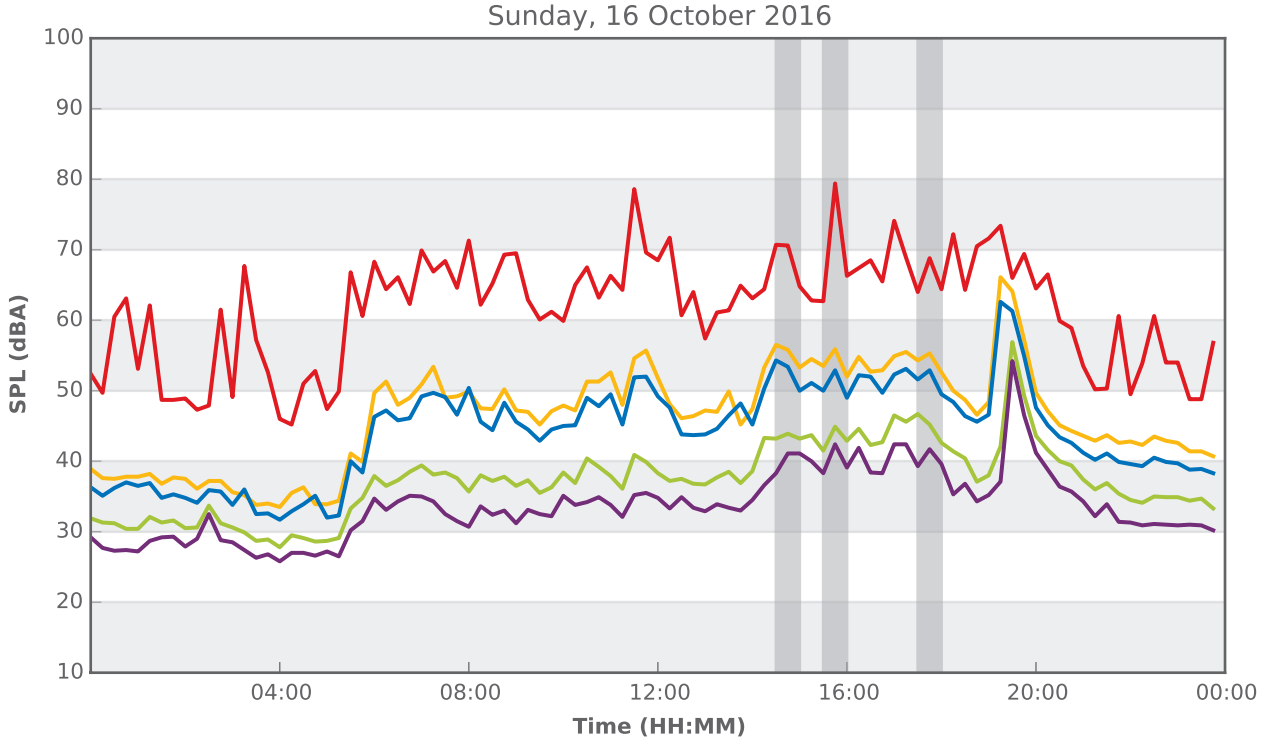

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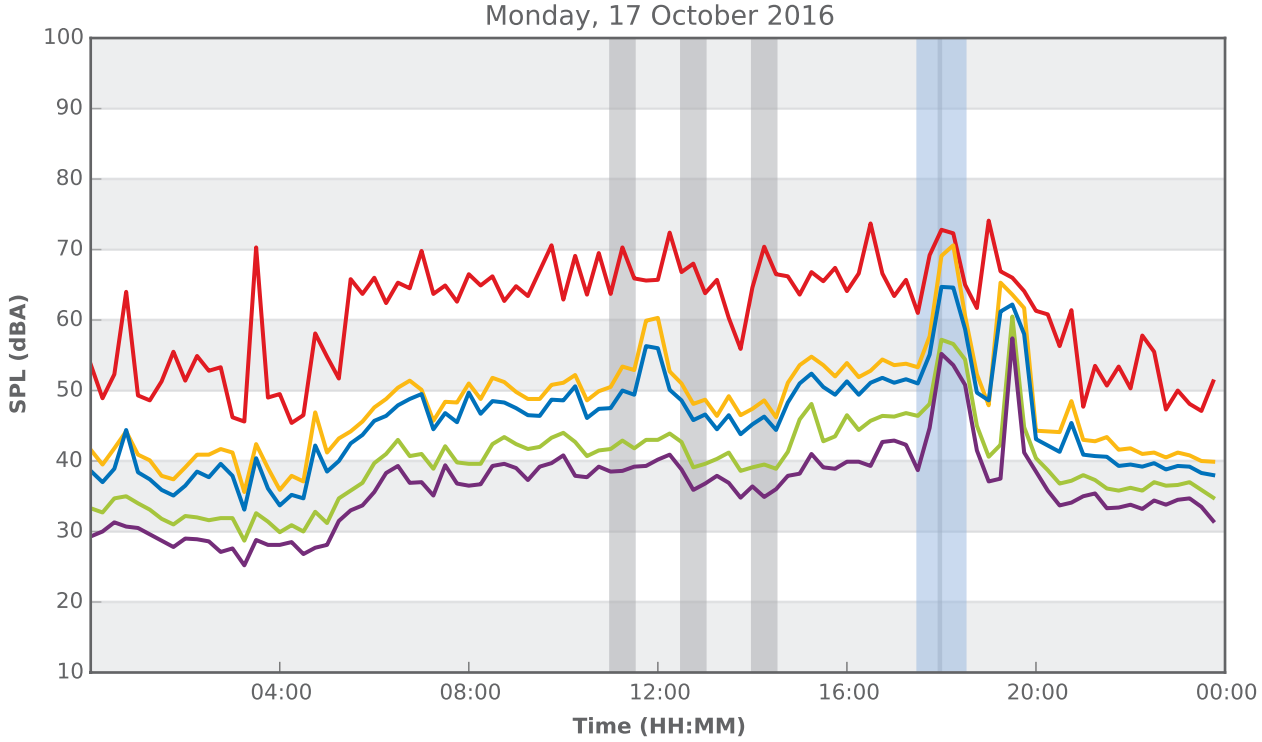

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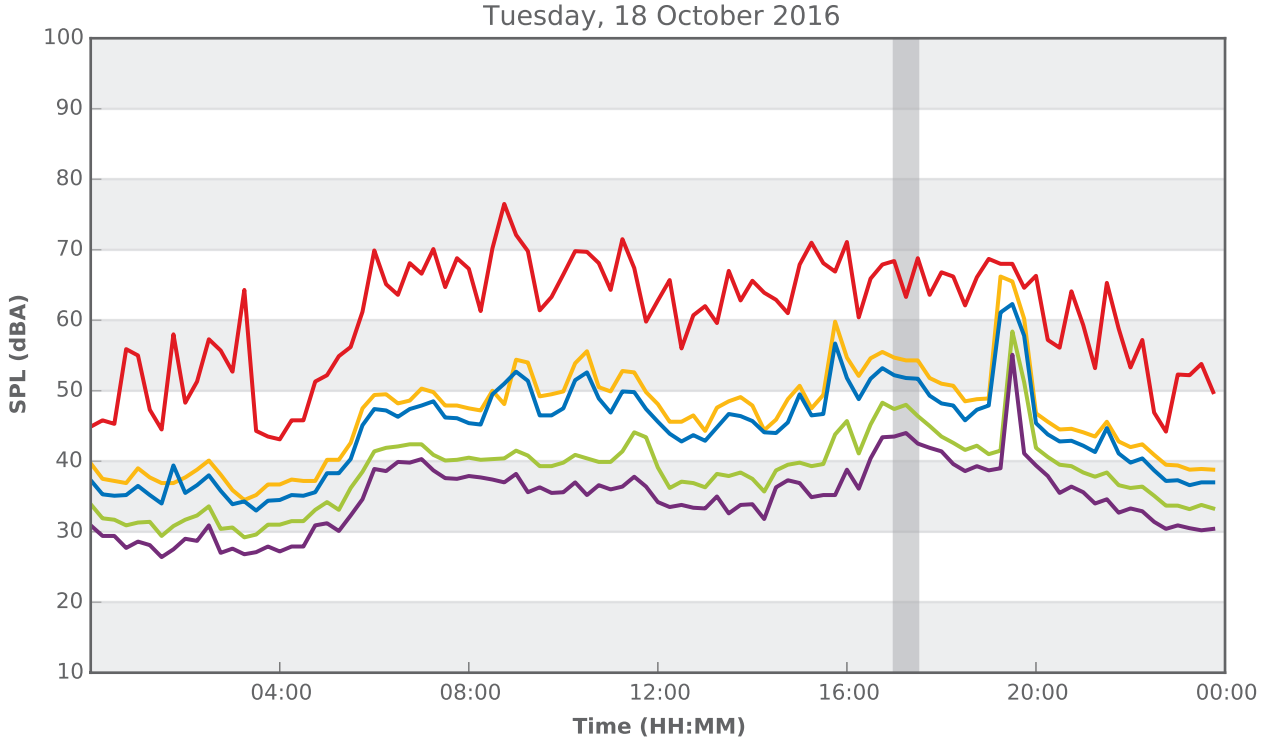

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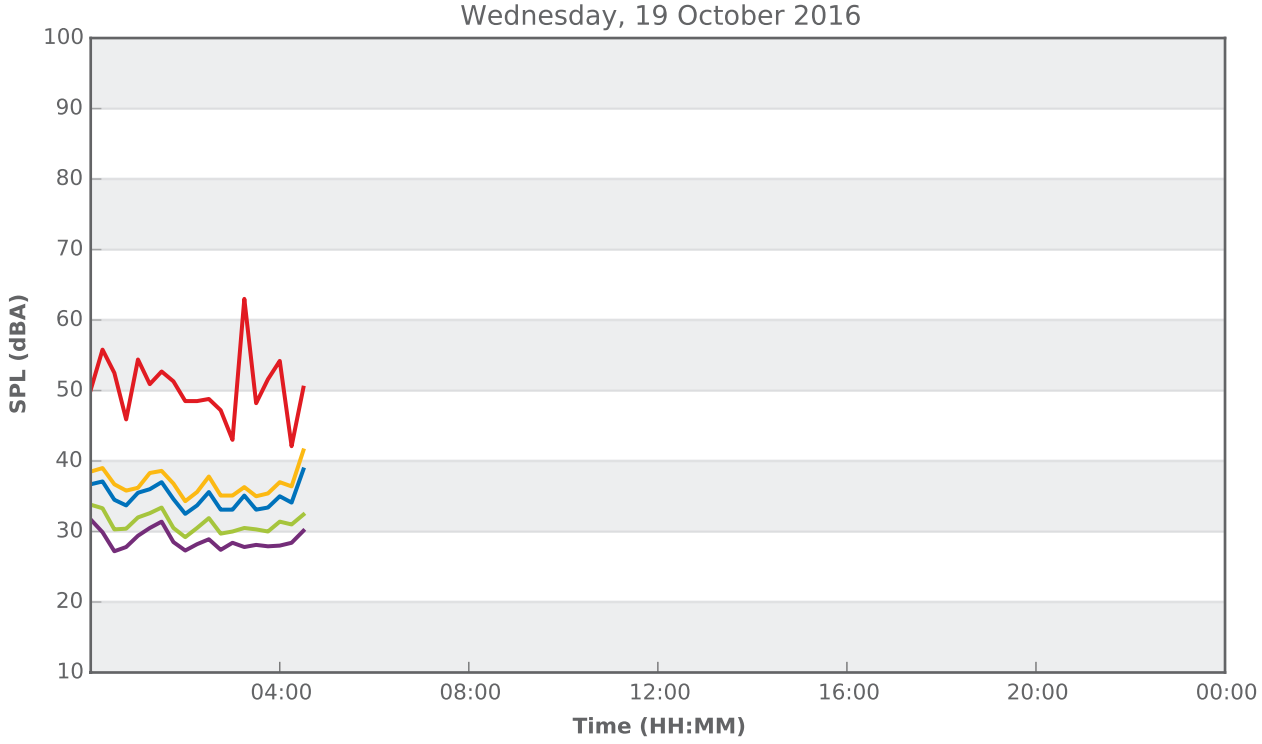

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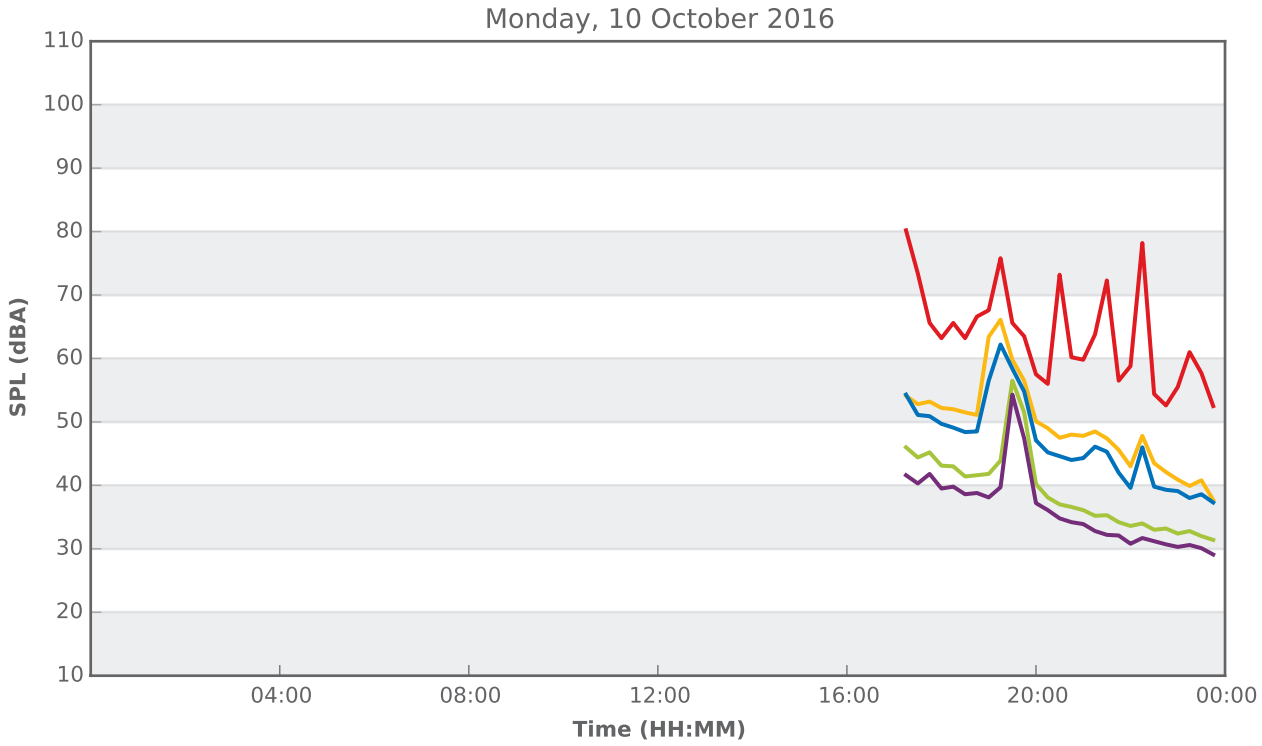

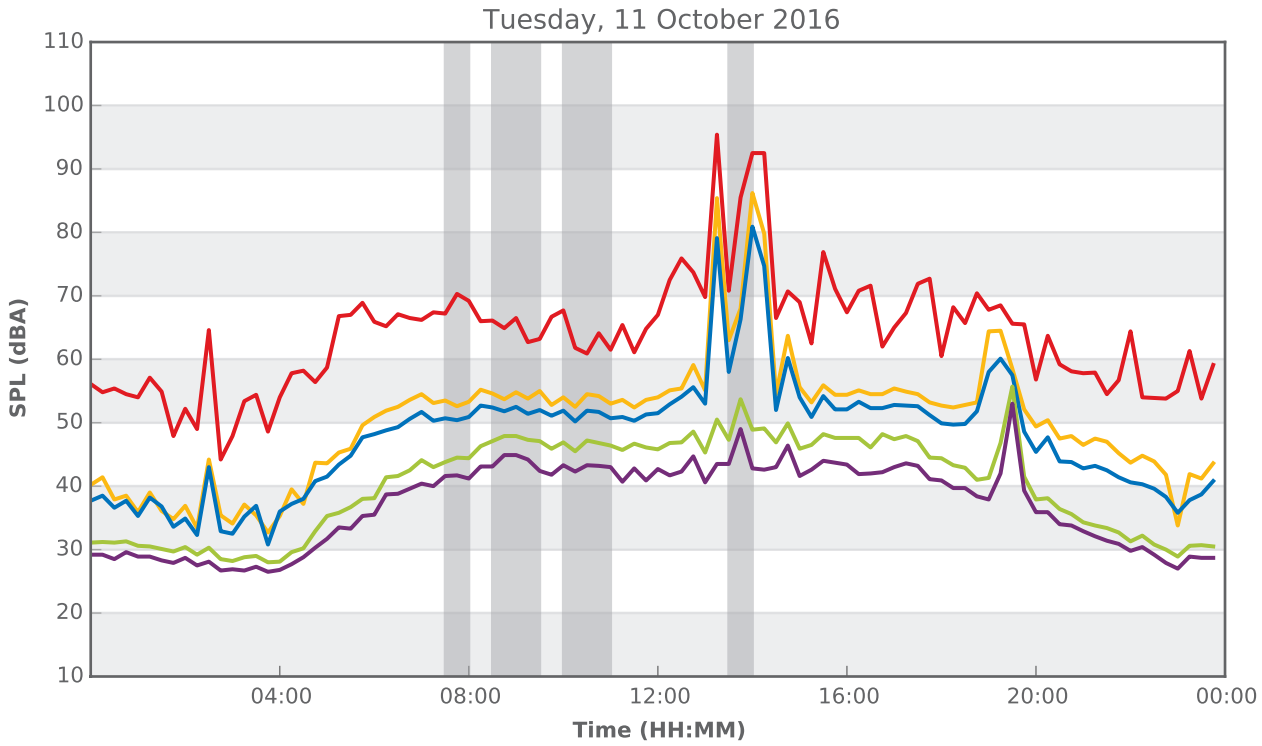

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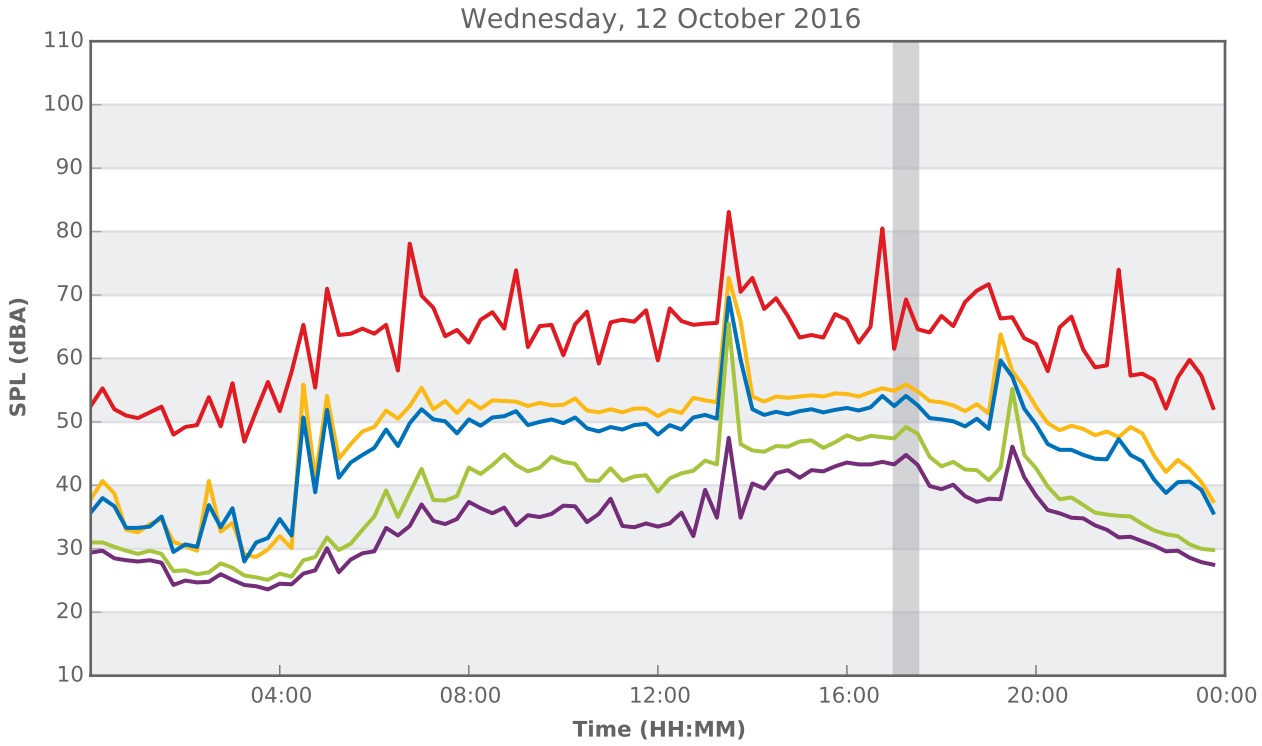

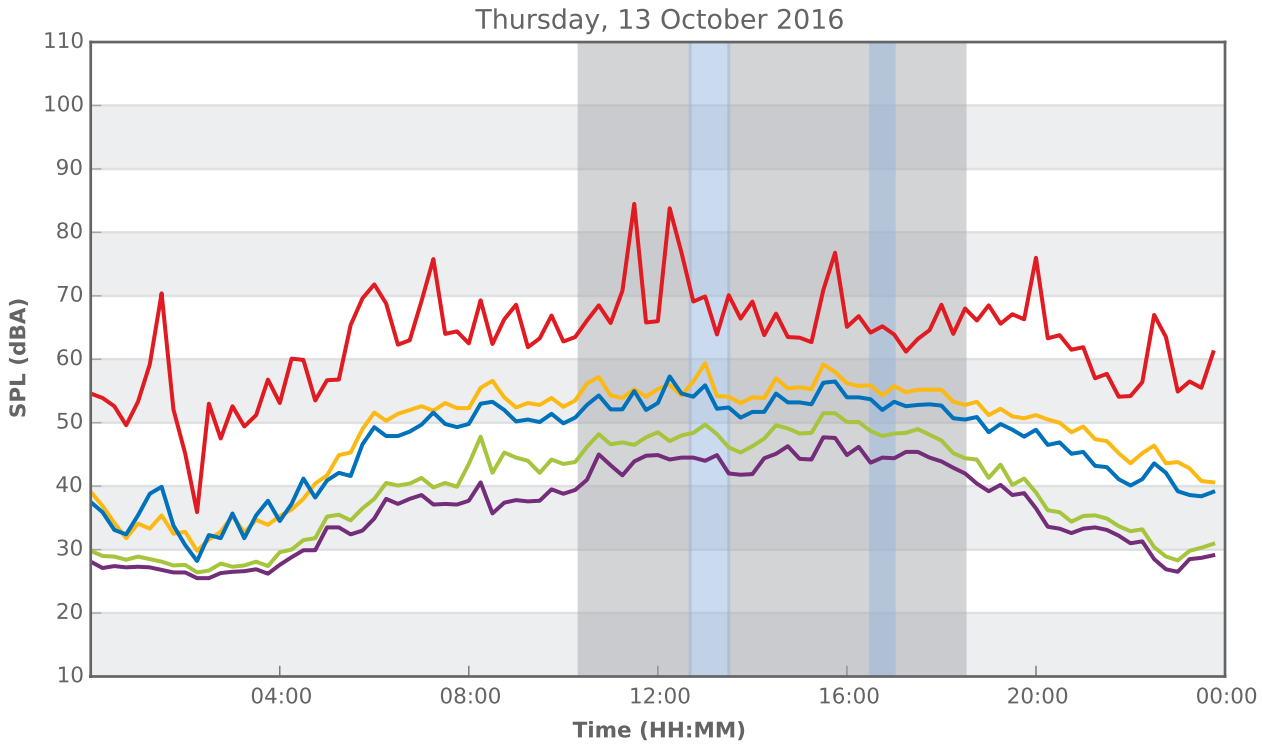

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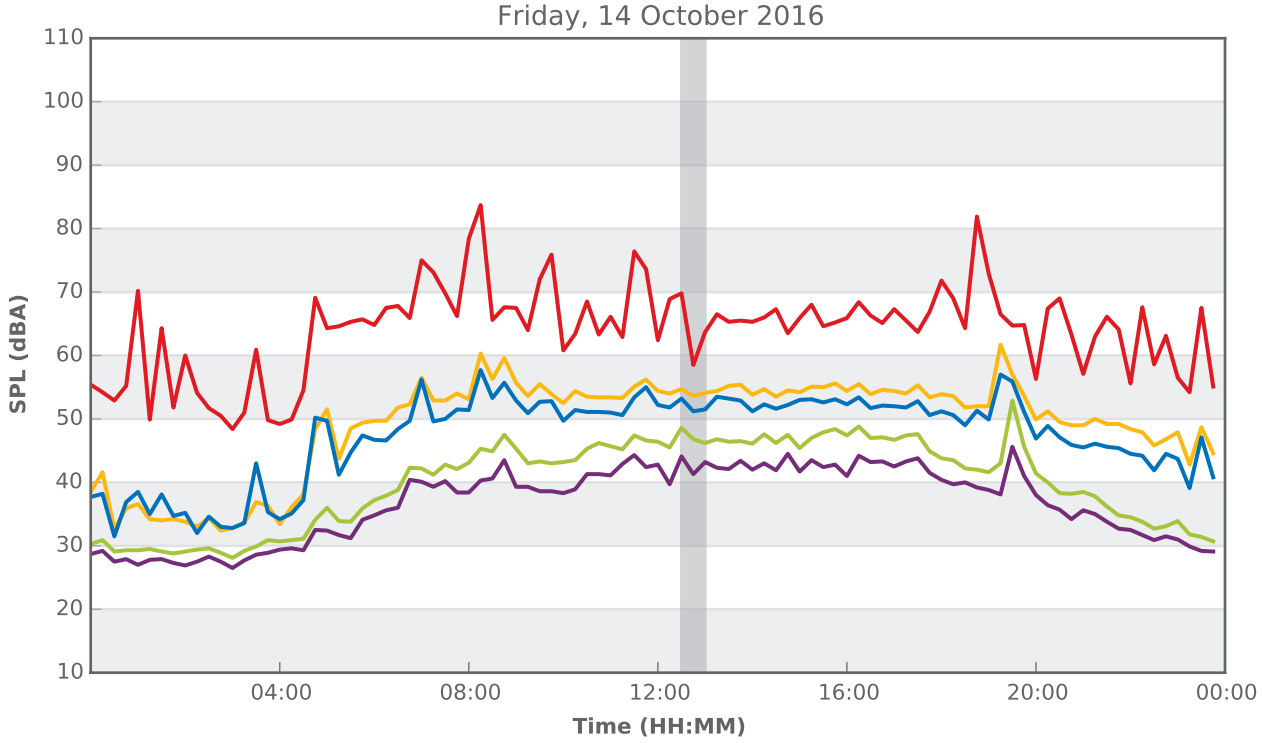

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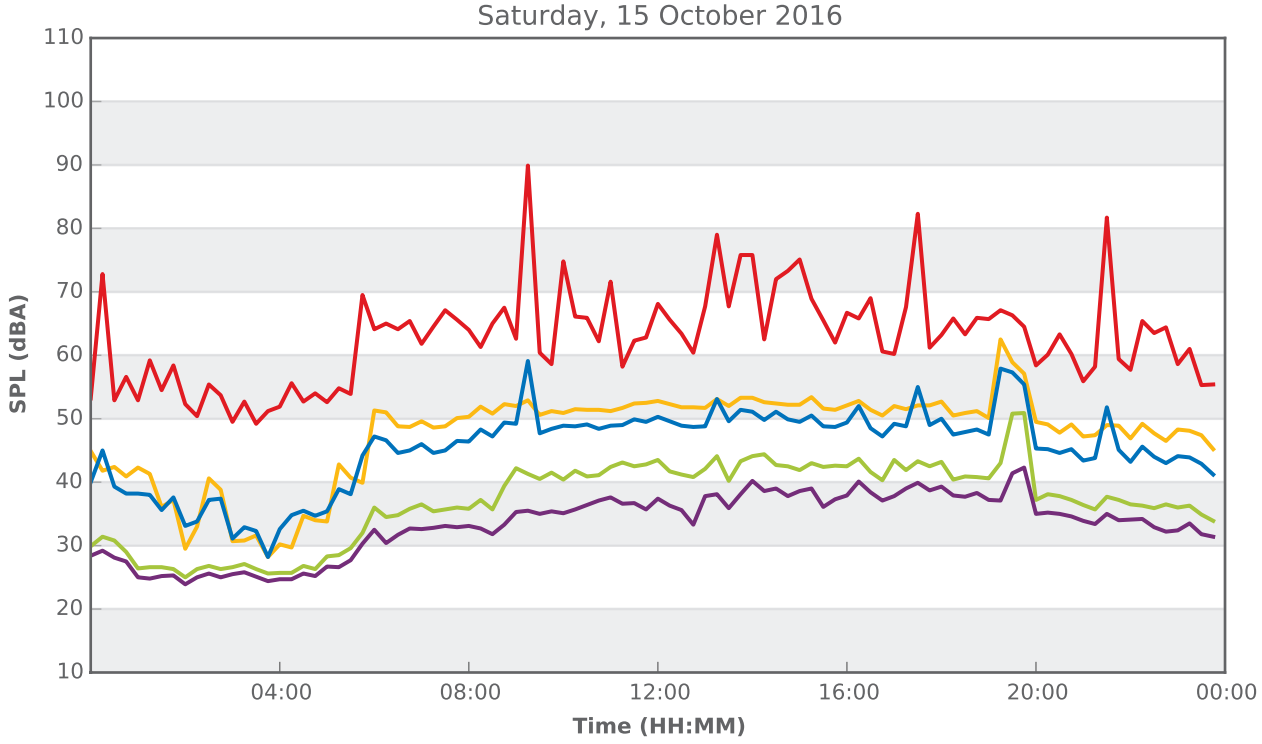

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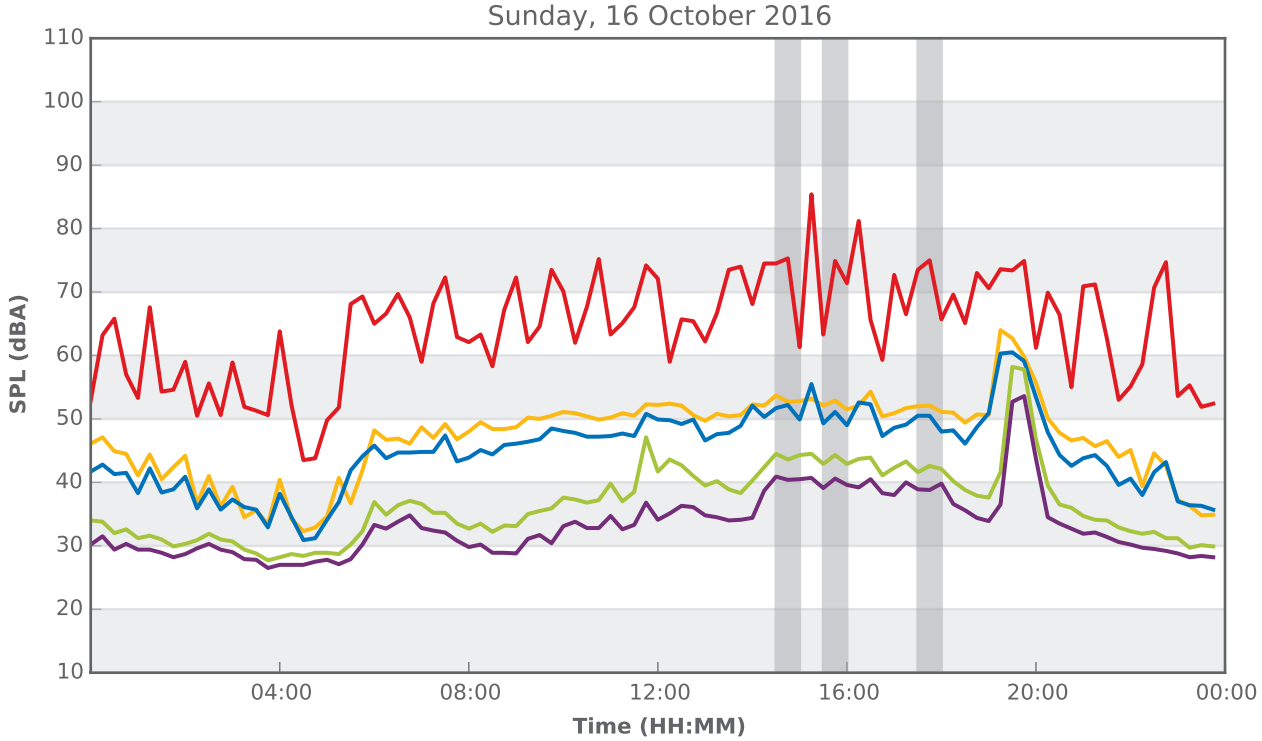

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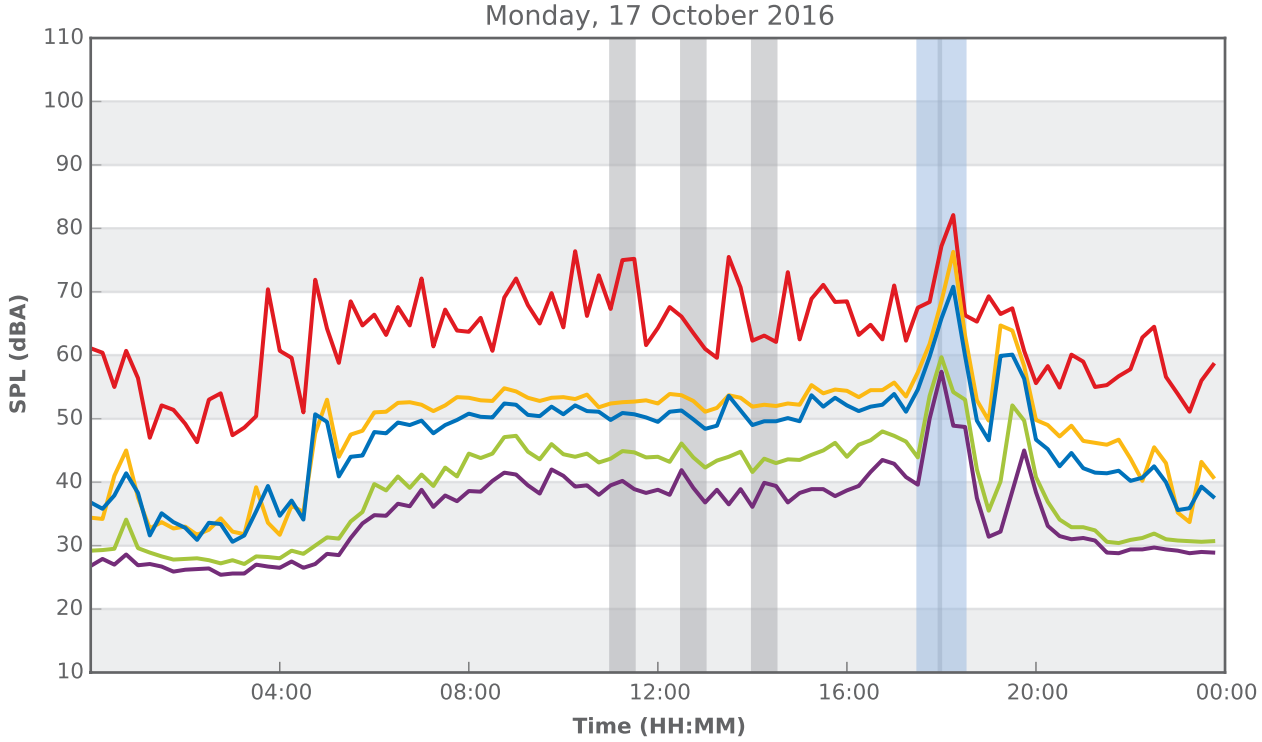

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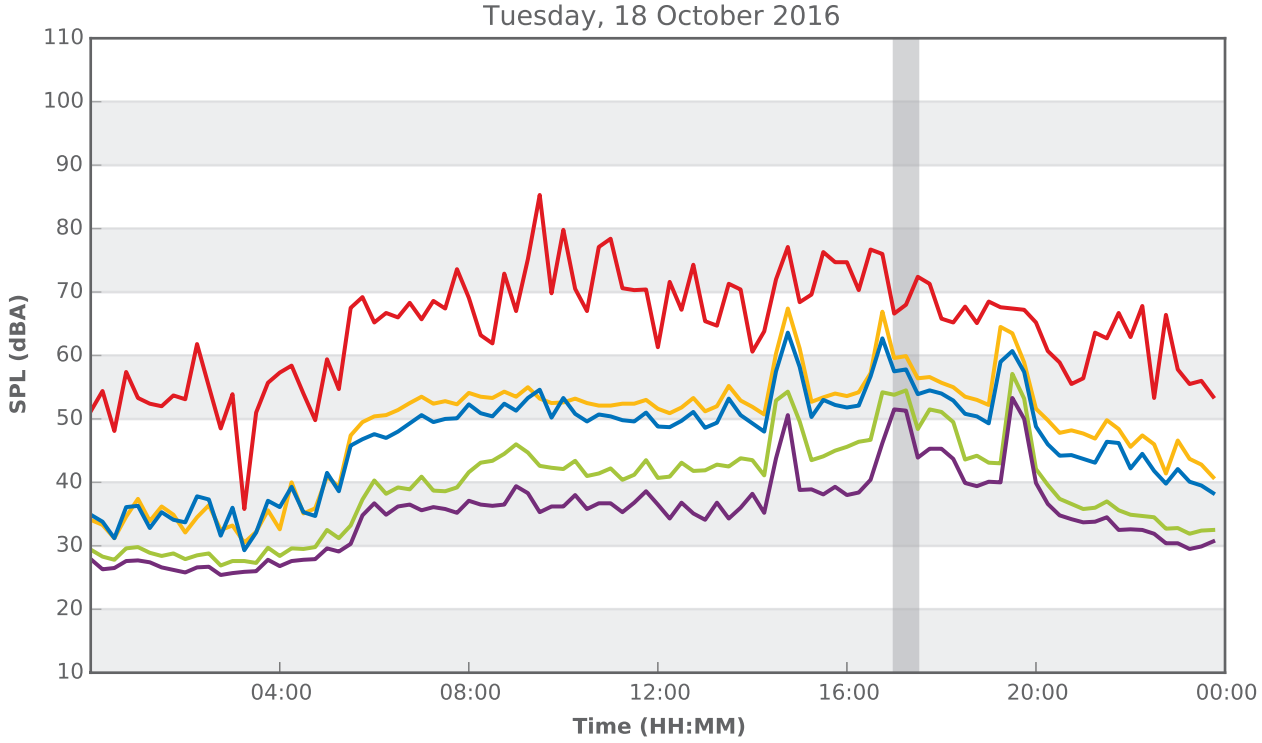

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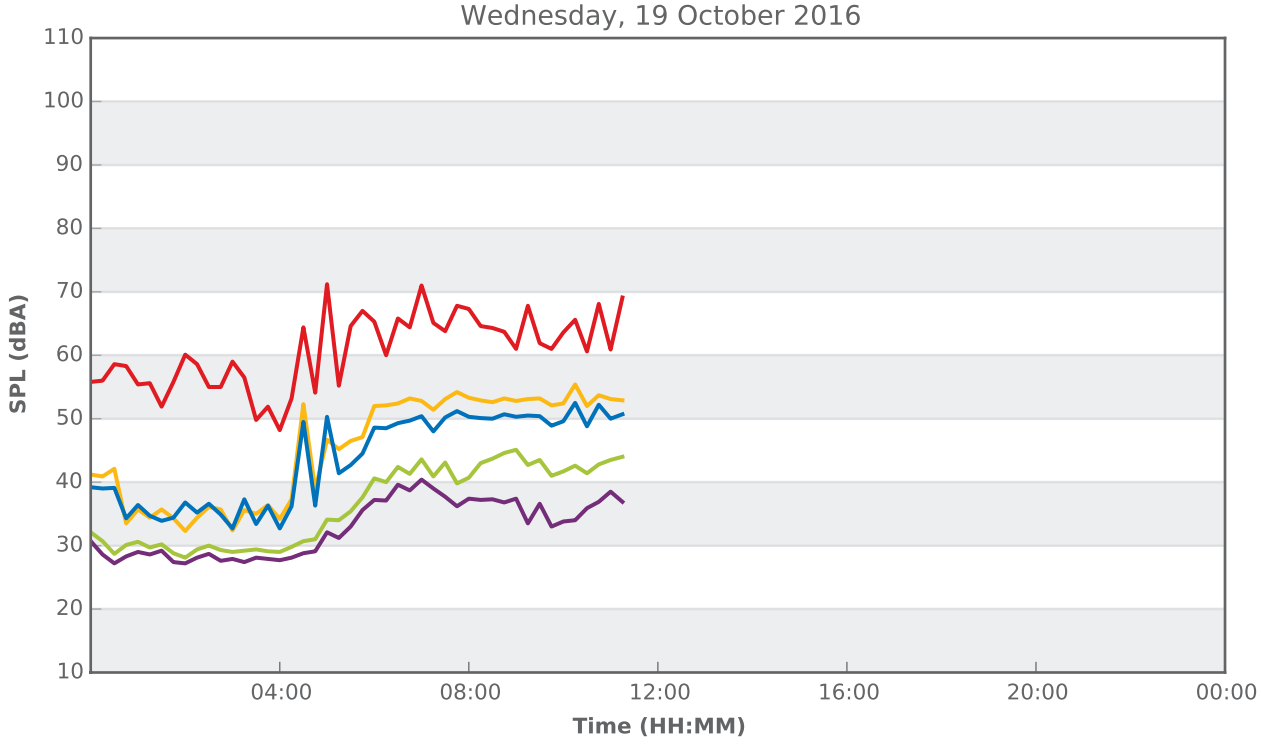

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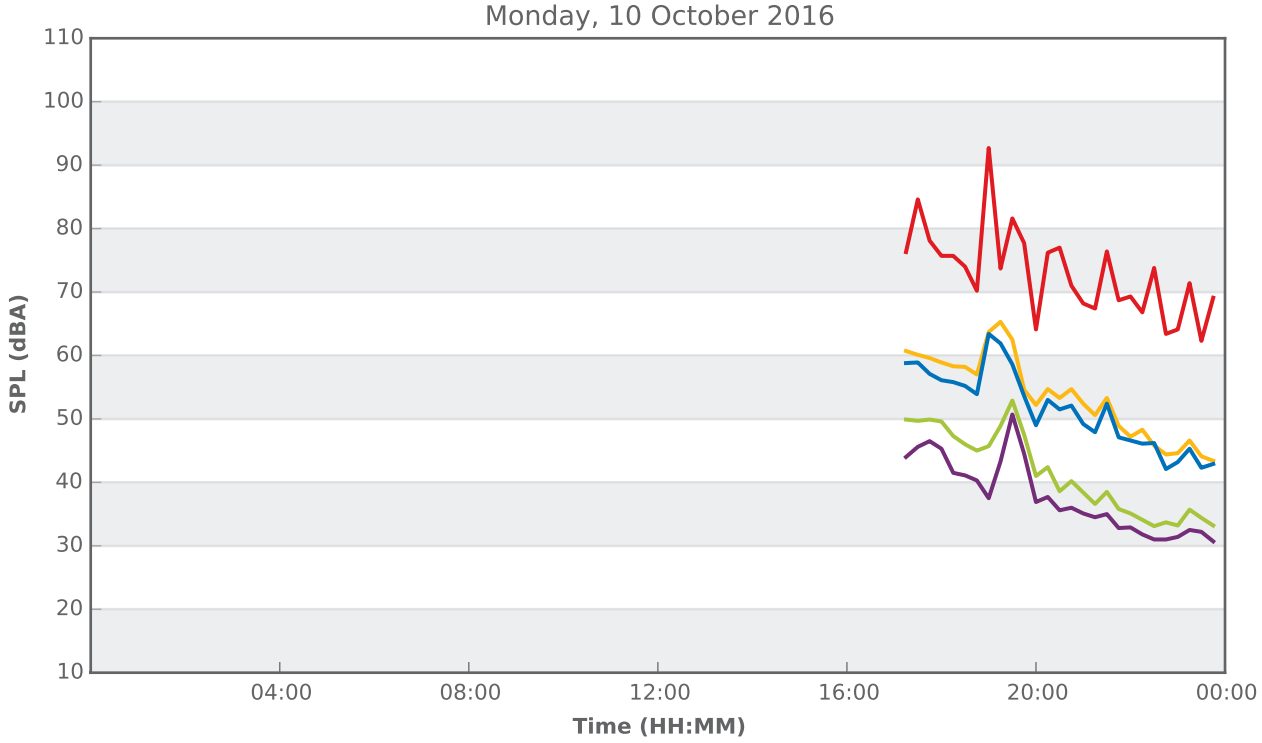

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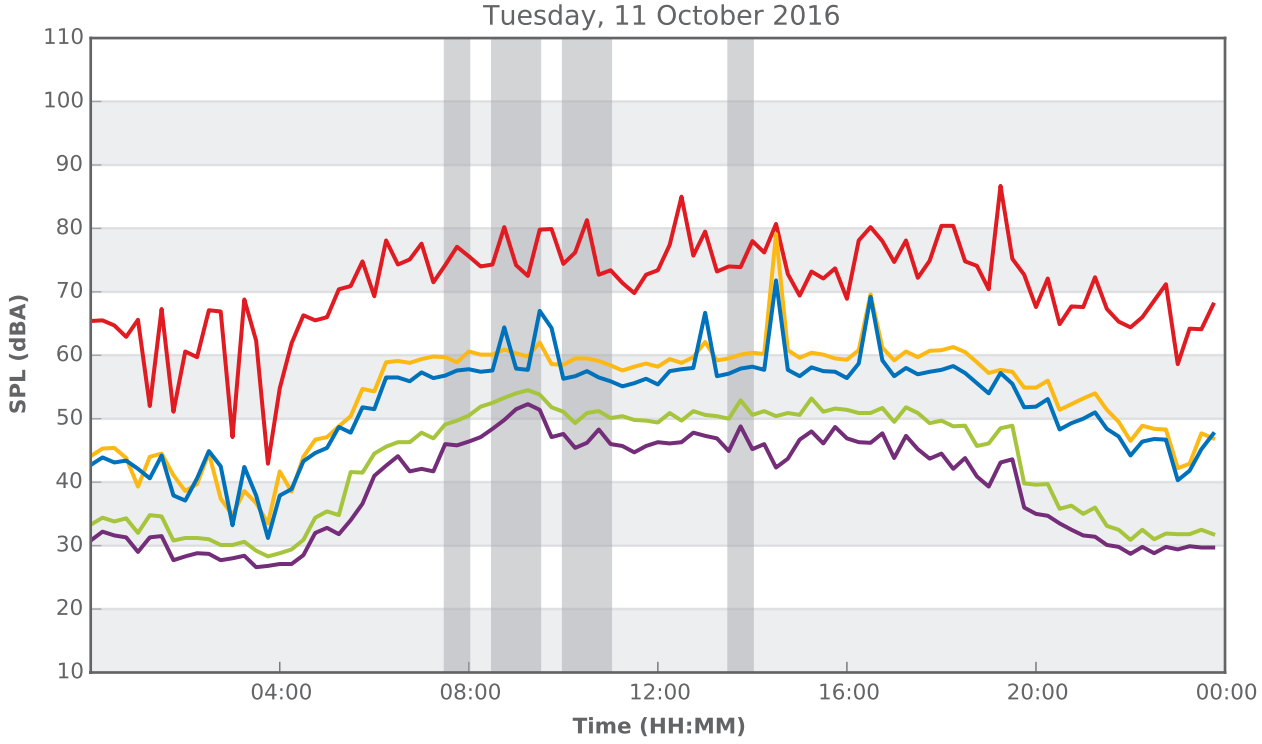

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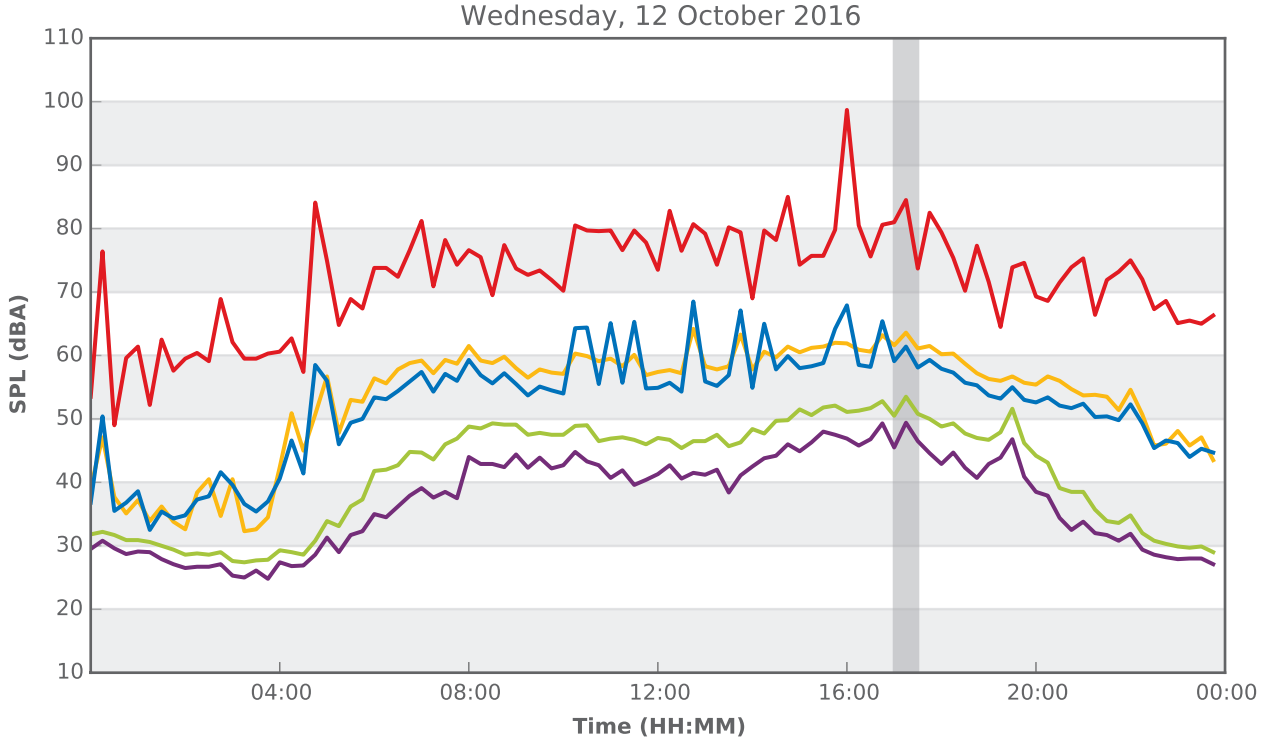

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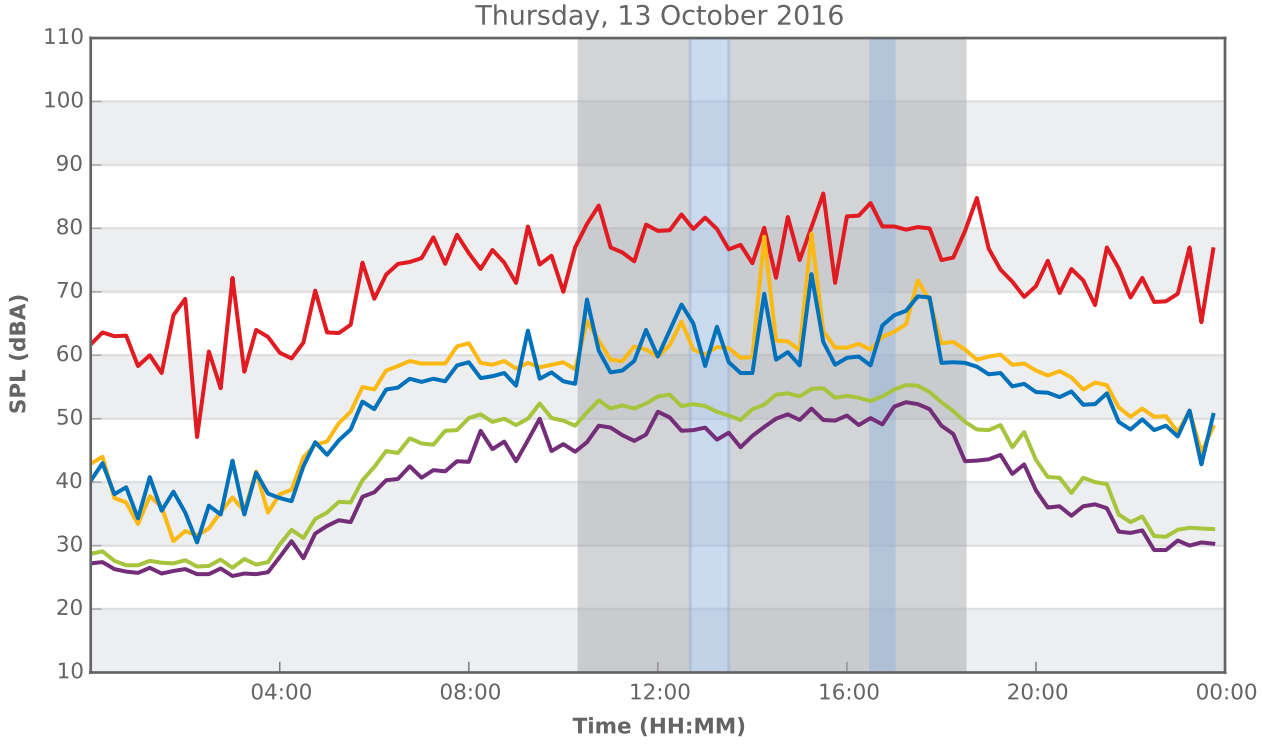

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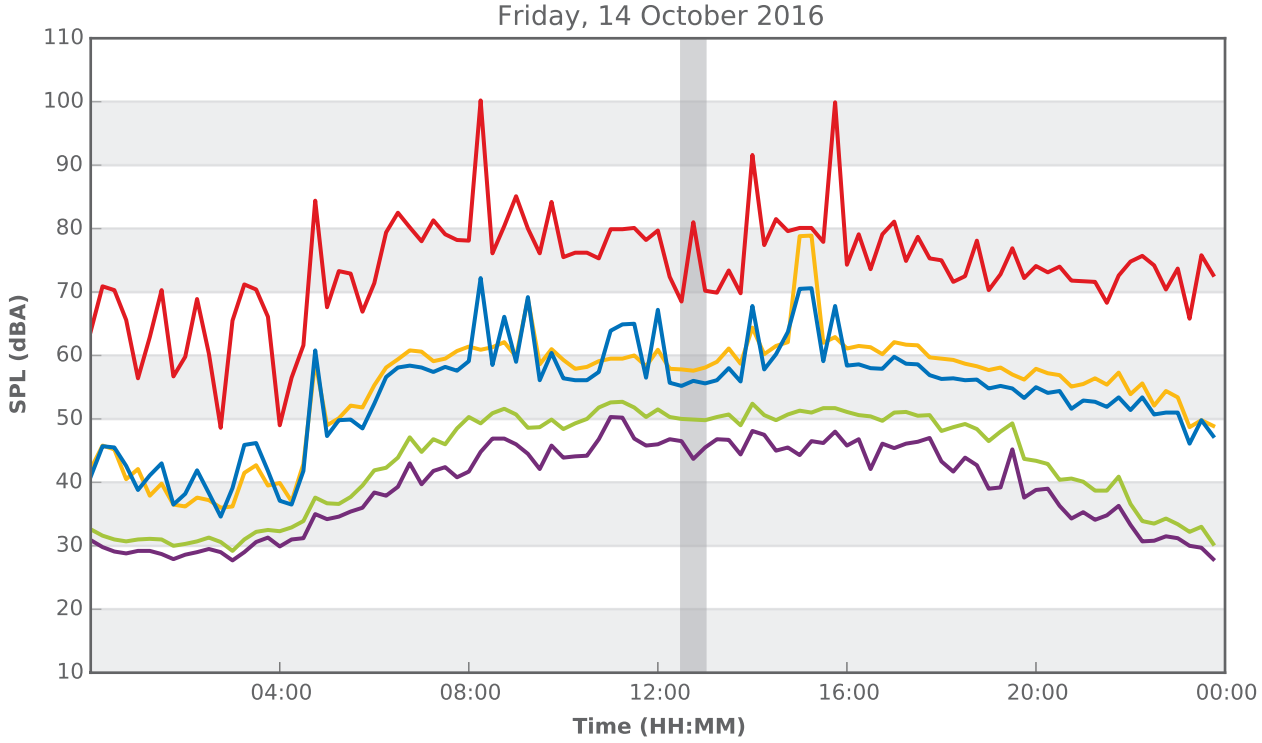

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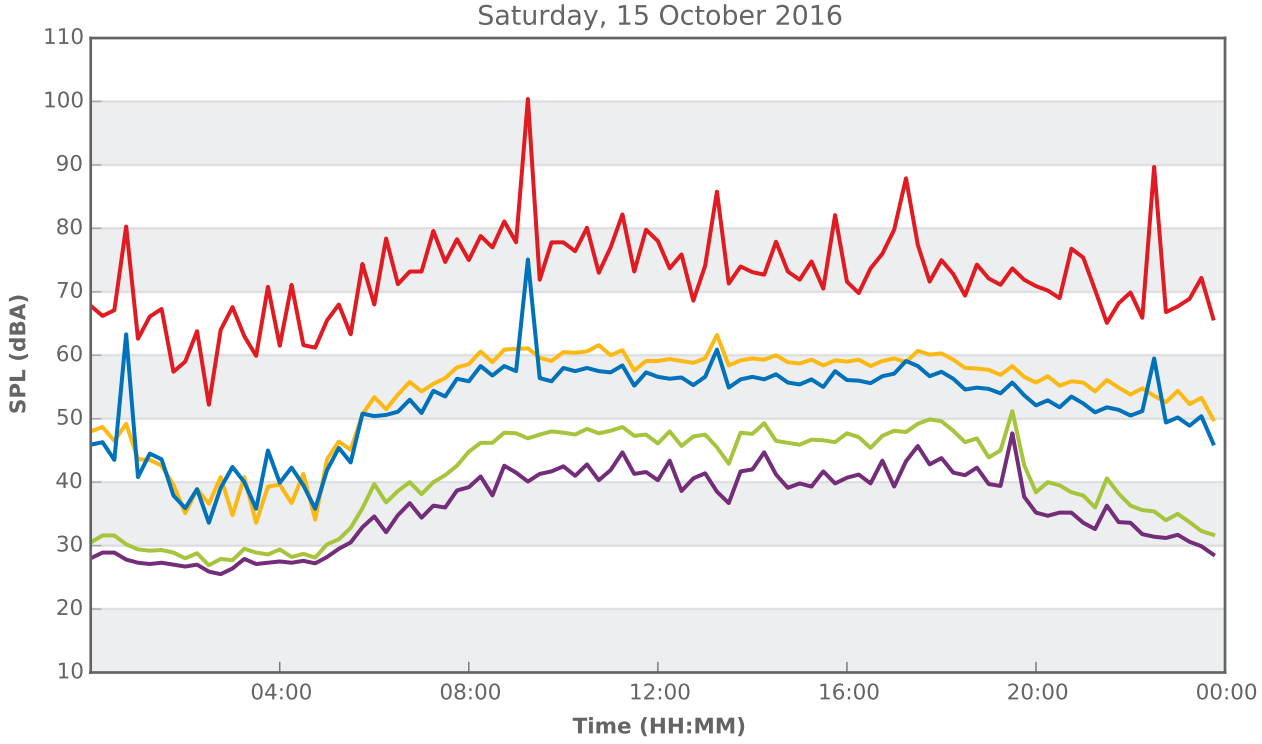

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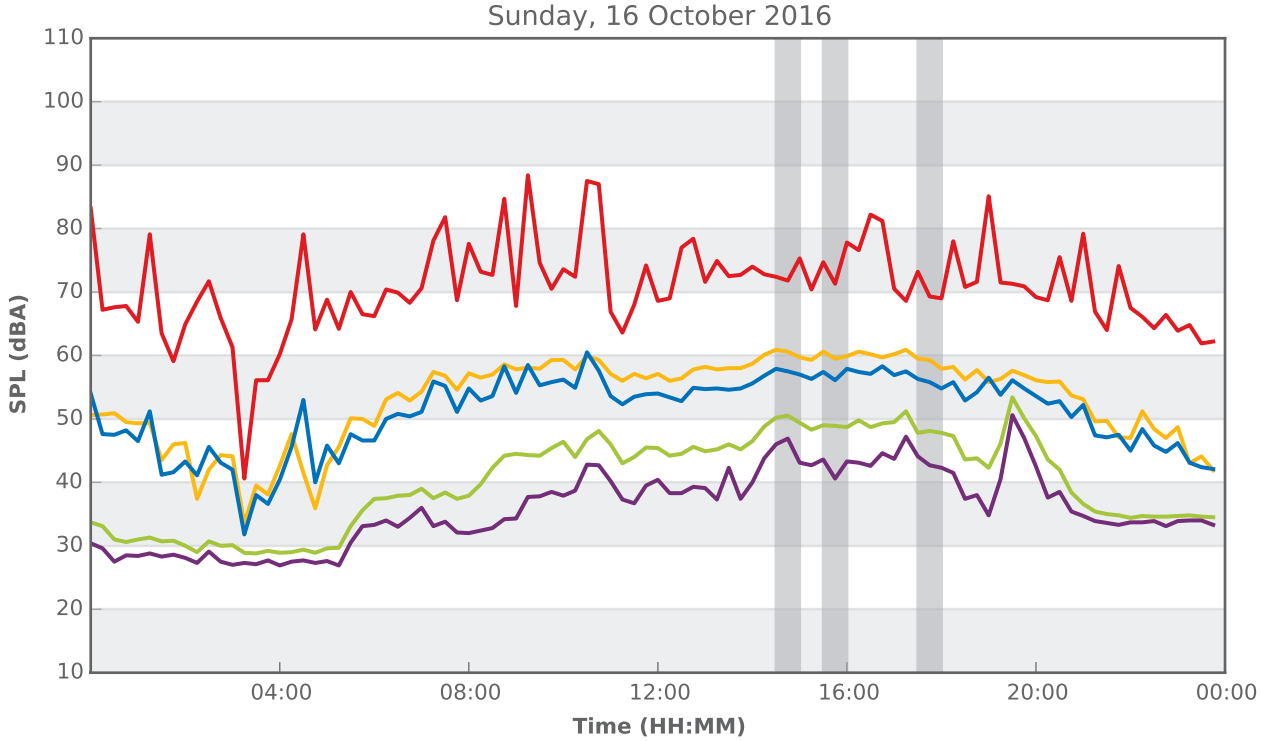

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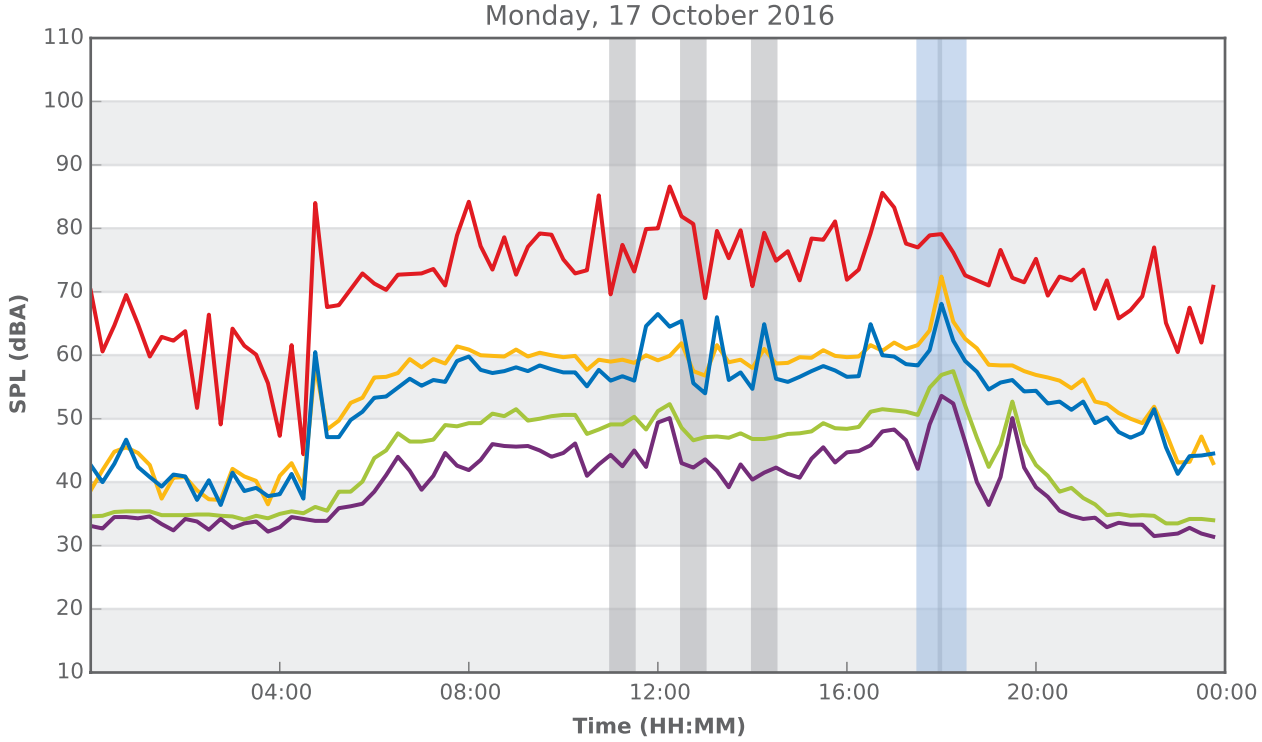

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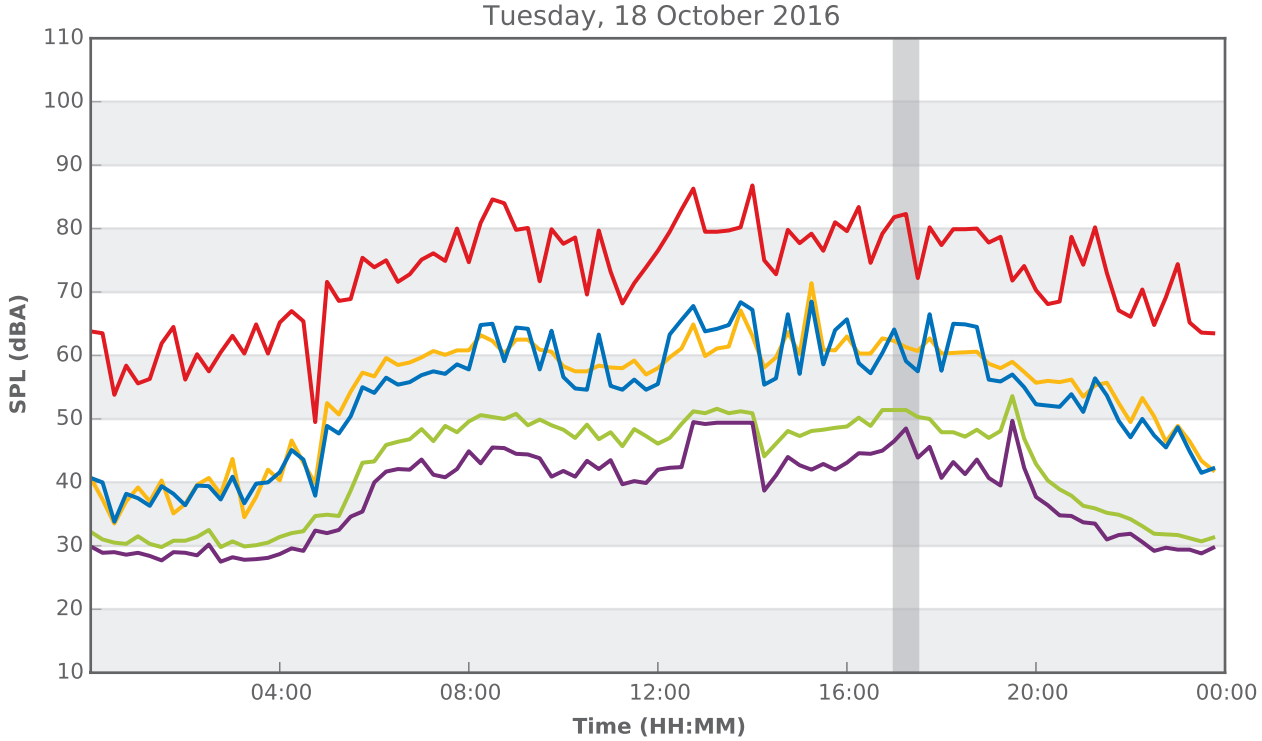

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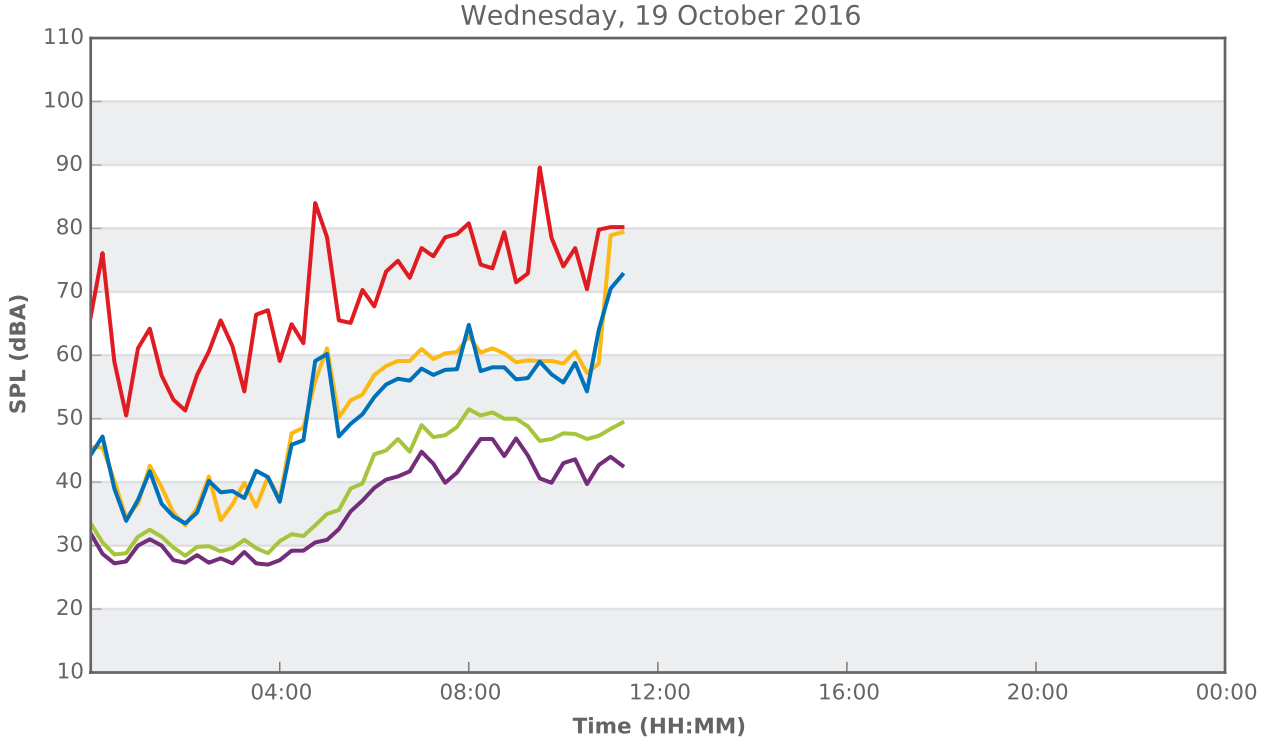

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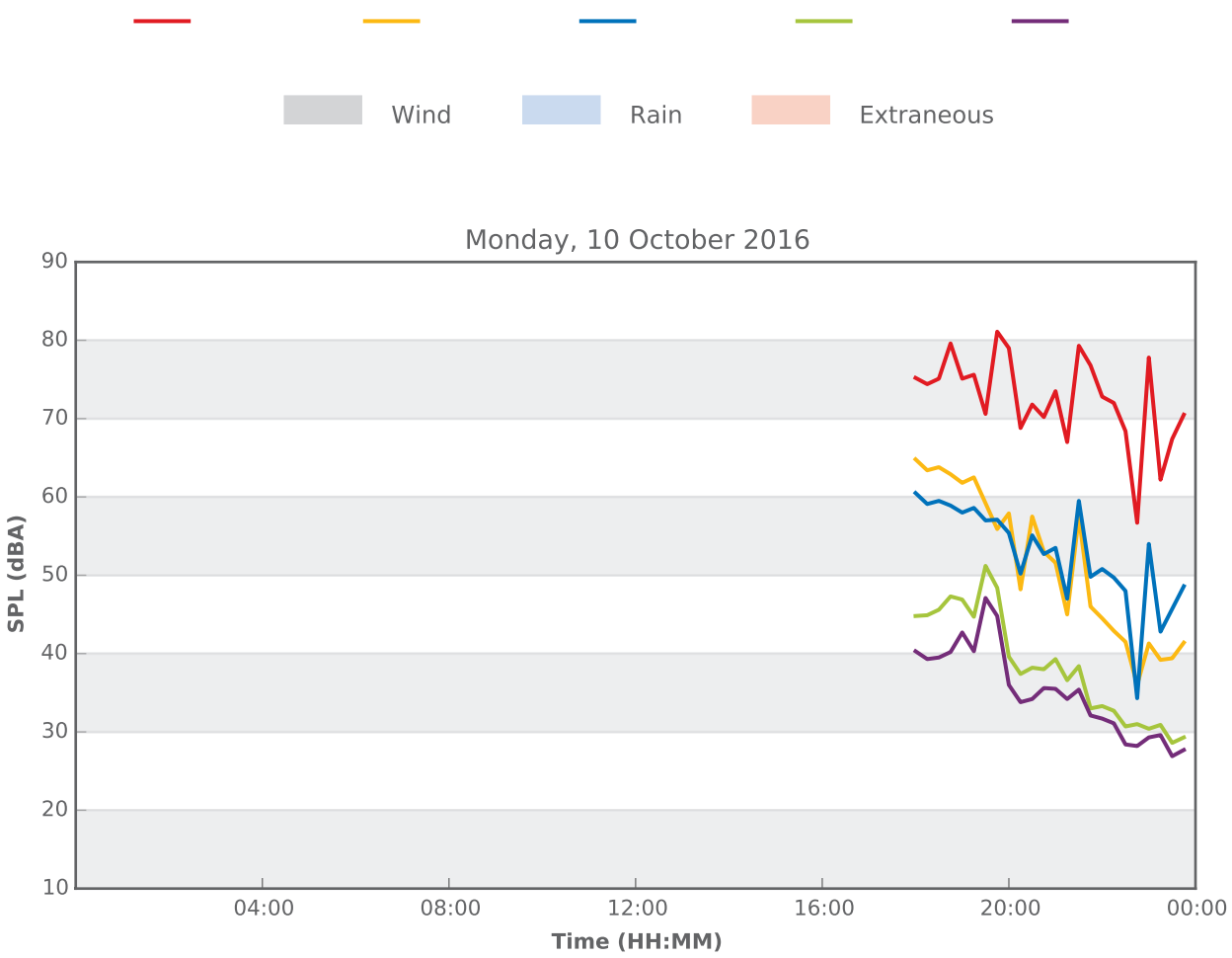

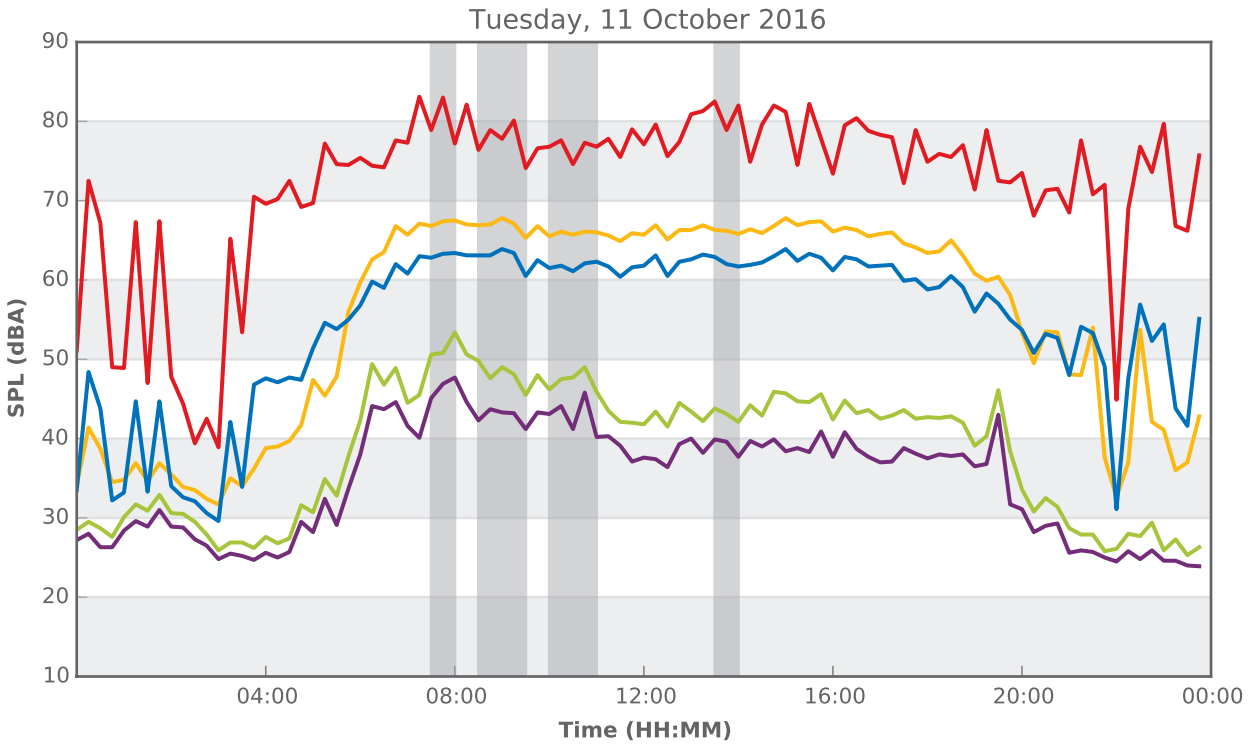

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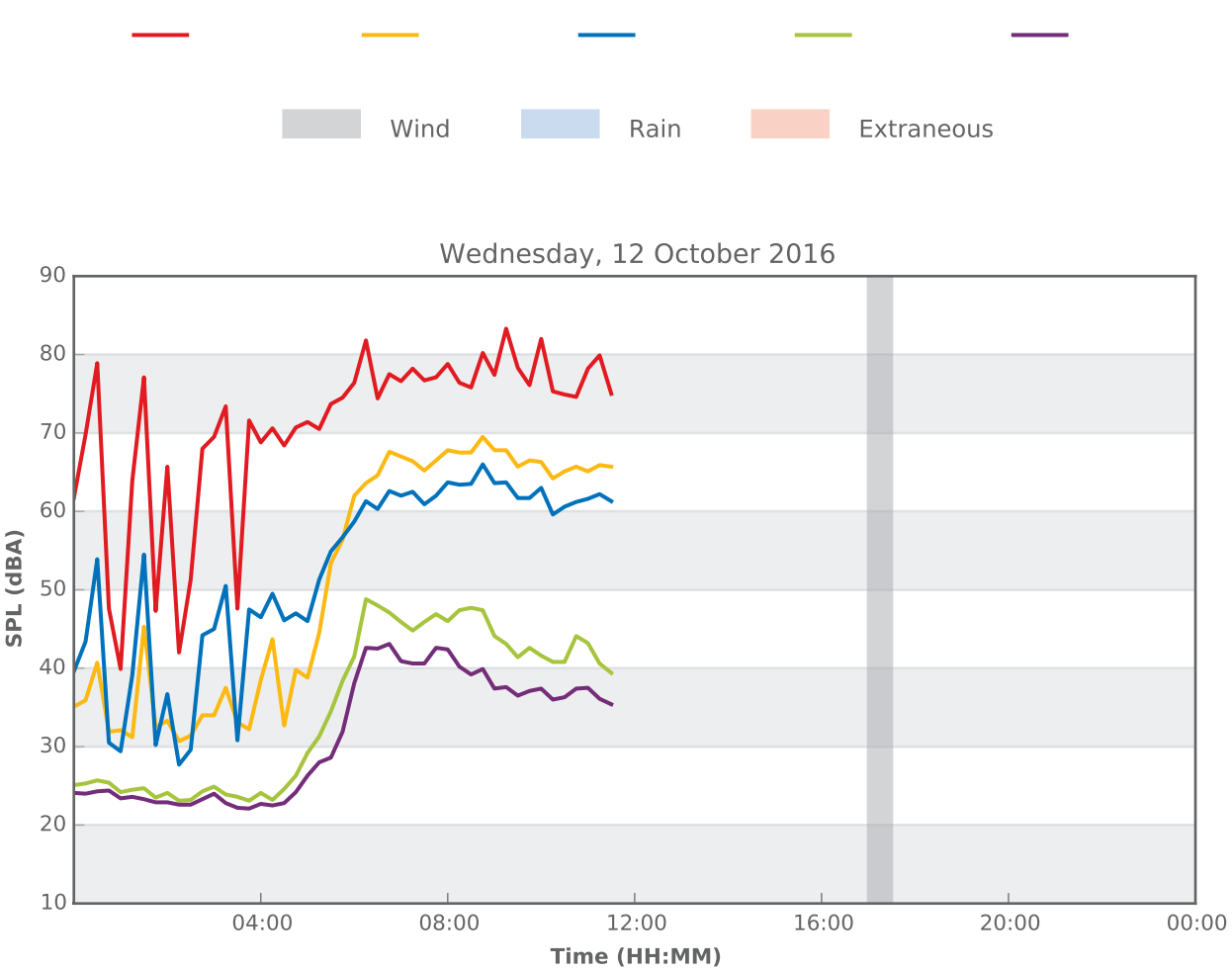

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Customer feedback
Roads and Maritime
Locked Bag 928,
North Sydney NSW 2059

August 2017
RMS 19.1275
ISBN: 978-1-925891-51-5

Appendix H

Statement of heritage impacts

Colemans Bridge: Strengthening & Maintenance

Statement of Heritage Impact

Roads and Maritime Services | 3 May 2019

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CONTENTS

1 Introduction

NSW Transport (Roads & Maritime Services) is planning to undertake a program of strengthening and maintenance works on Colemans Bridge, which spans Leycester Creek at Lismore on the NSW Far North Coast. The structure is a five-span timber bridge with Dare-style timber trusses. It features a stress laminated timber deck supported by timber trestles and a twin column, cast iron central pier. Also known as Leycester Creek Bridge, it is a State heritage-listed structure built in 1908. Refer **figures 1** – **5**.

1.1 Project

Colemans Bridge has been assessed by RMS engineers as being in need of strengthening and structural repairs and general cosmetic enhancement. Consequently, RMS has proposed a program of works that will strengthen and remediate the structure, while ensuring its long-term survival. Central to the works are:

- **Re-stressing** of the stress laminated timber deck (SLT)
- **Protection** & **Strengthening** of the iconic trusses (with new traffic barriers & bracing)
- **Repair** of select elements including trestle piers, steel bottom chords, deck & footway surfaces
- **Repainting** of trusses in heritage colours: timber elements (white) & steel elements (black).

1.2 Background

As part of the project planning process, RMS are required to prepare a Review of Environmental Factors (REF) to address any environmental concerns associated with the proposal and meet service obligations under the *Environmental Planning & Assessment Act 1979* (Section III; Part 5).

RMS contracted GeoLINK (environmental design & planning consultants) to prepare the project REF, and they in-turn have engaged Dan Tuck (archaeologist & heritage consultant) to prepare this contributory document: a Statement of Heritage Impact (SoHI) that assesses the potential impacts of the proposed works on the heritage values of the bridge and its setting. This report has been prepared in accordance with the RMS project brief and with reference to the following:

- Timber Truss Bridge Overarching Conservation Management Plan (RMS 2018)
- Timber Truss Bridge Conservation Strategy (RMS 2012)
- State Agency Heritage Guide (NSW Heritage Council 2004)
- Statements of Heritage Impact (NSW Heritage Branch 2002).

1.2 Study Area

Colemans Bridge (RMS Bridge Nos. 2594) spans Leycester Creek, near its junction with the Wilsons River, on the NSW North Coast in the regional hub of Lismore. It is approached by Union Street (MR 544 to the southwest) and empties at the Bridge-Woodlark Street Intersection (to the northeast). For the purpose of this SoHI, the study area comprises the bridge and its immediate setting.

1.4 Acknowledgments

The author would like to thank David Havilah (GeoLINK environmental consultants) as well as Russell Leong (RMS project engineer) and Kate Dallimore and Ian Berger (RMS Environmental Team).

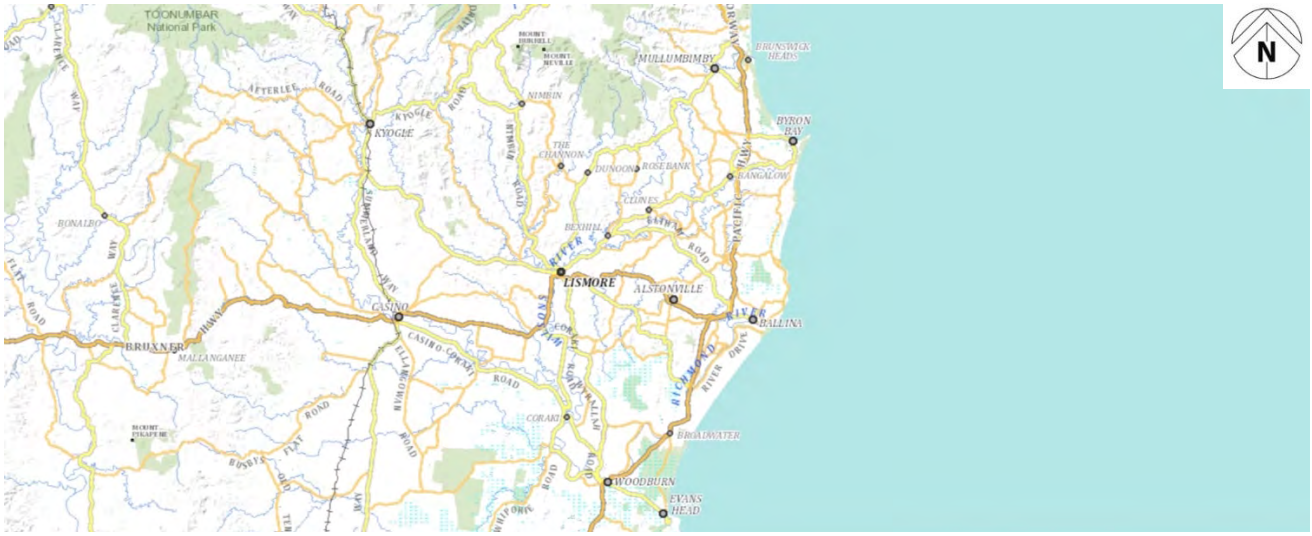


FIGURE 1: REGIONAL MAP SHOWING STUDY AREA LOCATION

NSW Spatial Services SIX Viewer 2019

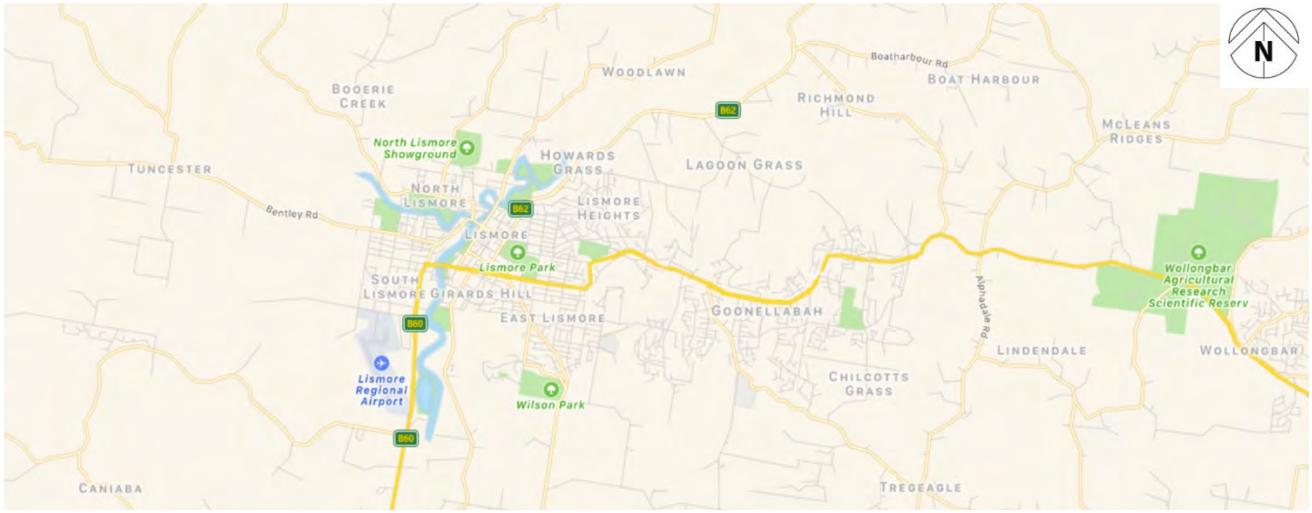


FIGURE 2: DISTRICT MAP SHOWING STUDY AREA LOCATION

NSW Spatial Services SIX Viewer 2019

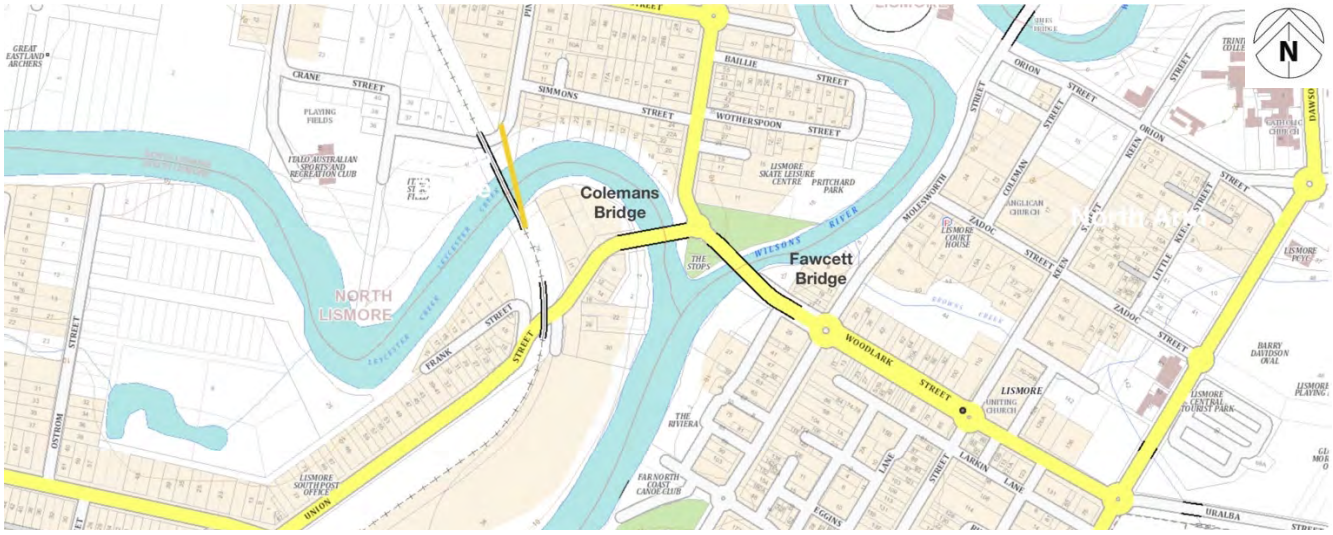


FIGURE 3: COLEMANS BRIDGE & SURROUNDS (MAP)

NSW Spatial Services SIX Viewer 2019

FIGURE 4: COLEMANS BRIDGE & SURROUNDS (SATELLITE)

NSW Spatial Services SIX Viewer 2019

FIGURE 5: COLEMANS BRIDGE

View NE – Dan Tuck 2019

2 History

2.1 Richmond River Valley

The Lismore District in the Richmond River Valley is within the domain of the *Bundjalung*: the sole occupiers of this resource-rich region for thousands of years prior to European settlement. At the time of first European settlement, the *Bundjalung* were an expansive Aboriginal nation that encompassed eleven major dialectic sub-groups, which were arranged into extended family groups (clans). The Lismore area was within *Wiyabal* territory (which also included Alstonville, Dunoon, Nimbin, Cawongla and Larnook).[1]

Prior to European incursion, the varied landscapes of the Far North Coast (which included forests, open grasslands, swamps, rainforests, estuaries, headlands and open beaches) combined with a mild climate to provide an ideal living environment for the region's first people. The Richmond River system and its tributaries and feeder creeks provided a range of estuarine and freshwater resources including birds, cetaceans, crustaceans, fish and shellfish. The adjacent plains, forests and woodlands (and the ranges and tablelands further afield) were also rich in terrestrial food reserves including marsupials, such as kangaroos and wallabies; birds such as ducks, bush turkeys and emus; and various reptiles.[2] The region's notable forests were not only a food larder, but also a source of numerous usable products. Ethno-historical records indicate that the Aborigines of the North Coast made use of a variety of tree species including Tea tree, various eucalypts and Bangalow Palm for the production of canoes and shelters; the manufacture of tools, weapons and other implements; and the preparation of traditional medicaments.[3]

2.1.1 Exploration

First European incursion into the Richmond River valley commenced in the early nineteenth century, not long after establishment of the third penal settlement of Newcastle in 1823. Captain Henry Rous and the crew of the *Rainbow* investigated the mouth and lower reaches of the Richmond as far up as Tuckean Swamp in August 1828 and are the first to be reliably documented.

Tentative exploration inspired settlement, and like most East Coast riverside locations with exploitable timber reserves and arable land, the first settlers on the Northern Rivers were timber getters and pastoralists. Cedar getters are known to have been working the Richmond River by the 1840s - Including Messieurs Leycester and Wilson, after whom the Lismore tributaries of the Richmond River are named. During the 1850s, after the area had been opened up for closer settlement, vast pastoral runs were established along the navigable reaches of the river and farmsteads began to dot the riverbanks. [4]

2.1.2 Settlement

The tropical climate of the Northern Rivers was unfamiliar to the first white settlers and was both a boon and a bother to early pastoralists, who were forced to experiment with the changeable conditions and warm, moist climate. On the Richmond (and in the district more generally) sheep faltered, whilst cattle proved lucrative for some. Dairying however trumped all and was universally successful, particularly on the well-watered river flats. Supplementing dairying was mixed farming, which saw the proliferation of cropping experiments that were met with varying degrees of success. Sugar, wheat, arrowroot, tropical fruits, rice, tobacco, cotton, tea, coffee (and even opium) were all grown at various times.[5]

[1] http://www.abc.net.au/indigenous/map/; Tindale 1974; Keats 1998

[2] NSW Dept of Planning 1989b; Ryan 1964

[3] McBryde 1978; Kass 1989b

[4] Kass 1989a; 1995

[5] Kass 1989a; 1995

2.2. Lismore

The location of Lismore, at the head of navigation on the North Arm of the Richmond River, was first a ramshackle collection of cedar getter's huts on cleared riverside land surrounded by the impenetrable vastness of the primordial Big Scrub rainforest. Carved out of the homestead paddock of an early pastoral run attributable to William Wilson, the village site was surveyed by Frederick Peppercorne in 1855 and gazetted as a township in the following year.[6]

Thereafter, the locality grew as both a timber industry centre and pastoral hub. A post office and numerous stores, inns and churches - as well as a sawmill for the processing of timber - were quickly established. Lismore was incorporated as a municipality 1879 and grew steadily over the ensuing years to the point where it was proclaimed a city in 1946.[7]

2.2.1 Growth

Much of Lismore's growth during the latter decades of the nineteenth century was tied to the growth of diary farming. Dairying required grazing land and its expansion resulted in clearance of much the Big Scrub country that characterised the region and the subsequent planting of exotic grasses for stock feed.[8]

While a fledgling industry, dairying was well served by the river for transport purposes. As it grew however, and new refrigeration technologies were advanced, dairying (and farming more generally) came to rely increasingly on road and rail transport to facilitate collection, processing and product distribution. Ironically, the iconic rivers and creeks that had once facilitated trade became something of a hindrance to it.

Bridging the Richmond

It was well recognised by the late nineteenth century, as the regional road network was developed and transport needs diversified, that permanent and reliable river-crossings were essential for the continued development of both Lismore and its industries. To this end, Fawcett Bridge and the Leycester Creek Bridge/Colemans Bridge (1884/1908) were established to allow cross-river transportation. Collectively, the bridges opened up important transport routes beyond the township.[9] Most notably to Casino and Grafton to the west and south, and Nimbin and the tablelands to the northwest.

Subsequently, Lismore grew as a multi-dimensional and relatively prosperous regional centre, with dairying firmly at the centre of district enterprise for much of the twentieth century. Like Grafton on the Clarence River, it came to serve important administrative functions and became a leader in government services, regional health and education. Post WWII, capital city-centric urbanisation and a nation-wide decline in the dairying industry started to change the nature of the locale and the makeup of its populace.[10]

The Rainbow Region

Since the 1960s, the city has diversified to accommodate a range of uses and residents (and the counter-culture movement of the 1970s) and has become a modern, multi-cultural node: set between the coastal playgrounds of the North Coast and the Great Dividing Rangelands to the west.

Refer **figures 6** - **9**.

[6] Kass 1989a; 1995; Daley 1968

[7] Kass 1989a; 1995; Daley 1968

[8] Kass 1989a; 1995

[9] Kass 1989a; 1995; Higginbotham 1995

[10] Perumal Murphy Wu Pty Ltd 1995

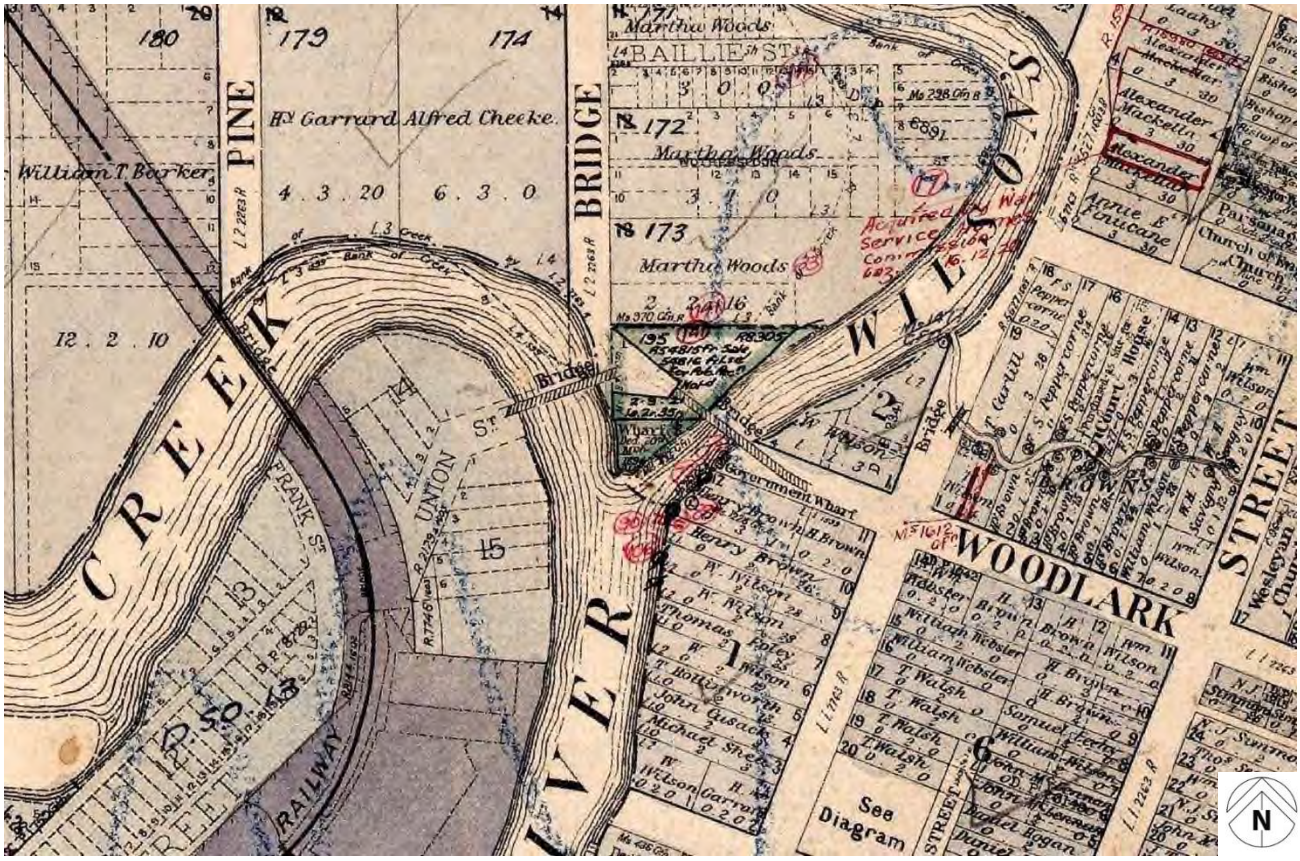


FIGURE 6: MAP OF THE TOWN OF LISMORE (1922)

NSW Land Registry Services Historic Lands Record Viewer

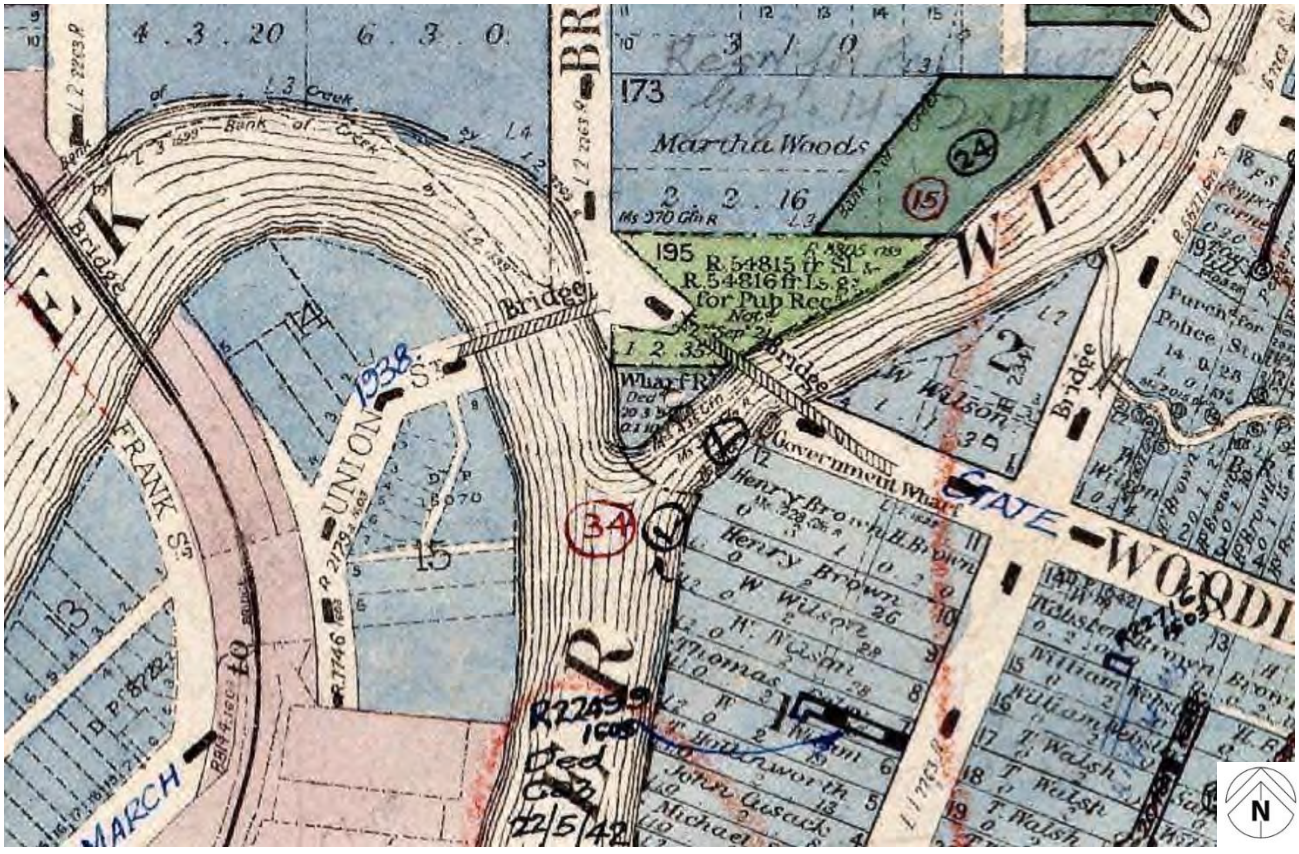


FIGURE 7: MAP OF THE TOWN OF LISMORE (1931)

NSW Land Registry Services Historic Lands Record Viewer

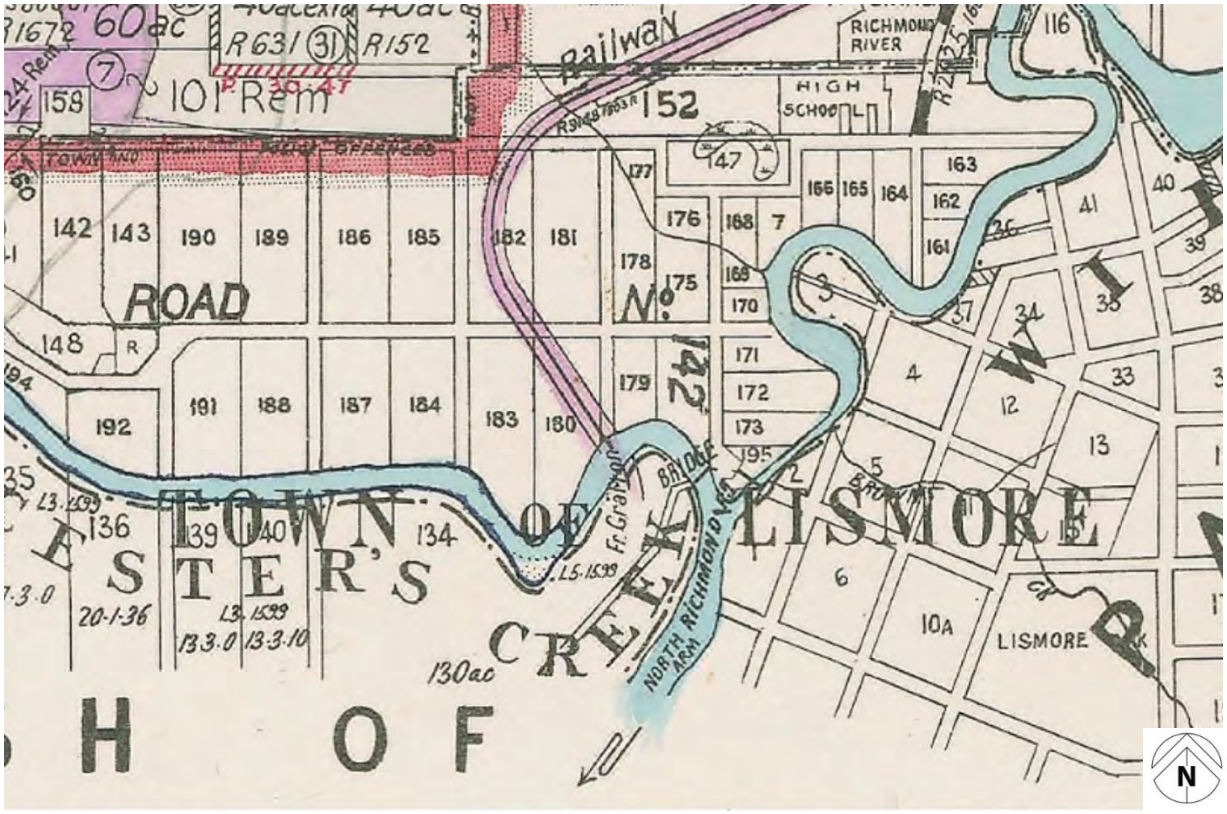


FIGURE 8: MAP OF THE TOWN OF LISMORE (1971)

NSW Land Registry Services Historic Lands Record Viewer

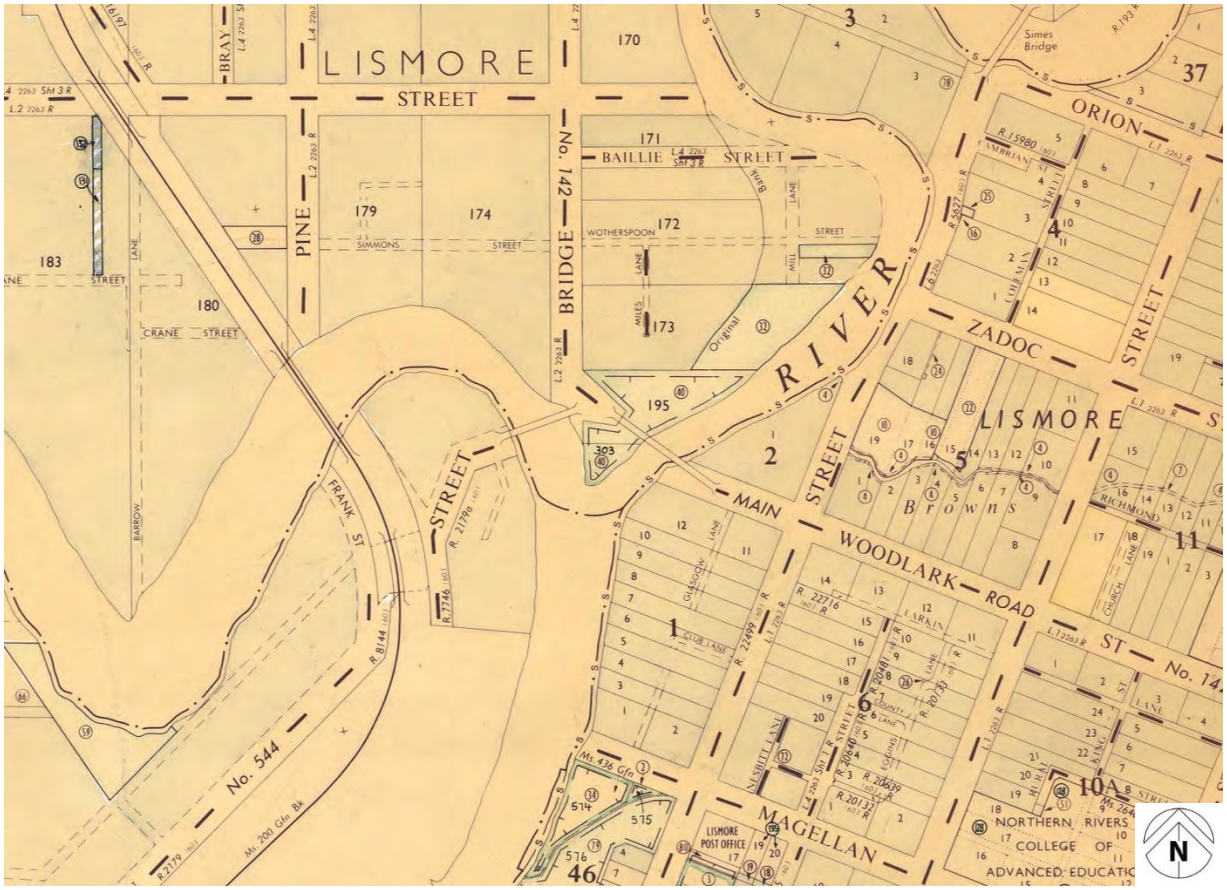


FIGURE 9: CHARTING MAP OF THE TOWN OF LISMORE (ND)

NSW Land Registry Services Historic Lands Record Viewer

2.3 Leycester Bridge

Construction on the first bridge over Leycester Creek (near the junction with the Wilson River) commenced in the early 1880s and concluded in 1885. This bridge was of the Old Public Works Department Style (Old PWD) and featured Queen post trusses, supported by wrought and cast iron cylinder piers.[11] The bridge was built at around the same time as the neighbouring Fawcett Bridge, which spanned the Wilsons River (the northern arm of the Richmond River).

The bridge over Leycester Creek was heavily utilised in association with Fawcett Bridge, as the main cross-river access points between Lismore and the other district hub of Casino. Perhaps not surprisingly, intensive use coupled with the impacts of repeated flooding and alternate drought, ensured that by the opening decade of the twentieth century, both the Leycester Creek Bridge and its neighbour were in serious disrepair. As early as 1902, local newspapers were reporting that both bridges were in trouble with the Leycester bridge 'in a dangerous condition … secured by chains' and Fawcett Bridge 'absolutely dangerous … owing to the bad state of the under structure'.[12]

2.4 Colemans Bridge

By 1906, the original Leycester Creek Bridge was irredeemable. After considerable public debate, a request for a new bridge was put to then Premier Joseph Carruthers during his visit to Lismore in March of that year. The Mayor requested that a new bridge be built as the extant bridge '… was in a bad condition, being held together by chains' and that '… it was on the mail coach road to Casino and was the only means of access to the railway station, three creameries and a bacon factory'.[13] Ultimately, the replacement bridge request was granted by ministerial approval and one year later, then Mayor Ald Nesbitt was able to report that:

> *The construction of Fawcett Bridge over Wilson's Creek … also the commencement of a new bridge over Leycester Creek, to South Lismore, are pleasing features of the year's work.*[14]

The new composite truss bridge was constructed to the designs of notable PWD engineer Harvey Dare by local bridge builder William Oakes and his team (who also rebuilt Fawcett Bridge). The construction process made use of a temporary bridge that allowed new sections to be erected as old portions were demolished. Though largely a completely new construction, the replacement bridge retained the pre-existing cast iron columns at pier three.

Features of the new bridge included the Dare-style timber trusses as well as independent footways.[15] The new bridge was completed in 1908 and subsequently named Colemans Bridge: a dip of the hat to the late Member for Rous, John William Coleman M. L. A.[16] Coleman was a local figurehead and notary and the land on which the bridge was built also bears his name (Colemans Point).

Refer **figures 10** - **11**.

[11] *Northern Star* 26 July 1884

[12] *Northern Star* 24 December 1902: 11

[13] *Lismore Chronicle* 4 March 1906

[14] *Clarence & Richmond Examiner* 16 October 1906: 5; *Lismore Chronicle*1 March 1907

[15] RMS file 257.1126 Part 2; *Richmond & Tweed River Advocate* 24 January 1908

[16] *Clarence & Richmond Examiner* 24 December 1907: 5).

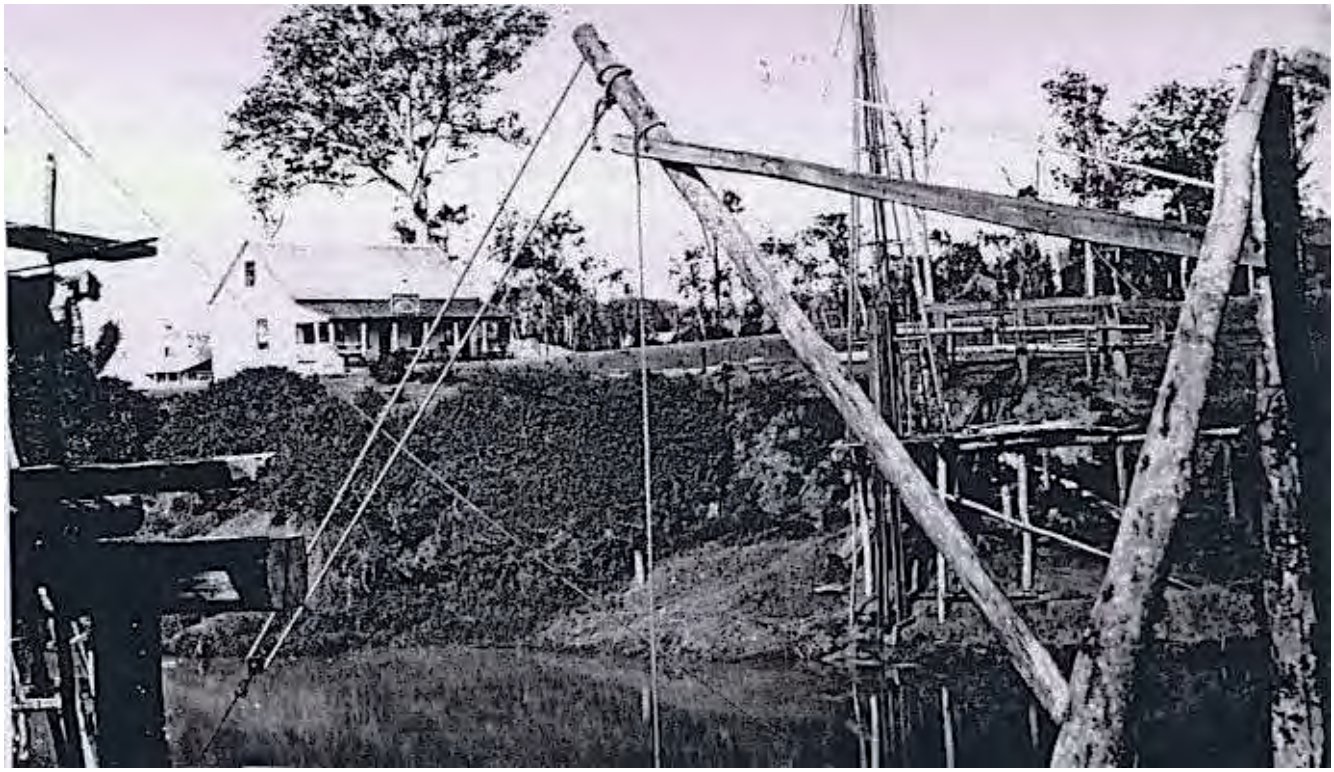


FIGURE 10: LEYCESTER CREEK BRIDGE (1884)

Leycester Bridge under construction in 1884. The hotel shown is the North Lismore Hotel, later replaced by the Winsome Hotel.

Richmond River Historical Society Collection

FIGURE 11: LEYCESTER CREEK BRIDGE, LISMORE, NSW (c.1906)

Postcard from Richmond River Historical Society Collection

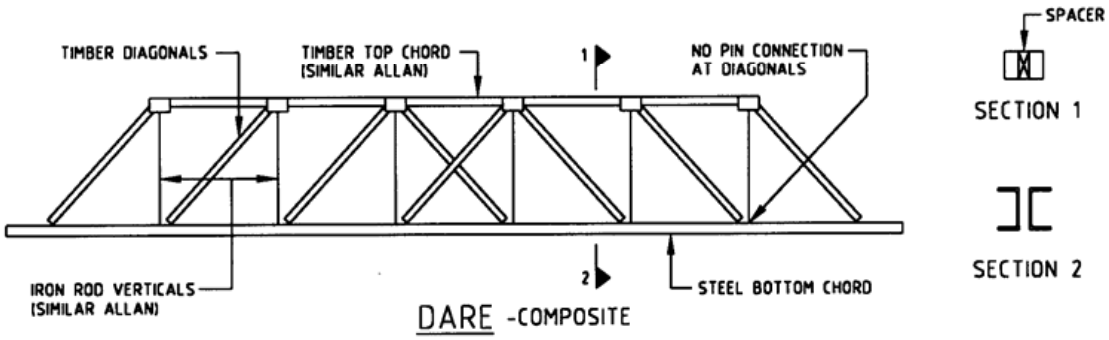
3 Survey

The bridge site was subject to site inspection-survey on 6 February 2019 as part of an inception meeting with RMS project staff and GeoLINK environmental consultants.

Timber Truss Bridges: A Brief History

Timber truss bridges were the main type of large span bridges constructed in NSW during the period 1861-1936. During this period, in excess of 400 such bridges were built, in a range of sizes and styles. Timber truss bridges were ultimately replaced by reinforced concrete bridges: the construction of which was facilitated by the supply of structural steel from BHP for bridgeworks from around the 1920s.

The **Dare Truss Bridge** was the fifth, and last, timber truss road bridge design. Largely attributed to PWD highway bridge designer Harvey Dare, it was a composite truss-type that drew on the American Howe Truss arrangement of the earlier Allan Truss design but substituted a pair of steel channels for the timber bottom chord. It also included a re-design of the bottom chord joints to eliminate the pins characteristic of the DeBurgh truss. The Dare Truss design is considered to mark the end of the timber truss evolutionary process and is remembered for its cost effectiveness & the relative ease with which timber members could be replaced due to Dare's enhancements.



Dare Truss bridges were produced from 1905 to 1936. Forty-four such bridges were erected of the course of thirty years, of which approximately half survive. The earliest, dating to 1905, spans the MacDonald River at Bendemeer in the New England Region. The Northern Rivers Region is notable for its Dare Truss bridges which aside from Colemans Bridge include Briner Bridge (Tucabia 1908) & Korns Crossing Bridge, near Crystal Creek (northwest of Murwillumbah, Rous River 1916).

For additional information the reader is directed to MBK (1998) & Futurepast (2014)

3.1 Description

Colemans Bridge is an elevated, five-span, cross-river bridge with two Dare-type truss spans: each 32 metres long & comprising eight, four metre long panels (at spans three & four). The bridge has an overall length of almost 91 metres and has two timber beam approach spans at the western end and a single timber beam approach span at the eastern end. The bridge has a twin-cylinder, iron central pier (in-river) adptively used from the 1885 Old PWD truss bridge, with timber trestles (set on the creek banks). The bitumanised SLT deck has a dual-lane carriage way (of around six metres) and there are footways on either side. An Armco thriebeam, traffic guard/crash barrier provides protection from vehicular traffic. A timber post & rail fence forms the pedestrian walkway handrail. Curved steel braces (affixed to the top chord of the timber trusses) help strengthen the outer timber pedestrian barriers (and the walkways more generally). There is an attached sewer main (exterior of the upstream walkway) and a water main (downstream walkway).

Refer **figures 12** & **13**.

Repair & Modification

Since 1908, the bridge has been heavily trafficked and subject to the impacts of flooding, termites, dry rot, wear and tear, fire damage and arson (including a deck fire caused by the dropping of lighted cigarettes in 1936) and vehicle accidents. Consequently, it has been subject to near-continual maintenance and periodic renewal and repair, which has included re-decking of the bridge in the 1920s, 1930s and 1940s, as well as major reconstruction in the 1950s.[17]

An extensive rehabilitation program was undertaken in 2000-2001. These works involved:

- Replacement of timber planking with a Stress Laminated Timber (SLT) decking system
- Replacement of all timber cross girders with steel cross girders
- Replacement of approach span decks with Doolan (proprietary precast concrete) decks
- Replacement of existing timber abutments with reinforced concrete elements.

There was also emergency truss strengthening works in 2005 and Colemans Bridge was further upgraded in 2006, with a Section 60 application approved for the increase in thickness of the second and third diagonal members from 4.5 inches to 6 inches.[18]

3.2 Surrounds

For the most part, land beyond the immediate bridge corridor comprises a relatively steep and heavily modified riverine landscape that has been shaped by early-twentieth century bridge and road building, as well as bridge, road and riverbank repair. There has also been considerable slope remodelling and flood scouring hence.

Universally, the river banks are eroded and either barren, where erosion continues, or covered with vegetative regrowth (including native plantings interspersed with woody weeds).

The earth adjacent to the embankments under the approach spans at either end of the bridge is relatively flat, dry and devoid of vegetation. Close to the margins of the town centre and near the Winsome Hotel hostel and soup kitchen, these areas are frequently used by the area's addled and homeless as informal camping and shelter areas.

There is a Council park to the immediate south of the east end of the bridge.

Refer **figures 14** - **24**.

[17] *Northern Star* 20 March 1917: 2; 13 August 1940: 4

[18] RMS 2011; Ian Berger RMS pers. comm.

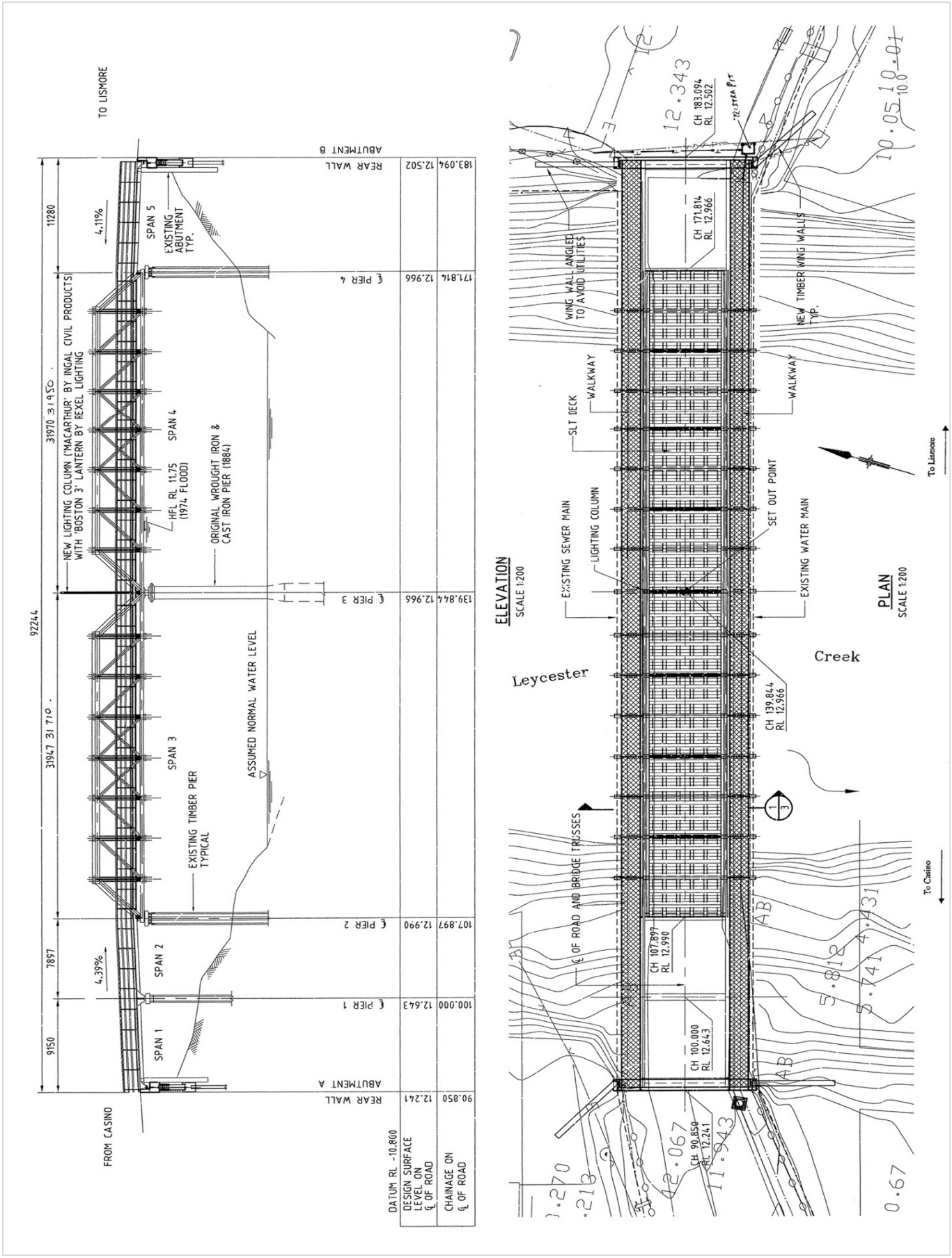


FIGURE 12: COLEMANS BRIDGE (ELEVATION + PLAN)

Image provided by RMS 2002

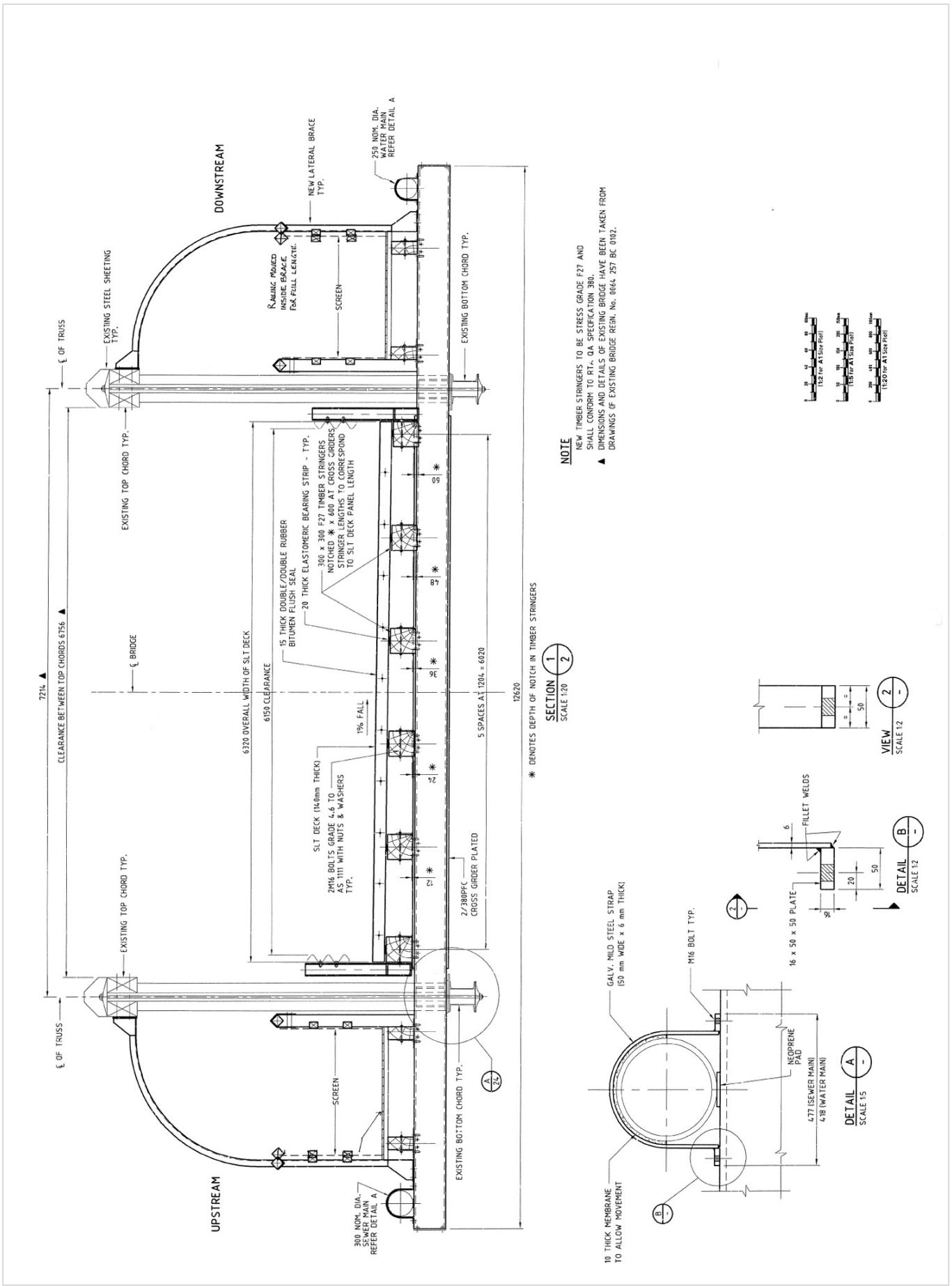


FIGURE 13: COLEMANS BRIDGE (CROSS SECTION) Image provided by RMS 2002

Summary: Colemans Bridge over Leycester Creek - RMS Bridge Nos. 2594			
Type	Two-lane; Dare-type timber truss bridge		
Construction	1907-1908	**GPS**	56J 526820.8E; 6813529.59S
Design	PWD (Harvey Dare)	**Builder**	William Oakes
Details	• Bridge length: 91 metres • Dare truss central spans • Two approach spans on the east & one approach span on the west • Trestle piers (on-land) with a twin cylinder, cast & wrought iron central pier • Decks of bituminised timber decking &/or SLT • Between-kerb carriageway of approximately six metres • Pedestrian walkways (each side) with ordnance fencing & curved steel truss bracing • Armco, thriebeam crash barriers (each side)		
Modifications	• Periodic and occasional maintenance, including the replacement of failed elements & painting, since construction (1945 &c) • Re-decking (e.g. 1920s, 1930s, 1940s) • Major reconstruction (1950s) • Major rehabilitation (2000-2001) including the replacement of timber planking with SLT; replacement of all timber cross girders with steel cross girders; replacement of approach span decks with concrete decks; replacement of timber abutments with reinforced concrete elements. • Emergency truss strengthening works (2005)		
Condition	• Fair • Load limited to 44t		
Table based on site survey & information provided by RMS			

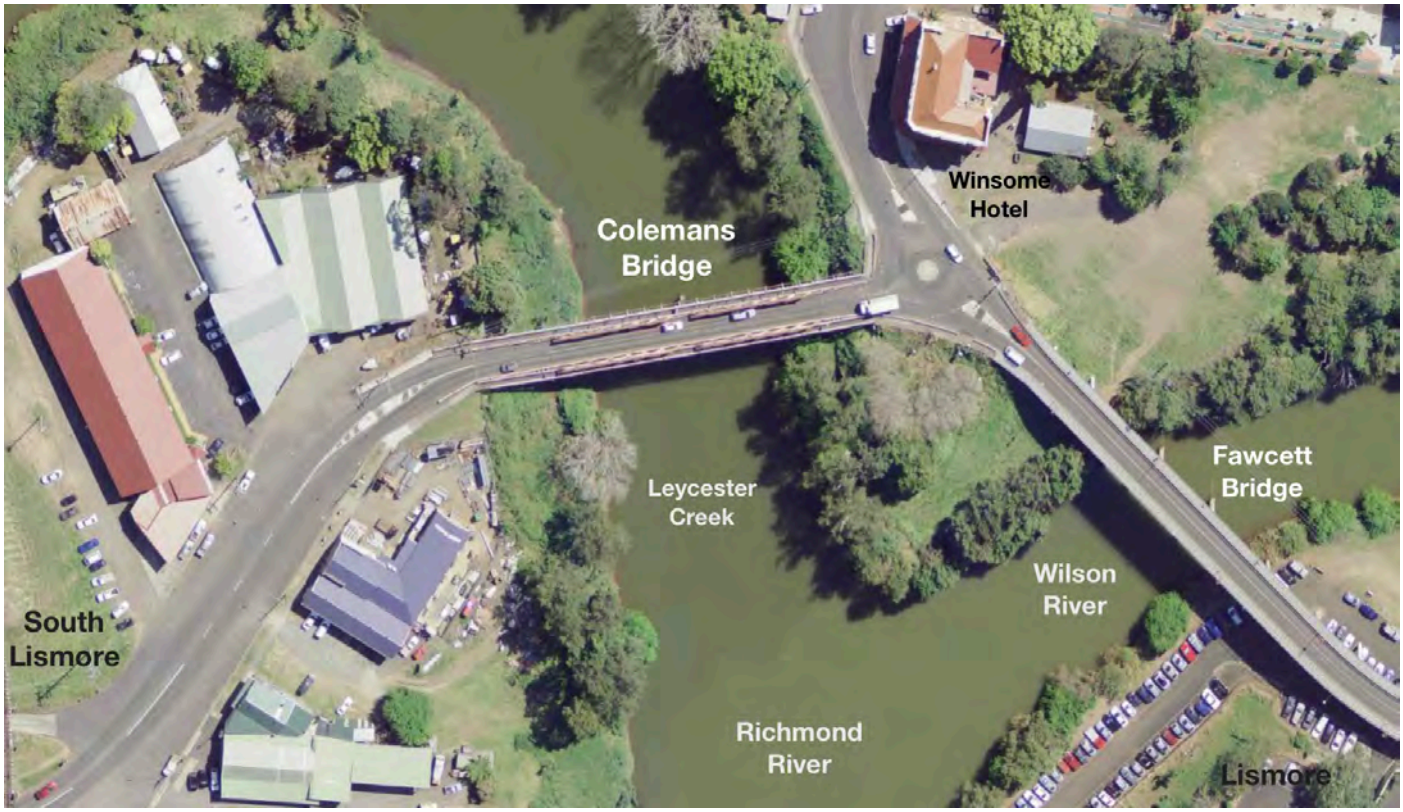


FIGURE 14: SATELLITE IMAGE SITE PLAN

Google Earth Pro 2019

FIGURE 15: EASTERN APPROACH (WITH ROAD JUNCTION IN FOREGROUND)

View SW – Dan Tuck 2019

FIGURE 16: TRUSS SPANS

View WSW – Dan Tuck 2019

FIGURE 17: TRUSS SPANS + IRON PIER NO.3 + WALKWAY (UPSTREAM SIDE DETAIL)

View SW – Dan Tuck 2019

FIGURE 18: DETAIL OF DECK, ORDNANCE FENCING, THRIEBEAM BARRIER + DOWNRIVER TRUSSES (EAST END)

View SW – Dan Tuck 2019

FIGURE 19: DETAIL OF WALKWAY, DECK, THRIEBEAM BARRIER + UPRIVER TRUSSES (EAST END)

View W – Dan Tuck 2019

FIGURE 20: WESTERN APPROACH

View ENE – Dan Tuck 2019

FIGURE 21: DETAIL OF WALKWAY, DECK, THRIEBEAM BARRIER + TRUSSES (WEST END)

View SSE – Dan Tuck 2018

FIGURE 22: DOWNRIVER SIDE OF COLEMANS BRIDGE (SUBSTRUCTURE)

View ESE – Dan Tuck 2019

FIGURE 23: DOWNRIVER SIDE OF COLEMANS BRIDGE (TRESTLES; SOFFIT & CENTRAL IRON PIER)

View ESE – Dan Tuck 2019

FIGURE 24: DOWN-RIVER SIDE WALKWAY DETAIL (WITH TRUSS SWAY BRACING-SUPPORTS)

View ENE – Dan Tuck 2019

4 Heritage

The following section provides a brief review of the legislative and listing context and presents an assessment of the heritage significance of Colemans Bridge.

4.1 Legislation

4.1.1 NSW Heritage Act 1977

The *NSW Heritage Act 1977* is the principle document governing the management of heritage items (relics and places containing relics) in NSW.

http://www.austlii.edu.au/au/legis/nsw/consol_act/ha197786/

Environmental heritage is broadly defined under Section 4 of The Act as comprising the following items:

> *… those places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance.*

The Act further defines a relic as:

any deposit, artefact, object or material evidence that:

> *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, & (b) is of State or local heritage significance.*

http://www.austlii.edu.au/au/legis/nsw/consol_act/ha197786/s4.html

All relics are afforded automatic statutory protection by the relic's provisions of the Act. Sections 139 to 145 within Division 9 of The Act, which prevents the excavation or disturbance of land for the purpose of discovering, exposing or moving a relic, except by a qualified archaeologist to whom an excavation permit from the Heritage Council of NSW has been issued. Permits are issued under Sections 140 and 141 of The Act (for items of local significance), or under Sections 60 and 63 of The Act, in cases where relics are situated within sites or places listed on the State Heritage Register.

Section 146 of The Act requires that the inadvertent discovery of relics be reported to the Heritage Council in a timely and appropriate manner.

4.1.2 EP&A Act 1979

The NSW Department of Planning and Environment (DoPE) administers the *Environmental Planning & Assessment Act 1979*, which provides the legislative context for environmental planning instruments to be made to govern and guide the process of development and land use. Local heritage items, including known archaeological items, identified Aboriginal Places and heritage conservation areas are protected through listings on Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). The EPA Act also requires that potential Aboriginal and historical archaeological resources are assessed and considered as part of the development process, in accordance with the NPW Act and the Heritage Act.

http://www.austlii.edu.au/au/legis/nsw/consol_act/epaaa1979389/

4.2 Listings

The following statutory and non-statutory registers and planning documents were reviewed during preparation of this report:

- Lismore LEP 2012
- RMS s170 Heritage & Conservation Register
- NSW Heritage Office's State Heritage Register (SHR) & State Heritage Inventory (SHI)
- Australian Heritage Database (AHD).

4.2.1 Review

Lismore LEP 2012

The Lismore LEP (LLEP) as amended is the primary local government planning instrument. Part 5.10 *Heritage Conservation* provides objectives for heritage conservation and identifies when development consent is required (or not required) for heritage items, archaeological sites and Aboriginal places, or locations in the vicinity.

https://www.legislation.nsw.gov.au/#/view/EPI/2013/66/part5/cl5.10

Schedule 5 lists items of *Environmental Heritage* consecutively under Heritage Items (part 1); Heritage Conservation Areas (part 2) and Archaeological Sites (part 3):

https://www.legislation.nsw.gov.au/#/view/EPI/2013/66/sch5

Colemans Bridge is listed as an archaeological item (A9) in the Heritage Schedule of the Lismore LEP 2012.

Refer **figure 25** for the relevant Heritage Map Sheets (HER_005AA):

https://www.legislation.nsw.gov.au/maps/c4a4150f-1f43-4c51-9a65-b333efd5fee8/4850_COM_HER_005AA_020_20170327.pdf

Note:

Colemans Bridge was first identified as an item of archaeological significance by Edward Higginbotham in his *Report on Historical Archaeological Sites*, which was a contributory document to the *Lismore City-wide Heritage Study* (Perumal Murphy Wu Pty Ltd 1995).

As part of the study, Higginbotham recorded 55 items, including Fawcett and Coleman Bridges (items 10026 & 10027), noting that they were '… two of the earliest bridges in Lismore' (p: 15). As a consequence of Higginbotham's appraisal and its detailing in the city-wide heritage study, the bridge was listed in the heritage schedule of the Lismore LEP 2001 (which has been superseded by the current LEP).

RMS s170 Heritage + Conservation Register

All State government agencies are required to identify and manage heritage assets under their control and maintain a maintain a register of heritage items under the NSW Heritage Act 1997 (as amended).

Colemans Bridge is listed as a heritage item of State significance in the RMS s170 Register.

https://www.environment.nsw.gov.au/heritageapp/HeritageItemImage.aspx?ID=5051363#ad-image-2

Refer **figure 26**.

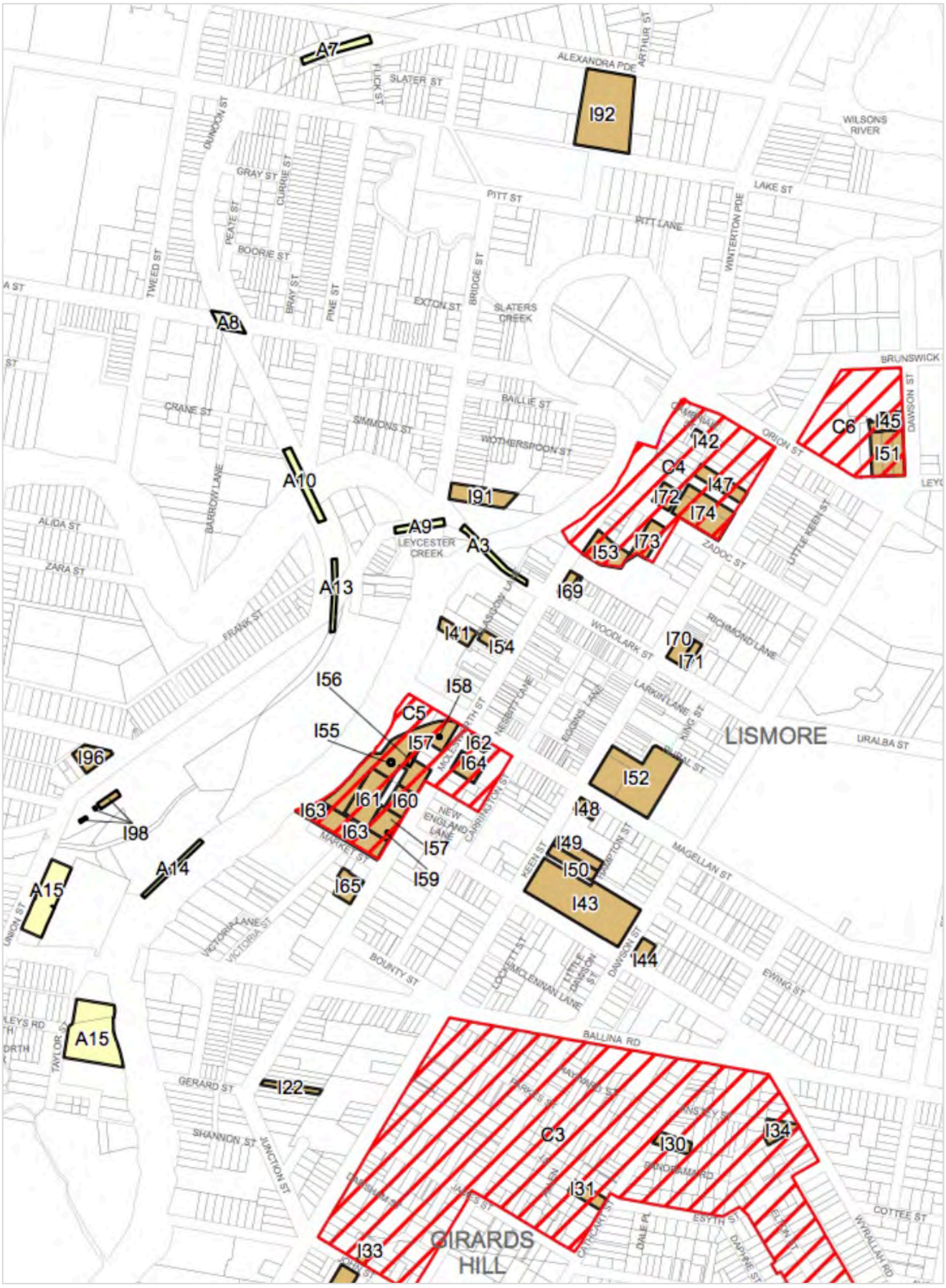


FIGURE 25: LLEP 2012 HERITAGE MAP SHOWING COLEMANS BRIDGE (A9)

LLEP 2012 HER_005AA

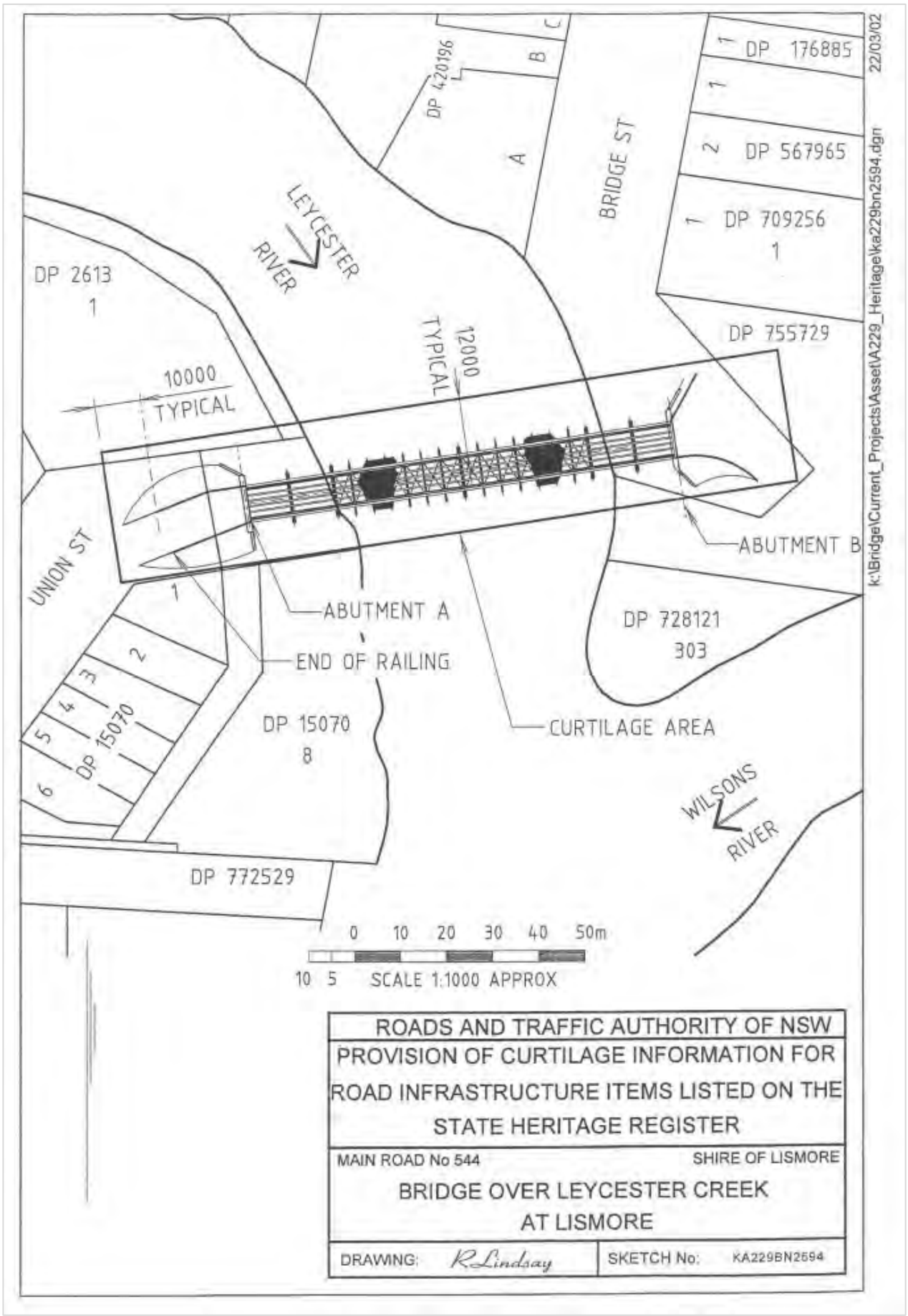


FIGURE 26: RMS s170 LISTING MAP FOR COLEMANS BRIDGE

NSW Heritage Division

NSW Heritage Register & Inventory

The **State Heritage Register (SHR)** and **State Heritage Inventory (SHI)** list heritage items that have been assessed and acknowledged as having state or local heritage significance respectively. The NSW Office of Environment and Heritage's Heritage Council maintains the registers and generally the listing of items results from their inclusion in local or regional planning instruments within heritage studies; and/or due to their inclusion in the s170 heritage and conservation registers of government agencies.

Any development proposal that is likely to effect items of local significance generally requires NSW Heritage Division approval (s.140) or a relevant exception. Any development proposal that is likely to impact items on the SHR generally requires NSW Heritage Council approval (s.60) or a relevant exemption.

'Colemans Bridge over Leycester Creek' is listed on the State Heritage Register (Listing Nos. 1463; gazetted 2000)

https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5051363

The **heritage curtilage map** accompanying the listing is presented at **figure 27** and can be found here:

https://www.environment.nsw.gov.au/heritageapp/HeritageItemImage.aspx?ID=5051363#ad-image-3

The **State Heritage Inventory (SHI)** lists items of both state and local heritage significance. Generally, the listing of items on the SHI results from their inclusion in local and regional planning instruments, heritage studies of the heritage and conservation registers of government agencies. Any development proposal that is likely to affect items on the inventory generally requires NSW Heritage Division approval (s.140).

'Colemans Bridge over Leycester Creek' is not listed within the State Heritage Register (Listing Nos. 1463; gazetted 2000)

Refer **attachment 1**.

Australian Heritage Database

The Australian Heritage Database is a non-statutory heritage database managed by the Commonwealth Department of Environment. The database contains information about more than 20,000 natural, historic and Indigenous places and includes locations and items listed (or formerly listed) on the World Heritage List (WHL); National Heritage List (NHL); Commonwealth Heritage list (CHL); and Register of the National Estate (RNE).

Colemans Bridge was listed on the Register of the National Estate (7079) in April 1989.

http://www.environment.gov.au/cgi-bin/ahdb/search.pl?mode=place_detail;search=place_name%3DColemans%3Bkeyword_PD%3Don%3Bkeyword_SS%3Don%3Bkeyword_PH%3Don%3Blatitude_1dir%3DS%3Blongitude_1dir%3DE%3Blongitude_2dir%3DE%3Blatitude_2dir%3DS%3Bin_region%3Dpart;place_id=7079

Heritage Listings: Colemans Bridge		
Register/Database	**Details**	**Number**
Lismore LEP 2012	Colemans Bridge, South Lismore	A9
State Heritage Register	Colemans Bridge over Leycester Creek	1463
Register if the National Estate	Colemans Bridge, Union Street	7079
RMS s170 Register	Colemans Bridge over Leycester Street	Listed

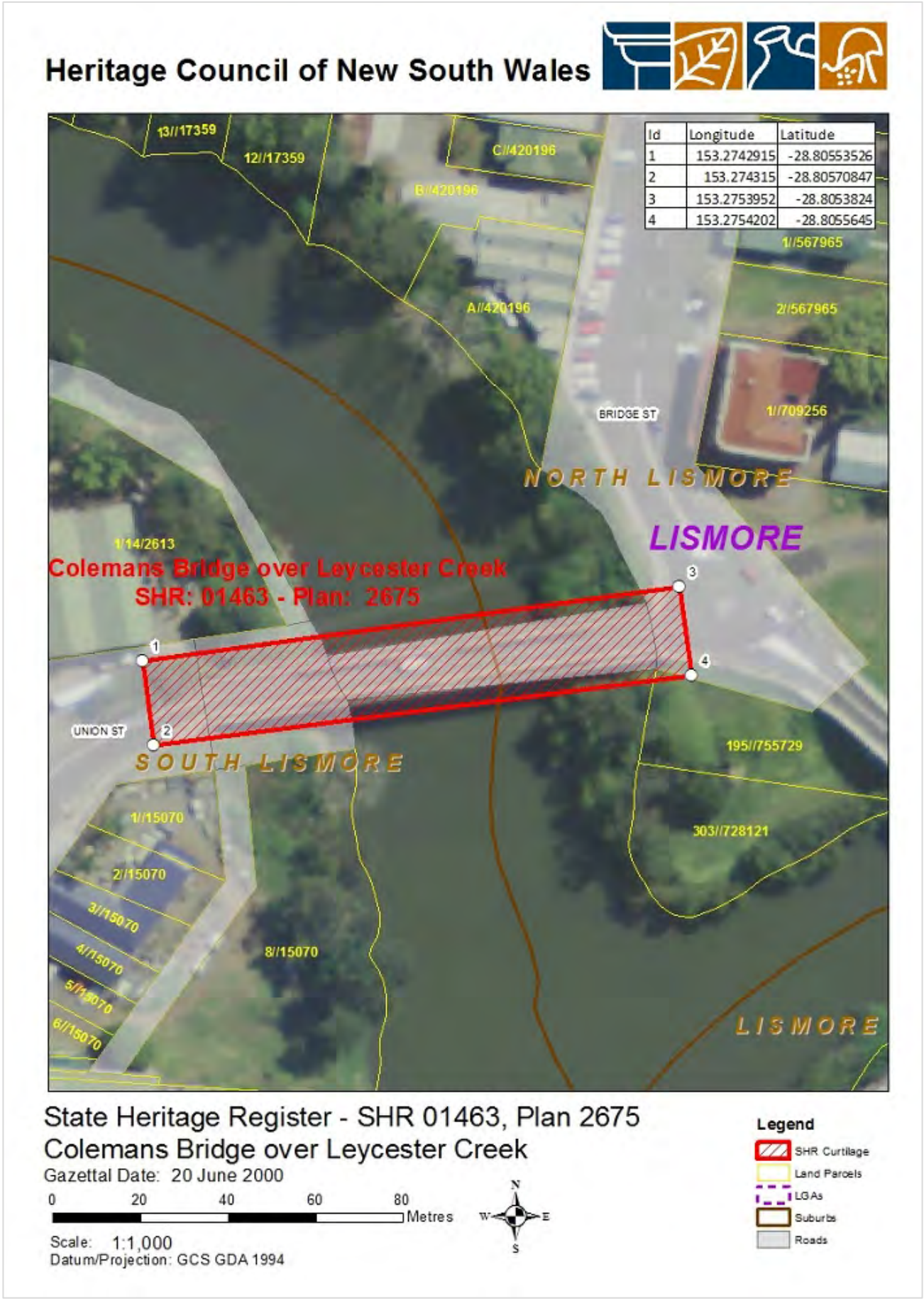


FIGURE 27: NSW SHR CURTILAGE PLAN FOR COLEMANS BRIDGE

NSW STATE HERITAGE REGISTER PLAN 2675

4.3 Significance

The significance of the bridge was initially assessed as part of the *Study of the Heritage Significance of All Timber Truss Bridges in NSW* undertaken by McMillan Britton & Kell Pty Ltd (MBK 1998). The significance of the bridge (as at 2005) is stated in the SHR listing is as follows:

CRITERION A: Historical Significance

Through the bridge's association with the expansion of the NSW road network, its ability to demonstrate historically important concepts such as the gradual acceptance of NSW people of American design ideas, and its association with Harvey Dare, it has historical significance.

CRITERION C: Aesthetic Significance

The bridge exhibits the technical excellence of its design, as all of the structural detail is clearly visible. In the context of its landscape it is visually attractive. As such, the bridge has moderate aesthetic significance.

CRITERION D: Social Significance

Timber truss bridges are prominent to road travellers, and NSW has in the past been referred to as the "timber truss bridge state". Through this, the complete set of bridges gain some social significance, as they could be said to be held in reasonable esteem by many travellers in NSW. The Colemans bridge is valued by the people of the Lismore region.

CRITERION F: Rarity

Rare - Colemans bridge contains many important technical and aesthetic elements.

CRITERION G: Representativeness

Highly representative of Dare timber truss bridges and late 19th century bridge technology.

Statement of Significance

Colemans bridge was completed in 1908 and is an early example of Dare timber truss bridges. In 1998 it was in good condition.

As a timber truss road bridge, it has many associational links with important historical events, trends, and people, including the expansion of the road network and economic activity throughout NSW, and Harvey Dare, the designer of this type of truss. Dare trusses were fifth in the five-stage design evolution of NSW timber truss road bridges. They were similar to Allan trusses, but contain improvements which make them stronger and easier to maintain. This engineering enhancement represents a significant evolution of the design of timber truss bridges, and gives Dare trusses some technical significance. Colemans bridge has particular technical significance, having iron piers, the only two-lane Dare truss, footways, and long spans. In 1998 there were 27 surviving Dare trusses in NSW of the 40 built, and 82 timber truss road bridges survive from the over 400 built. The Colemans bridge is a representative example of Dare timber truss road bridges, and is assessed as being Nationally significant, primarily on the basis of its technical and historical significance.

4.4 Guiding Documents

The principal heritage management documents relating to this proposal are:

Timber Truss Bridge Conservation Strategy (2012)

This strategy recognises the role of RMS as the 'custodian of the heritage significance of the population of timber bridges' under Service control. In accordance with the strategy, RMS is required to:

- Retain a minimum of 26 timber truss road bridges until 2032 (& retain a minimum of 20 beyond 2032)
- Use traditional methods & materials where possible & where upgrading is not required
- Upgrade bridges for strength and safety as required in order to ensure their ongoing safety & operability.

  The Strategy mentions the need to make use of *modern materials* to achieve required load capacities, with all design solutions developed on a case-by-case basis.
- Continue to improve conservation knowledge & skills through training
- Continue to improve engineering knowledge & understanding through research.

http://www.rms.nsw.gov.au/documents/projects/key-build-programs/maintenance/timber-truss-road-bridges/120800-timber-truss-bridges-subs-revised-strategy-august-2012.pdf

Timber Truss Bridges: Overarching Conservation Management Plan (2018)

The purpose of this Conservation Management Plan (CMP) – recently endorsed by the NSW Heritage Office - is to guide the conservation and management of the bridges to be retained under the *Timber Truss Bridges Conservation Strategy* into the future, with a continuing role and use in the life of communities. It states that:

- For each individual bridge a more detailed bridge specific CMP will be written by RMS (informed by this overarching CMP)
- The CMP is intended to inform *all decision making* for the conservation & management of each State-listed timber truss bridge until bridge specific CMPs are endorsed.

While the CMP details the importance of heritage management in the treatment of significant bridges, it acknowledges that it is but one of a number of agency priorities that include:

- Making safety paramount while delivering services & an effective infrastructure program
- Meeting customer & community needs & enhancing economic & social outcomes.

It is noted that although a bridge-specific CMP is planned for Colemans Bridge, it is yet to be completed. This means that the Overarching CMP is the main decision-making document in relation to heritage management and planning for the bridge at present.

https://app.box.com/s/ygkiu20o7qf77djao91kj0a6tn8gw6gp

State Agency Heritage Guide (2005)

This document acknowledges that management of state-owned heritage assets is a State agency service responsibility, to be jointly managed with other service delivery responsibilities and given a high priority in the corporate planning and budgetary processes. It recognises that the effective management of heritage assets will achieve an appropriate balance between the twin objectives of efficient provision of government services and conservation of the State's heritage for future generations.

In accordance with the guide, each agency is required to identify, list and manage/conserve heritage assents that fall within their respective jurisdictions in an appropriate, sustainable and integrated manner.

The guide requires that each agency:

- Actively identifies heritage assets & keeps a S170 Heritage & Conservation Register
- Prepare Statement of Heritage Impact for works that may have an impact on a listed item
- Update and review information on heritage assets & their management from time to time
- Take a strategic approach to the management of heritage assets (including the application of Heritage Asset Management Plans, Management Action Plans & Maintenance Action Plans)
- Manage assets according to & with respect for their significance
- Consider archaeology as well as structural & moveable heritage
- Appropriately and sensitively manage change & alteration to use and function
- Acquire the relevant approvals when altering or conserving an asset
- Monitor, report on, interpret & promote heritage assets & agency conservation initiatives.

https://www.environment.nsw.gov.au/resources/heritagebranch/heritage/StateAgencyHeritageGuide.pdf

5 Project

Roads and Maritime Service propose to undertake bridge truss strengthening and maintenance on Coleman's Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area. The work is required to improve the structural capacity of the bridge in order to keep Coleman's Bridge serviceable. Coleman's Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore CBD and South Lismore (as well as allied townships and farmland to the south and west).

5.1 Understanding

- RMS desire a safe bridge that will meet current & future operational requirements without prohibitive upfront expense or ongoing maintenance & repair costs.
- Timber truss bridges of the late-nineteenth & early-twentieth century - such as Colemans - were designed to be economic structures with limited load-bearing capacity & a finite lifespan.
- RMS acknowledge in their endorsed *Timber Truss Bridges Overarching CMP* (2018) & *Timber Truss Bridge Conservation Strategy* (2012) that not all timber truss bridges can be conserved & a management approach that sees representative examples conserved & retained, while others are demolished & replaced, is the only practical way to manage these items.
- Colemans Bridge is listed on the SHR & has been identified as one of six Dare Truss bridges to be retained in the RMS's *Timber Bridge Conservation Strategy*.
- The transport infrastructure needs of the town of Lismore are currently under review, and therefore, so is the ongoing role of the town's suite of bridges.

5.2 Rationale

Structural inspection and appraisal of the bridge has found that it requires maintenance and strengthening to improve safety, amenity, capacity and longevity in the short to medium term:

- The Dare-type trusses requires strengthening
- The extant crash barrier (thriebeam) is in poor condition & requires upgrading.
- The extant SLT decking is damaged-uneven & needs to be replaced & resealed
- Repairs are required to modern crash barriers & fencing on the bridge approaches
- One timber truss on the western bank requires a replacement trestle post
- The existing bridge paintwork is subpar.

5.3 Proposal

RMS propose to undertake the following:

Site Establishment

Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage.

Construction

Construction activities are required above and below the bridge deck and on the embankment (within three metres either side of the bridge). Access may be required via the water; however, no construction is required within the creek proper.

Construction activities above-deck include:

- Re-stressing of the stress laminated timber (SLT) deck
- Strengthening of the Dare trusses with bracing
- Replacement of the existing traffic barrier
- Replacement of the bridge wearing course
- Minor footway repairs
- Repainting of the bridge in traditional bridge colours: steel (black); timber (white).

Construction activities below-deck include:

- Localised steel bottom chord corrosion repairs & repainting
- Timber trestle pier repairs
- Minor vegetation clearing within three (3) metres of the bridge will be required to facilitate works around timber trestle piers
- Minor earthworks will be required to provide access to timber trestle piers & below deck work areas
- Elevated (hung) scaffolding will be required to conduct work for the SLT deck re-stressing & localised repairs to the steel bottom chord & girders.

Construction is expected to commence **mid-2019**. In order to minimise the period of disruption to the public, the bridge would be closed to traffic for the extent of works which would take approximately **four month**s to complete. Alternate detours would be available in the order of approximately 2.5 km and four kilometres respectively; depending on the route taken, origin and destination. During the project, pedestrian access on one side of the bridge would be maintained and remain open.

Refer **figure 28.**

Barriers

The most significant bridge components are the Dare Trusses on bridge spans three and four. Works that that relate to these trusses, both indirectly and directly include:

- **Replacement** of the existing thriebeam crash barrier between abutments (spans 1 to 5), with a new steel traffic barrier comprising horizontal railing (150 x 100 x 8 mm RHS; hot-dipped galvanised steel) attached to new barrier posts (100 x 100 x 6 SHS).

The new barrier will sit slightly proud of the trusses, as does the existing thriebeam barrier, and will better protect the trusses from direct or side-wipe impacts. The barrier posts will be affixed with plates to the bridge deck (or substructure) in the locations of the existing barrier posts.

Refer **figures 29** - **31**.

Truss Work

- **Strengthening** of the trusses (both sides) via installation of new curved, lateral, sway bracing.

The top chord of the timber trusses has been assessed as demonstrating bowing and some lateral movement. As a consequence, the RMS Bridge Engineering design team has concluded - with the agreement of the RMS (RMD Bridges Northern Team) - that an upgrade of the lateral sway brace with continual monitoring of the top chord will ensure the ongoing safe operation of Colemans Bridge. The upgrade will entail replacing the current PFC C-channel with steel UC section. This reflects a similar alteration to the recent upgrade of the heritage-listed Barham Bridge.

Refer **figures 33** - **36**.

Painting

In addition to the strengthening works, the bridge will also be repainted. At present, the bridge features a failing, pseudo-Victorian colour scheme dominated by a dated palette of pinks, creme-yellows and greens. The scheme likely relates repainting activities in the 1980s/90s.

The timber and steel elements will be painted white and black colours respectively, which will be consistent with early twentieth bridge colour schemes and with recent heritage bridge repainting (including Glennies Creek Bridge and the above-mentioned Barham Bridge).

As to painting methodology, there will be no blasting required (and therefore no bridge wrapping and/or other containment necessary). Vacuum shrouded tools will be used to prepare surfaces for painting, and hand tools will be used to repaint the bridge.[19]

Refer **figure 36**.

☞ A full set of **concept design drawings** accompany the **REF**.

[19] Russell Leong RMS pers. comm.

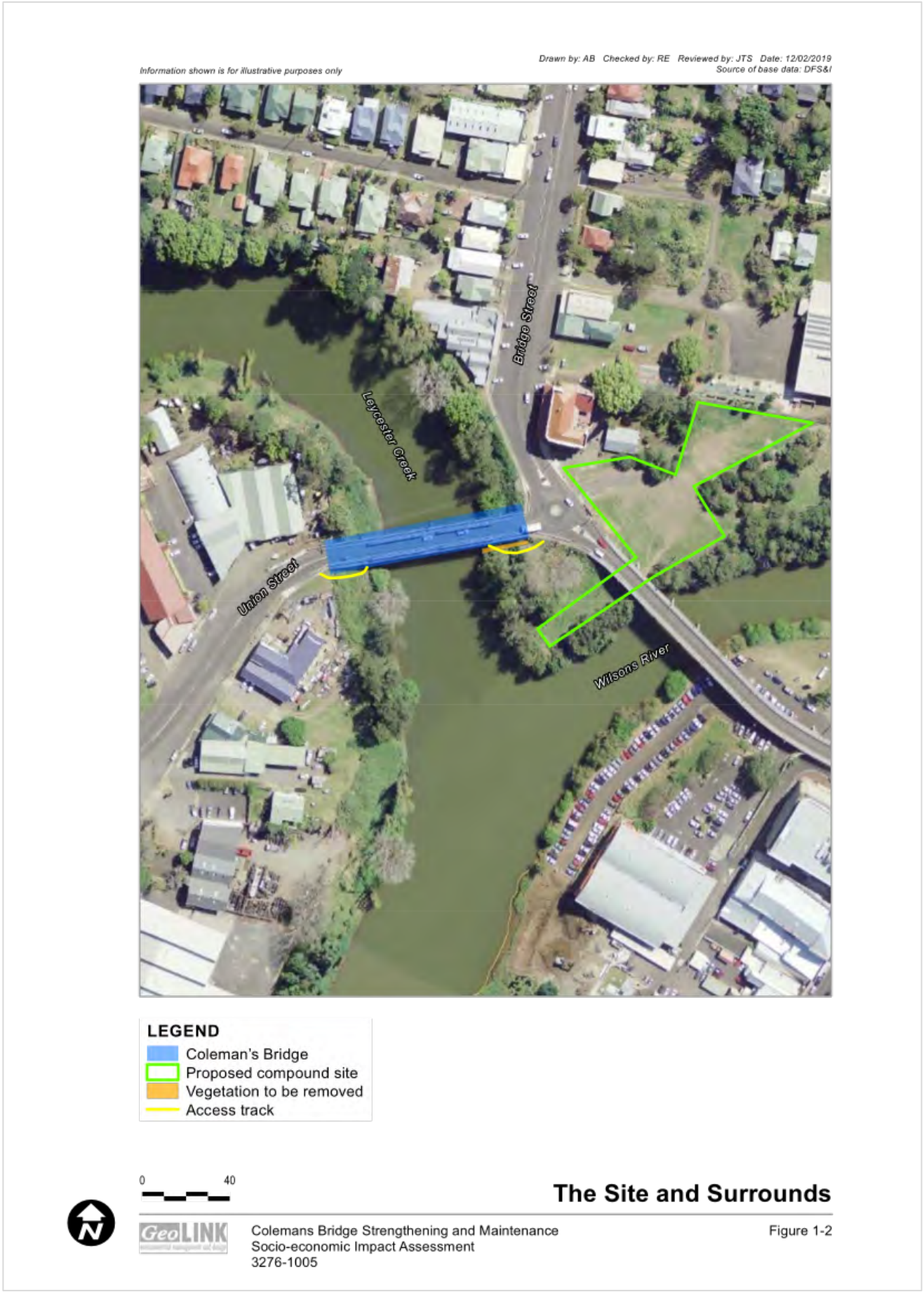


FIGURE 28: PROPOSED SITE AREA

Image provided by GeoLINK March 2019

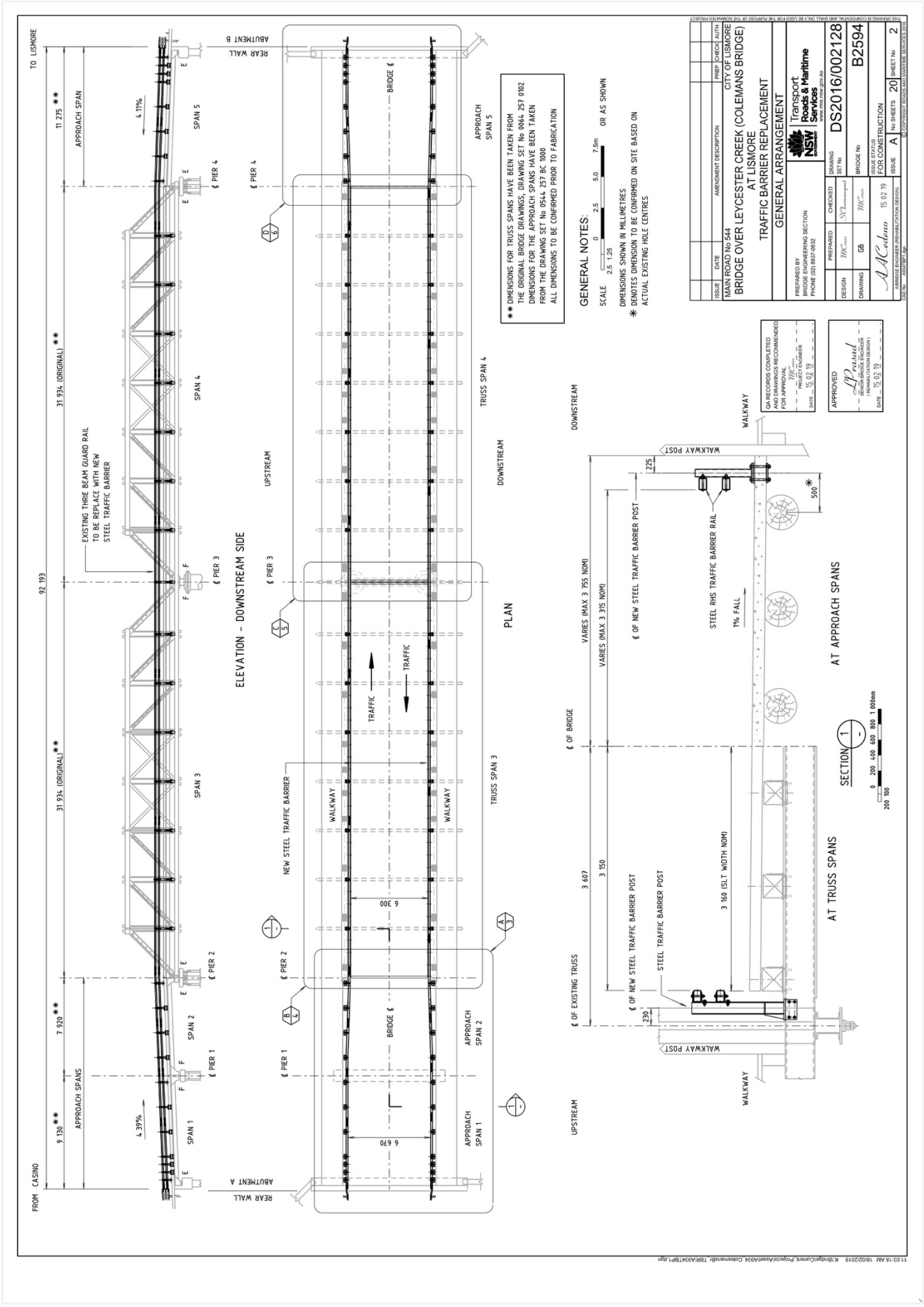


FIGURE 29: PROPOSED TRAFFIC BARRIER REPLACEMENT – GENERAL ARRANGEMENT

RMS 2019

FIGURE 30: INDICATIVE NEW TRAFFIC BARRIER (GLENNIES CREEK, MIDDLE FALBROOK)

RMS 2019

FIGURE 31: INDICATIVE NEW TRAFFIC BARRIER (GLENNIES CREEK, MIDDLE FALBROOK)

RMS 2019

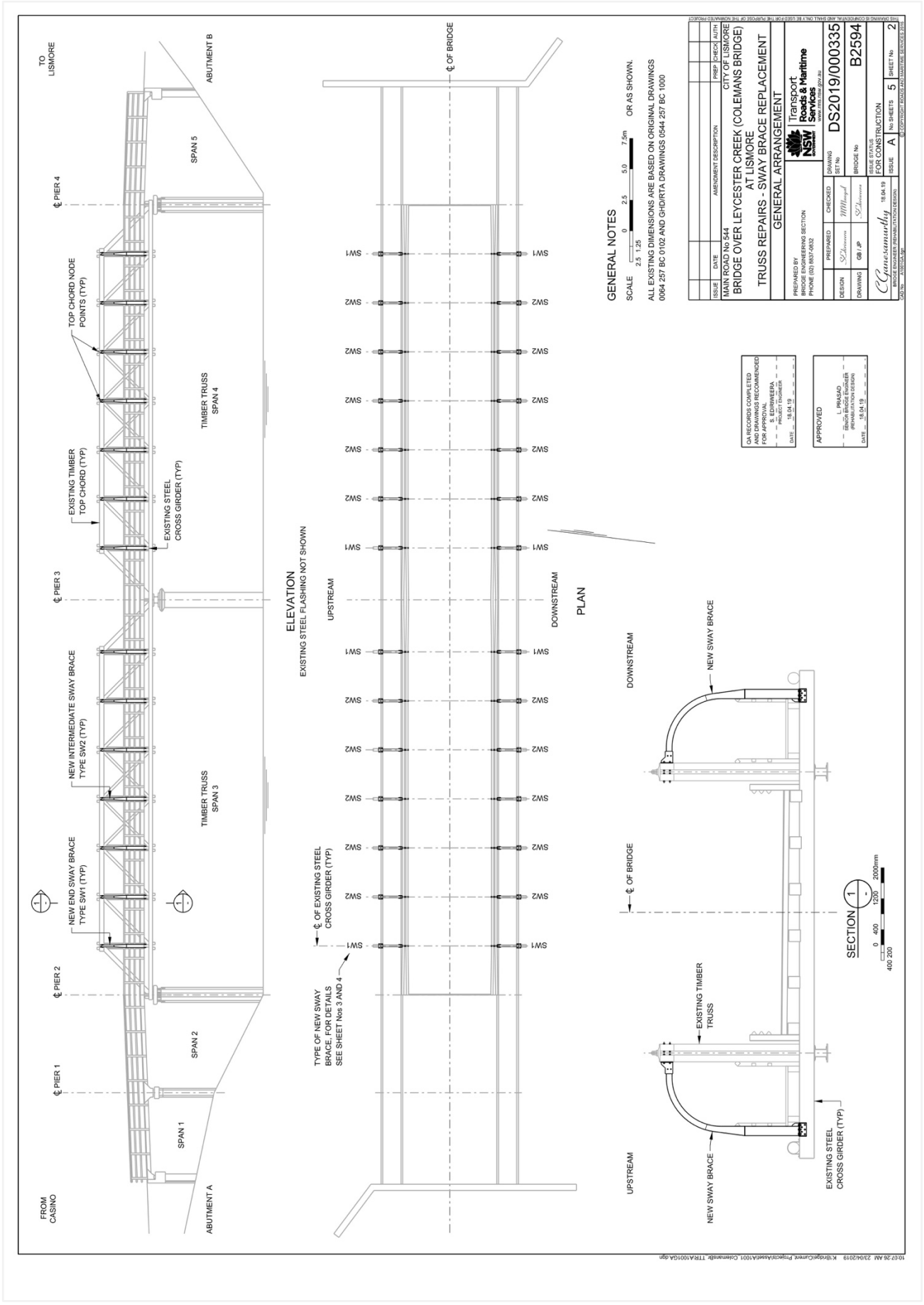


FIGURE 32: PROPOSED TRUSS REPAIRS – SWAY BRACE GENERAL ARRANGEMENT

RMS 2019

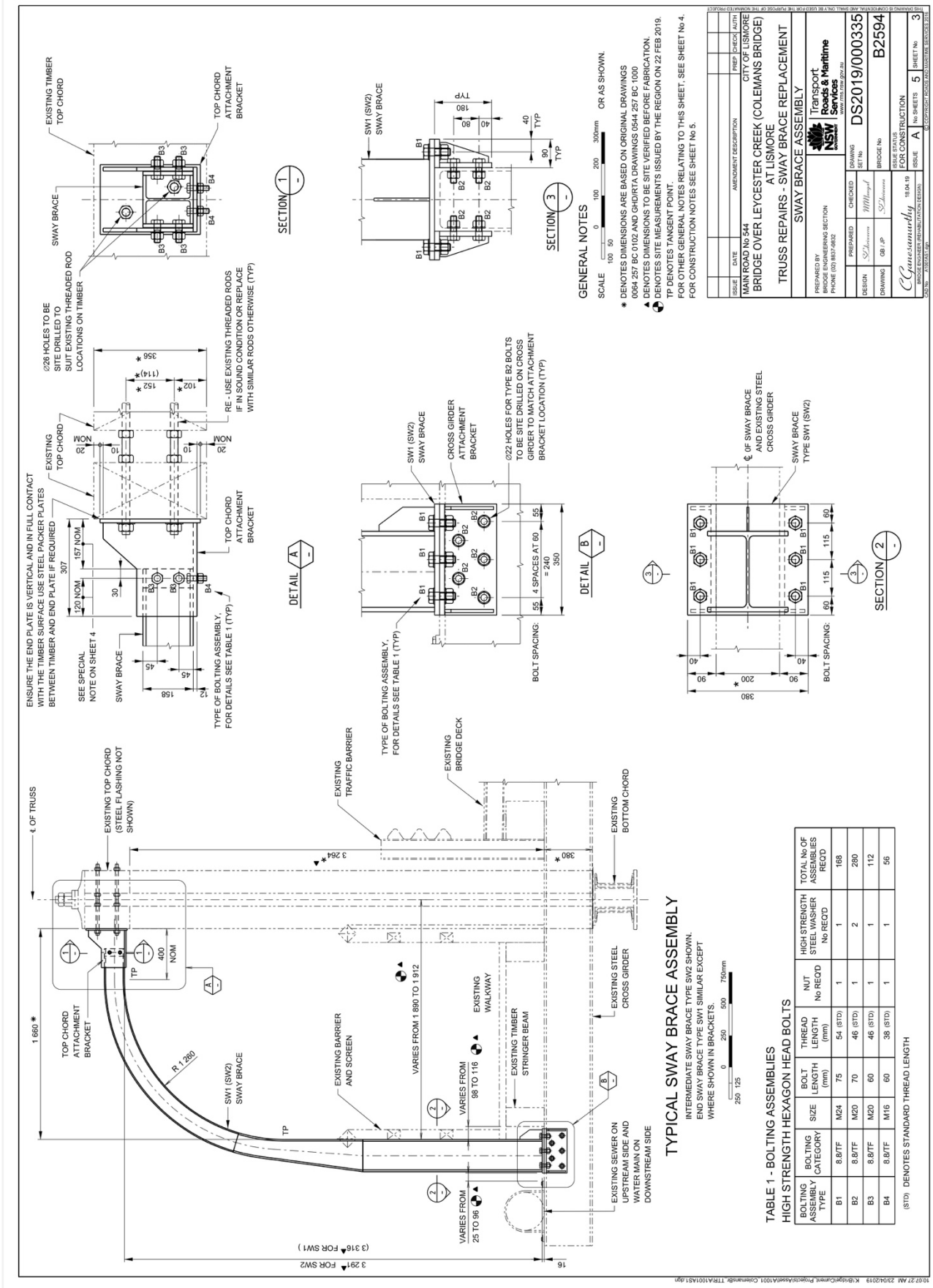


FIGURE 33: PROPOSED TRUSS REPAIRS – SWAY BRACE REPLACEMENT - ASSEMBLY

RMS 2019

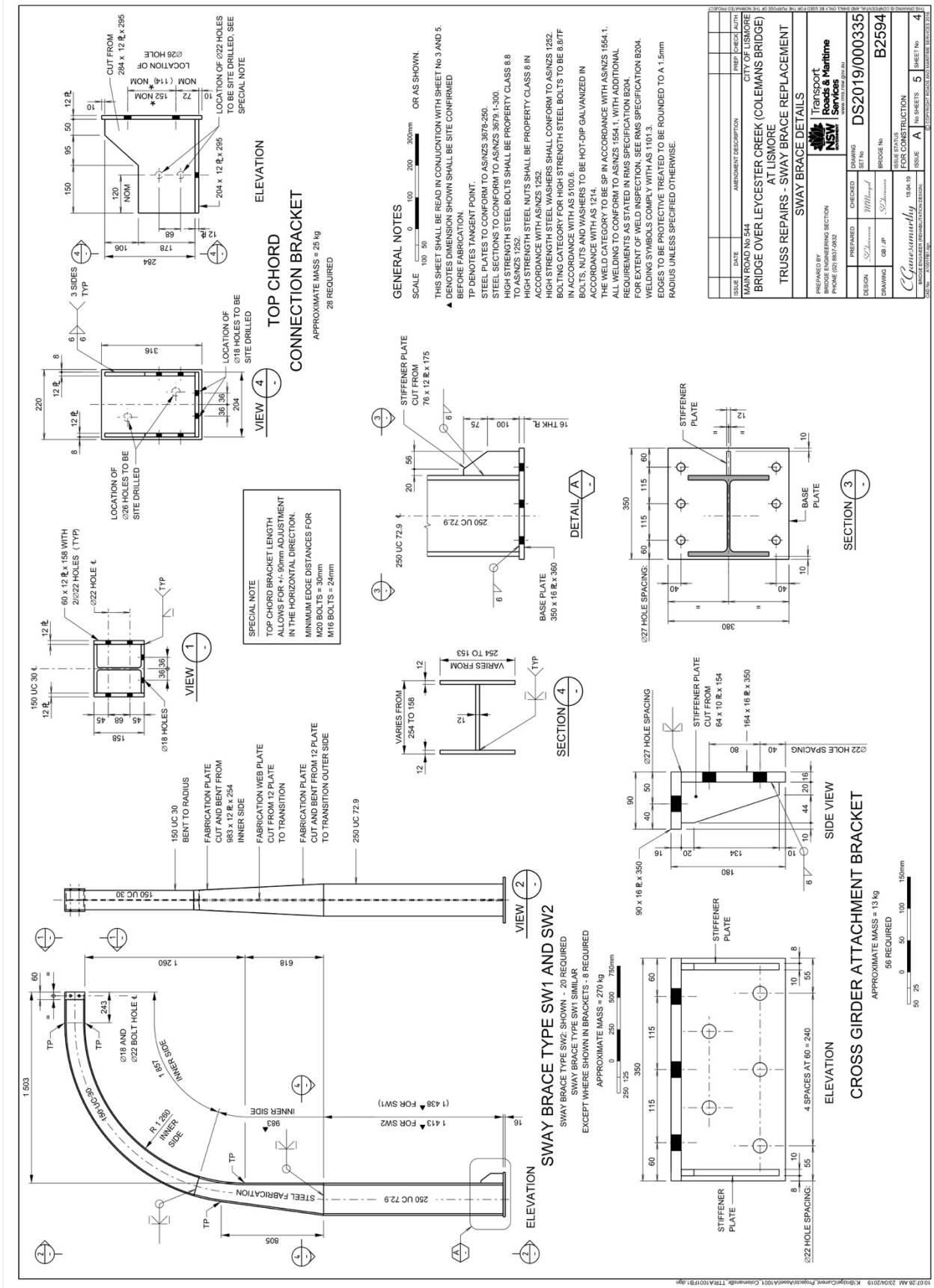


FIGURE 34: PROPOSED TRUSS REPAIRS – SWAY BRACE REPLACEMENT - DETAIL

RMS 2019

FIGURE 35:

EXISTING SWAY BRACING + THRIEBEAM BARRIER

DAN TUCK 2019

FIGURE 36:

PROPOSED SWAY BRACING + A SIMILAR CRASH BARRIER. (BARHAM-KOONDROOK BRIDGE)

Note that this image depicts a black metal walkway. On Colemans Bridge, the timber railing shown in the above image will remain in place; repainted white.

RMS 2019

6 Impacts

6.1 Assessment

The following questions derive from the NSW Heritage Branch guideline document *Statements of Heritage Impact* and are the established means of assessing the impact of proposals on heritage items in NSW.

What aspects of the proposal respect or enhance the heritage significance of Colemans Bridge?

The restoration proposal will see Colemans Bridge retained and is consistent with the *Timber Truss Bridge Overarching CMP* (2018) in the following ways:

- The bridge will be retained (policies 1 & 4)
- Use of the bridge as an operational vehicular thoroughfare (once works are completed) will continue (policy 6)
- Works to strengthen & improve the bridge will incorporate new work that will be sympathetic to the overall design & form of the bridge, while making use of contemporary design & modern materials of high strength & durability (policy 8). For instance, repair of the snaking of the top chord bracing (including bowing & lateral movement) will see original truss fabric strengthened & supported by alternate but appropriate materials.
- The bridge setting will be returned to a pre-works state (or better) at completion (policy 10).

While the bridge will be modified, both its form (including its distinctive Dare trusses), functionality, and the nature of its semi-suburban setting, will endure and be enhanced.

Furthermore, the use of modern materials to protect and strengthen the bridge trusses, such as steel traffic barriers and sway braces has an historic precedent in the remediation of other significant RMS-controlled bridges. Namely, the highly significant cross-border, Barham-Koondrook Bridge, which features de Burgh timber trusses and a steel lifting span. The use of such fabrics will ensure that the truss elements in particular survive well into the future.

In addition, the replacement of the thriebeam crash barrier with a more visually recessive crash barrier, the resurfacing of the bridge deck and walkways, and the black and white repainting, will collectively improve the overall appearance and aesthetic appeal of this notable bridge.

What aspects of the proposal could detrimentally impact upon the heritage significance of Colemans Bridge?

The strengthening and maintenance of Colemans Bridge will alter the bridge physically, and visually when viewed up close. Notably, the northern trusses will feature improved sway bracing. In addition, some lesser elements, including the approach fencing and the crash barriers will be replaced. The latter with an improved metal barrier that meets modern safety standards.

That said, these alterations are discrete improvements that are in keeping with the overarching CMP and will improve the appearance of the bridge rather than detract from it. They will also ensure the survival of the bridge into the future in a form that is fresh, yet recognisable and consistent with the existing presentation of the structure.

Importantly, the highly significant and defining Dare trusses will remain as operational components of the bridge, as opposed to non-functional decorative adornments, and their future protection will be aided rather than impeded by the new steel barrier fence.

Have more sympathetic bridge treatment solutions been considered? If so, why were they discounted?

The treatment option of least impact would be to leave the bridge as is. This treatment option would see the bridge continue to deteriorate over time and leave safety, amenity and heritage considerations unaddressed.

Other treatment options that have been considered by RMS, including the complete upgrade of the bridge or its replacement, have been deemed inappropriate at this time for operational, strategic, budgetary or conservation reasons.

6.2 Summary

The proposed strengthening and maintenance of Colemans Bridge will see the structure enhanced and its functionality retained. The proposed works respect the heritage significance of the item; will ensure that bridge's most significant elements (the Dare Trusses) are conserved; and are consistent with the modern approach to timber truss bridge management espoused in the NSW Heritage Office-endorsed *Timber Truss Bridge Overarching CMP* (2018).

The proposed work will enhance rather than devalue the heritage significance of the bridge and is considered a timely and appropriate operational and conservation initiative overall.

7 Recommendations

The following recommendations acknowledge:

- The *Burra Charter &* NSW Heritage Division guidelines & best practice
- The NSW Heritage Council *State Agency Heritage Guide* (2005)
- RMS cultural heritage guidelines, operational requirements & procedures
- The RMS *Timber Truss Bridge Conservation Strategy* (2012) & *Timber Truss Bridge Overarching Conservation Management Plan* (2018).

It is recommended that:

1. The Colemans Bridge strengthening & maintenance program be undertaken as planned.
2. Application be made to the NSW Heritage Office for a Section 57(2) exemption to facilitate the project:

   https://www.environment.nsw.gov.au/resources/heritagebranch/heritage/StandardExemptions.pdf

   The appropriate standard exemption type would be Type (7): Minor activities with little or no adverse impact on heritage significance.

   https://www.environment.nsw.gov.au/resources/heritagebranch/heritage/formexemptionnotifications57.pdf
3. As per policy 11 of RMS' *Timber Truss Bridge Overarching CMP* (2018), the bridge and its setting should be subject to a pre & post-works archival photographic recording.

   The recording should be undertaken by a suitably qualified professional & meet NSW Heritage Office standards as items on the State Heritage Register as per NSW Heritage Office. 2005. Photographic Recording of Heritage Items using Film or Digital Capture.

   https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Heritage/photographic-recording-of-heritage-items-using-film-or-digital-capture.pdf

   When the archival record is complete, it should be made available to the Richmond River Historical Society (RRHS); Lismore Library (Local History Collection) & NSW Heritage Office.

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9 Attachments

A1. SHI Listing

Office of Environment & Heritage

Home > Topics > Heritage places and items > Search for heritage

Colemans Bridge over Leycester Creek

Item details

Name of item:	Colemans Bridge over Leycester Creek
Type of item:	Built
Group/Collection :	Transport - Land
Category:	Road Bridge
Location:	Lat: -28.8055560972 Long: 153.2749292036
Primary address:	Main Road 544, Lismore, NSW 2480
Local govt. area:	Lismore
Local Aboriginal Land Council:	Ngulingah

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
Main Road 544	Lismore	Lismore			Primary Address
Union Street	Lismore	Lismore			Alternate Address

Owner/s

Organisation Name	Owner Category	Date Ownership Updated
Roads and Maritime Services	State Government	

Statement of significance:

Colemans bridge was completed in 1908, and is an early example of Dare timber truss bridges. In 1998 it was in good condition.

As a timber truss road bridge, it has many associational links with important historical events, trends, and people, including the expansion of the road network and economic activity throughout NSW, and Harvey Dare, the designer of this type of truss. Dare trusses were fifth in the five stage design evolution of NSW timber truss road bridges. They were similar to Allan trusses, but contain improvements which make them stronger and easier to maintain. This engineering enhancement represents a significant evolution of the design of timber truss bridges, and gives Dare trusses some technical significance. Colemans bridge has particular technical significance, having iron piers, the only two-lane Dare truss, footways, and long spans. In 1998 there were 27 surviving Dare trusses in NSW of the 40 built, and 82 timber truss road bridges survive from the over 400 built. The Colemans bridge is a representative example of Dare timber truss road bridges, and is assessed as being Nationally significant, primarily on the basis of its technical and historical significance.

Date significance updated: 13 Sep 05

Note: The State Heritage Inventory provides information about heritage items listed by local and State government agencies. The State Heritage Inventory is continually being updated by local and State agencies as new information becomes available. Read the OEH ***copyright and disclaimer****.*

Description

Designer/Maker:	Harvey Dare
Builder/Maker:	W F Oakes, Sydney
Construction years:	1908-1908
Physical description:	Coleman's Bridge is a Dare type timber truss road bridge. It has 2 timber truss spans, each of 32.0m (105ft). There are 2 timber approach spans at one end and 1 at the other giving the bridge an overall length of 90.7m (297ft). The bridge has a twin cylindrical cast iron central pier. Timber trestles provide the remaining sub structure. The bridge deck provides a dual lane carriage way and a footpath both sides of the roadway. The minimum width of the carriage way is 6.1m. An Armco traffic guard rail provides protection to vehicular traffic and a timber post and rail barrier forms the pedestrian walkway handrail. Curved steel braces fixed to the top chord of the timber truss help strengthen the outer timber pedestrian barriers.
Physical condition and/or Archaeological potential:	Physical condition is good. **Date condition updated:**13 Sep 05
Current use:	Bridge
Former use:	Bridge

History

Historical notes:	Timber truss road bridges have played a significant role in the expansion and improvement of the NSW road network. Prior to the bridges being built, river crossings were often dangerous in times of rain, which caused bulk freight movement to be prohibitively expensive for most agricultural and mining produce. Only the high priced wool clip of the time was able to carry the costs and inconvenience imposed by the generally inadequate river crossings that often existed prior to the trusses construction. Timber truss bridges were preferred by the Public Works Department from the mid 19th to the early 20th century because they were relatively cheap to construct, and used mostly local materials. The financially troubled governments of the day applied pressure to the Public Works Department to produce as much road and bridge work for as little cost as possible, using local materials. This condition effectively prohibited the use of iron and steel, as these, prior to the construction of the steel works at Newcastle in the early 20th century, had to be imported from England. Harvey Dare, the designer of Dare truss and other bridges, was a leading engineer in the Public Works Department, and a prominent figure in early 20th century NSW.

Timber truss bridges, and timber bridges generally were so common that NSW was known to travellers as the "timber bridge state".

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	(none)-

Assessment of signi4cance

SHR Criteria a) [Historical significance]	Through the bridge's association with the expansion of the NSW road network, its ability to demonstrate historically important concepts such as the gradual acceptance of NSW people of American design ideas, and its association with Harvey Dare, it has historical significance.
SHR Criteria c) [Aesthetic significance]	The bridge exhibits the technical excellence of its design, as all of the structural detail is clearly visible. In the context of its landscape it is visually attractive. As such, the bridge has moderate aesthetic significance.
SHR Criteria d) [Social significance]	Timber truss bridges are prominent to road travellers, and NSW has in the past been referred to as the "timber truss bridge state". Through this, the complete set of bridges gain some social significance, as they could be said to be held in reasonable esteem by many travellers in NSW. The Colemans bridge is valued by the people of the Lismore region.
SHR Criteria f) [Rarity]	Rare - Colemans bridge contains many important technical and aesthetic
SHR Criteria g) [Representativeness]	Highly representative of Dare timber truss bridges and late 19th century bridge technology
Integrity/ Intactness:	Intact
Assessment criteria:	Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Procedures / Exemptions

Section of act	Description	Title	Comments	Action date
57(2)	Exemption to allow work	Standard Exemptions	SCHEDULE OF STANDARD EXEMPTIONS HERITAGE ACT 1977 Notice of Order Under Section 57 (2) of the Heritage Act 1977 I, the Minister for Planning, pursuant to subsection 57(2) of the Heritage Act 1977, on the recommendation of the Heritage Council of New South Wales, do by this Order: 1. revoke the Schedule of Exemptions to subsection 57(1) of the Heritage Act made under subsection 57(2) and published in the Government Gazette on 22 February 2008; and	Sep 5 2008

2. grant standard exemptions from subsection 57(1) of the Heritage Act 1977, described in the Schedule attached.

FRANK SARTOR

Minister for Planning

Sydney, 11 July 2008

To view the schedule click on the Standard Exemptions for Works Requiring Heritage Council Approval link below.

Standard exemptions for works requiring Heritage Council approval

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		01463	20 Jun 00	-	-
Heritage Act - s.170 NSW State agency heritage register	Roads & Traffic s.170				
Local Environmental Plan			27 Mar 92		
Register of the National Estate		1992	18 Apr 89	40	2298

References, internet links & images

Type	Author	Year	Title	Internet Links
Tourism		2007	Colemans Bridge over Leycester Creek	View details
Tourism	Attraction Homepage	2007	Colemans Bridge over Leycester Creek	View details

Written	Roads and Traffic Authority	2003	Statement of Heritage Impact Proposed Truss strengthening works on Colemans Bridge over the Leycester Creek, Lismore, NSW	

Note: internet links may be to web pages, documents or images.




(Click on thumbnail for full size image and image details)

Data source

The information for this entry comes from the following source:

Name: Heritage Office

Database number: 5051363

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Appendix I

Socio-economic assessment

Colemans Bridge strengthening and maintenance

Socio-economic assessment

Roads and Maritime Services | May 2019

NSW GOVERNMENT

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Document Management

Revision History

Version	Date	Author	Description
1	26/02/2019	JTS	First draft
2	21/03/2019	JTS	Second issue
3	20/05/2019	DGH	Third issue

Executive Summary

Introduction

NSW Roads and Maritime Services (Roads and Maritime) propose to undertake strengthening and maintenance on Colemans Bridge (BN 2594), on Union Street (MR544) over Leycester Creek, Lismore. Colemans Bridge was built in 1908. However, the central twin-cylinder, wrought and cast iron pier, constructed c.1884, was part of the previous bridge that was removed. Colemans Bridge is of State heritage significance and is a rare and representative example of a Dare-type truss bridge. The bridge also exhibits less common features of Dare-type truss bridges, including the abovementioned central iron piers, which combined with having two-lanes, footways, and long spans, represents a level of technical significance according to heritage listing descriptions.

Colemans Bridge has two Dare-type truss spans; each 32 m long and comprising eight four-metre long panels. The bridge has an overall length of almost 91 m and has two timber beam approach spans at the western end and one timber beam approach span at the eastern end. This report documents the socio-economic impacts of the proposed bridge strengthening and maintenance work.

Proposal objectives

The objectives of the proposal are to:

- To improve the structural capacity of the bridge through strengthening.
- To support bridge longevity and maintain a safe connected road network.
- To reduce future maintenance.

The proposal

Roads and Maritime Services (Roads and Maritime) propose to undertake bridge truss strengthening and maintenance on Colemans Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area. Colemans Bridge spans over Leycester Creek, approximately 70 m north-west of Wilson's River. The Leycester Creek and Wilson's River sub-catchment forms part of the larger Richmond River catchment of northern NSW and drains to the sea at Ballina.

The work is required to improve the structural capacity of the bridge in order to keep Colemans Bridge serviceable. Colemans Bridge is a critical link in the road infrastructure of the Lismore area. It is approached by Union Street (to the south-west) and Bridge Street (to the north) and in combination with Fawcett Bridge, provides an important link between the Lismore Central Business District (CBD) and South Lismore (as well as allied townships and farmland to the south and west). The bridge is listed on the Roads and Maritime Section170 Heritage Register and Conservation Register. The bridge is also listed on the State Heritage Inventory (SHI): a consequence of its s170 listing.

The proposal will include the following aspects:

- Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage
- Construction activities are required above and below the deck and on the embankment three metres either side of the bridge. Construction works are not required within the water however access to the underside of the bridge may be required via the water with the use of a barge and elevated work

platform. If required access for this work would be undertaken from a public boat ramp near Ballina Street Bridge

- Construction activities above the deck include:
  - Re-stressing of the stress laminated timber (SLT) deck
  - Strengthening of the top chord of the dare trusses with new truss lateral sway brace
  - Replacement of the existing traffic barrier
  - Replacement of the bridge wearing course
  - Minor footway repairs
  - Repainting of the bridge truss with hand tools to restore the appropriate heritage bridge colour scheme (steel elements black, timber elements white).
  - Minor localised painting of the bridge in appropriate bridge heritage colours
- Construction activities below the deck include:
  - Localised steel bottom chord corrosion repairs and repaint
  - Timber trestle pier repairs
- Minor vegetation clearing within three metres of the bridge will be required to facilitate works around timber trestle piers
- Minor earthworks will be required to provide access to timber trestle piers and below deck work areas
- Elevated (hung) scaffolding will be required to conduct work for the SLT deck re-stressing and localised repairs to the steel bottom chord and girders.

Construction is expected to commence in September 2019 and will take approximately eight months to complete. In order to minimise the period of disruption to the public and complete the works in the most efficient manner, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures (refer to the REF for an analysis of options, including works methodology with regard to bridge closures and associated durations). During closures alternate detours would be available in the order of between approximately 2.8 km and 3.7 km (approximate travel time by car of five and seven minutes respectively – without heavy traffic), depending on the route taken, origin and destination. All modes of vehicle-based transport would be affected and diverted during the bridge closure. During the project pedestrian access on one side of the bridge would be maintained.

Socio-economic issues and management measures

The main socio-economic issues identified from the assessment relate to the following:

Local access and connectivity

The proposal would temporarily affect access and connectivity for road users, including residents, businesses, tourists and transport. Alternate detours would be available in the order of between approximately 2.8 km and 3.7 km, depending on the route taken, origin and destination. In most instances, the impact would be an inconvenience, with minor additional travel time and fuel cost incurred.

The temporary bridge closure and detour options are not expected to adversely affect disadvantaged people as there is a lack of reliance on alternative modes of transport in the local community which could otherwise be impacted and a walkway across the bridge would be maintained at all times. Most people have access to private vehicles for their transport, meaning most people can effectively use the detours and public transport routes would not be affected. Any closure and detour could generally be tolerated in the short-term. It is largely acknowledged that the works have a long-term benefit for the bridge's longevity and serviceability.

Colemans Bridge would be a designated construction site during the construction phase. Therefore, access to the waterway would be restricted around the bridge during construction. Access under the bridge via watercraft is not expected to be restricted. If this was required, this would need to be communicated to the users of the river as part of the consultation phase of the proposal.

The works are important to maintain the bridge and connectivity for the local community into the future. Not undertaking the works may result in additional degradation and could lead to bridge closure and larger and long-term socio-economic impacts.

Local business, industry and economy

Impacts to businesses stem from reduced transport links across Wilson River and Leycester Creek due to the temporary bridge closure, requiring local traffic to use detours. Subsequent effects of this on business and local economic activity can relate to reduced efficiency, increased travel time, fuel costs and the need for additional logistics planning or resourcing. Additional planning and appropriate notice would enable businesses to adequately plan for the changed road conditions during the works. No long-term or unmanageable impacts are considered likely.

Tourism

The proposal would impact access and change local connectivity during any temporary closure of Colemans bridge. While this may alter the route taken to access a tourist facility or business (eg accommodation or attraction), these places would still be readily accessible via the detours. This would ensure that tourism places and businesses remain accessible. While some inconvenience could be experienced, it is not expected to be significant. People planning to visit a particular place would continue to be able to readily access it.

Local amenity

The local environment and amenity could be adversely impacted by the works. Noise and vibration, air quality, traffic and parking and visual impacts all have the potential to be affected. In most of these contexts, the potential impacts posed by the proposal are not significant and would be of a temporary duration. Noise generated by the works could adversely impact nearby sensitive receivers (dwellings). However, specific safeguards and management measures would be implemented to minimise and appropriately manage any such impacts.

Property and land use

No property acquisition would be required for the proposal. The site compound would be located on Crown Land, that forms part of a reserve and sits adjacent to informal parkland/open space. The compound would be shared with proposed concurrent bridge work at Fawcetts Bridge (no impact to traffic will stem from Fawcetts bridge as the project would be done offline to traffic). Siting of the compound on Crown Land and open space, would result in some short-term occupation and restriction to this land however most of this open space would remain unoccupied and accessible. Other land use and property impacts relate to the road closure and detours, as well as construction related amenity impacts, as assessed further in this report.

Social and recreational infrastructure/ services

No key social or recreational infrastructure would be affected. Some short-term restriction on the use of and access along Leycester Creek in the vicinity of the works would be required, however this would only affect particular sections of the river at a time and no significant impact on social/ recreational activity or services is expected. Disadvantaged and homeless members of the community who may frequent the bridge site would need to be moved from the site to facilitate the works and ensure safety. This would be undertaken with the support of relevant agencies. Keeping at least one of the bridge's walkways accessible during the works would ensure that access for pedestrians is maintained and that support services on the opposite side of the bridge remain accessible.

Population and employment

There may be a minor short-term positive effect on employment and economic stimulus for the local area generated by the work and a small temporary increase in workers in the locality. Given the nature of the works, they would not influence population or employment growth or decline. Population distribution would also not be influenced.

Distribution of social impact and housing affordability

Whilst more disadvantaged members of the community could experience impacts, measures would be in place to inform members of the community and maintain key access via detours, alternative transport or retained pedestrian access. Given the temporary nature of the proposal, and the on-going future operation of the bridge once the works are complete, there would not be any change on the distribution of social impact or housing affordability.

Health and safety

Health and safety issues could arise if road users are not aware of the proposed work or potential disruptions. Emergency services and their response could be affected by the occasional bridge closure (dependant on origin and destination). However, the available detours would maintain access to the localities either side of the bridge and emergency services/ agencies would be consulted.

Community values

According to the *Imagine Lismore Community Strategic Plan*, the maintenance of existing roads network is a key value area and aligns with the key objective of ensuring that the city and village services (including road network) are well managed and maintained. In this sense the bridge maintenance is consistent with community value regarding the importance of quality roads and the local built environment.

Cultural values

Although Colemans Bridge is a listed heritage item, the proposal does not present any significant adverse impact to the existing bridge. Its appearance and character would be maintained and there would be no detriment to any associated heritage value. The works would support improved longevity of the bridge.

Cumulative impacts

Although the proposal has the potential to contribute to cumulative impacts such as construction noise, air quality, and traffic, these are not expected to be significant given the context of the site and nature/ scope of works. Mitigation measures within the Review of Environmental Factors (REF) and Construction Environmental Management Plan (CEMP) would ensure any such effects are minimised and managed appropriately.

Management measures

As outlined above, the proposal would present various potential impacts. While the proposal is not expected to result in significant detriment or long-term socio-economic effects, short-term effects during construction and preliminarily due to temporary bridge closure(s) would have a varying degree of impact for the local community. A number of safeguards and mitigation measures have been specified and would be implemented, along with those in the REF and CEMP, to assist in avoiding (where possible) and minimising or mitigating any socio-economic impacts. These can be appropriately addressed through consultation, notification and specific measures as recommended in this report and summarised below:

- Development and implementation of a communication plan
- Notification to advise business, residents, road users and other key stakeholders affected by the activity prior to commencement
- Community and stakeholder consultation, including advice on duration and timing provided to key stakeholders and authorities
- Advanced warning and detour directional signs established prior to and during the project to advise of changed conditions (roads and waterways) and alternative access
- Pedestrian access to, and use of, at least one of the bridge's walkways at any one time is to be maintained and remain accessible where safe to do so
- A complaint handling process
- Relevant health and safety protocols.

Contents

1. Introduction

1.1. Proposal background

NSW Roads and Maritime Services (Roads and Maritime) propose to undertake strengthening and maintenance on Colemans Bridge (BN 2594), on Union Street (MR544) over Leycester Creek, Lismore. Colemans Bridge was built in 1908. However, the central twin-cylinder, wrought and cast iron pier, constructed c.1884, was part of the previous bridge that was removed. Colemans Bridge is of State heritage significance and is a rare and representative example of a Dare-type truss bridge. The bridge also exhibits less common features of Dare-type truss bridges, including the abovementioned central iron piers, which combined with having two-lanes, footways, and long spans, represents a level of technical significance according to heritage listing descriptions.

Colemans Bridge has two Dare-type truss spans; each 32 m long and comprising eight four-metre long panels. The bridge has an overall length of almost 91 m and has two timber beam approach spans at the western end and one timber beam approach span at the eastern end. The bridge location is shown in Figure 1-1 (the locality). The proposal location and ancillary features (eg indicative site compound), as well as nearby land uses are shown in Figure 1-2 (the site and surrounds).

1.2. The proposal

Roads and Maritime Services (Roads and Maritime) propose to undertake bridge truss strengthening and maintenance on Colemans Bridge (B2594), on Union Street (MR544) over Leycester Creek, Lismore within Lismore City Council Local Government Area. Colemans Bridge spans over Leycester Creek, approximately 70 m north-west of Wilson's River. The Leycester Creek and Wilson's River sub-catchment forms part of the larger Richmond River catchment of northern NSW and drains to the sea at Ballina.

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The general arrangement of the proposal is shown in Figure 1-2.

The proposal will include the following aspects:

- Establishment of a site compound on the north-eastern side of the bridge (same site compound to be used for Fawcett Bridge maintenance). The site compound will be used for site facilities (site offices and amenities) and materials storage
- Construction activities are required above and below the deck and on the embankment three metres either side of the bridge. Construction works are not required within the water however access to the underside of the bridge may be required via the water with the use of a barge and elevated work platform. If required access for this work would be undertaken from a public boat ramp near Ballina Street Bridge.
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  - Replacement of the existing traffic barrier
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  - Minor footway repairs

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Construction is expected to commence in September 2019 and will take approximately eight months to complete. In order to minimise the period of disruption to the public and complete the works in the most efficient manner, the bridge would be closed to traffic on some weekends during the extent of the project and occasionally on the Monday following weekend closures (refer to the REF for an analysis of options, including works methodology with regard to bridge closures and associated durations). During closures alternate detours would be available in the order of between approximately 2.8 km and 3.7 km (approximate travel time by car of five and seven minutes respectively – without heavy traffic), depending on the route taken, origin and destination. All modes of vehicle-based transport would be affected and diverted during the bridge closure. During the project pedestrian access on one side of the bridge would be maintained.

The river channel below the bridge is not expected to be restricted as at this stage works are not expected to be in the river. If work is required from or in the river Roads and Maritime will have controls and buoys in place that will keep the channel open for any waterway traffic. The channel will more than likely be fully open after hours of construction to ensure the safe operation of the waterway.

1.3. Study objectives

This socio-economic assessment has been carried out as a specialist component of the REF for the Colemans Bridge strengthening and maintenance project to identify and assess the potential socio-economic impacts to the community as a result of the construction and operation of the proposal, identify options to avoid or reduce socio-economic impacts and recommend practical impact mitigation measures.

1.4. Consultation

As per the requirements of the State Environmental Planning Policy (Infrastructure) 2007, consultation with Lismore City Council, State Emergency Service and NSW Maritime has occurred. Roads and Maritime has also previously met with Lismore City Council (on 7 March 2019) to discuss the proposal and potential implications of the temporary bridge closure.

The Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI – Stage 1) was undertaken in April 2019 by Roads and Maritime's Aboriginal Cultural and Heritage Advisor who advised that the proposal was unlikely to have an impact on Aboriginal cultural heritage (refer to REF).

Review of the National Native Title Tribunal (NNTT) Online Register (February 2019) indicates that the broader area is subject to an active and registered Native Title Claim NC2013/2018 - Widjabul Wia-bal People. The claim area is described as being located on the Far North Coast of NSW inland from the coast and commencing on the southern boundary of Border Ranges National Park, south to the western boundary of Tuckean Broadwater, east of the towns of Kyogle and Casino. Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an

act is to take place. Roads and Maritime is therefore required to issue notification to representatives of the Native Title holders for their consideration and comment prior to undertaking the works. Roads and Maritime have met on-site with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works. In relation to clause 24KA of the *Native Title Act 1993*, the notification process will be followed, and a letter sent for use of the site compound.

Key findings of the consultation informed the proposal, the potential impacts and required impact avoidance or mitigation measures.

A communications officer has been appointed to the proposal. A project-specific consultation strategy would be developed and implemented in accordance with the Roads and Maritime Community Involvement – Practice Notes and Resource Manual and Roads and Maritime Minor Project procedure, Communications for minor projects (ILC-MP-TP0-301).

Roads and Maritime has undertaken initial consultation with local businesses near Colemans Bridge to inform them of the proposal and gauge their operations with regard to potential bridge closures. Businesses included:

- Youngberry Smash Repairs
- The op shop and Serpentine Gallery
- PJ Fletcher Automotive
- Pool fencing business
- Ron Winkler Smash Repairs
- J.A Leu Heavy Vehicle Repairs
- Local Church
- Cottam Auto Repairs
- Pirlos Tyre Centre
- Lismore appliances.

As part of early consultation for the proposal Roads and Maritime representatives met with 13 businesses on 2 May 2019, located south of Colemans Bridge in Union Street. The purpose of these meetings was to discuss the initial proposal to close the bridge for up to four months during construction. Six of the business owners objected to the full closure proposal, citing impacts to their business through loss of passing traffic as their key concern. In response to this consultation the proposal has been modified to minimise bridge closures to only some weekends and occasional Mondays following weekend closures.

The following bus service providers were consulted by Roads and Maritime to determine their usage of Colemans Bridge and any potential associated impact due to the proposed works and temporary bridge closure:

- Waller’s Bus Company
- Sodhi Bus Service
- Simes Bros Coaches
- Northern Rivers Buslines.

All consulted bus companies advised they do not use Colemans Bridge and would not be impacted by the closure. It is noted that a number of other smaller bus service providers also provide school transportation in the Lismore area, however this is understood to be generally in outer/ rural areas.

The following stakeholders are to be contacted as part of ongoing consultation:

- Lismore City Council
- Residents and businesses surrounding Colemans Bridge, particularly along Union Street

- Emergency services
- Local social and community support organisations
- Affected bus operators
- Local schools.

Roads and Maritime would undertake a media announcement/ release, letterbox drops (notice to the local community and affected parties), place portable and variable message signs in key areas, and post information on the Roads and Maritime website and Facebook page, including updates as works progress. Council's website would also likely be utilised to keep the community informed of the works.

Figure 1-1 Site locality

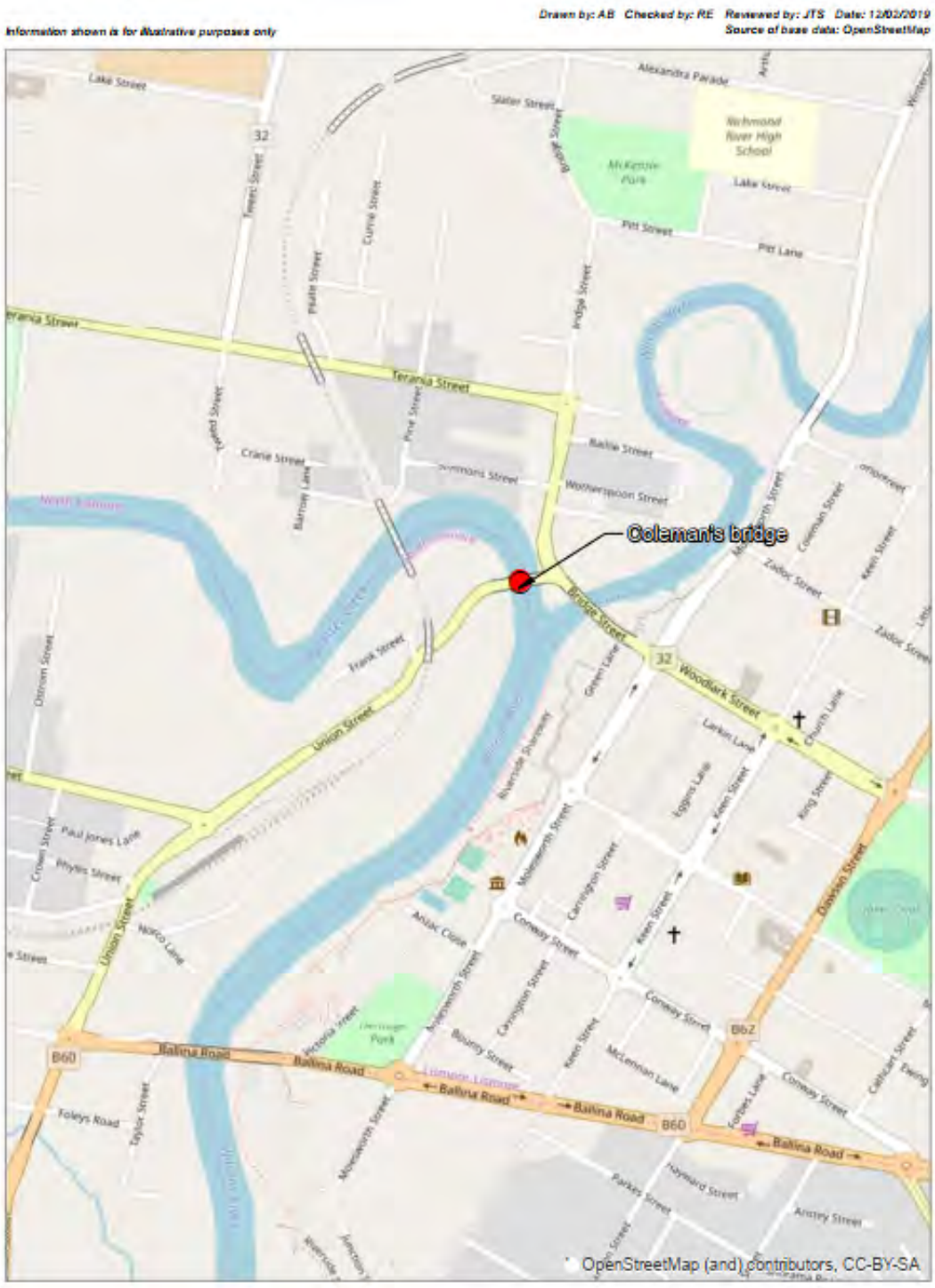


Figure 1-2 The Site and Surrounds

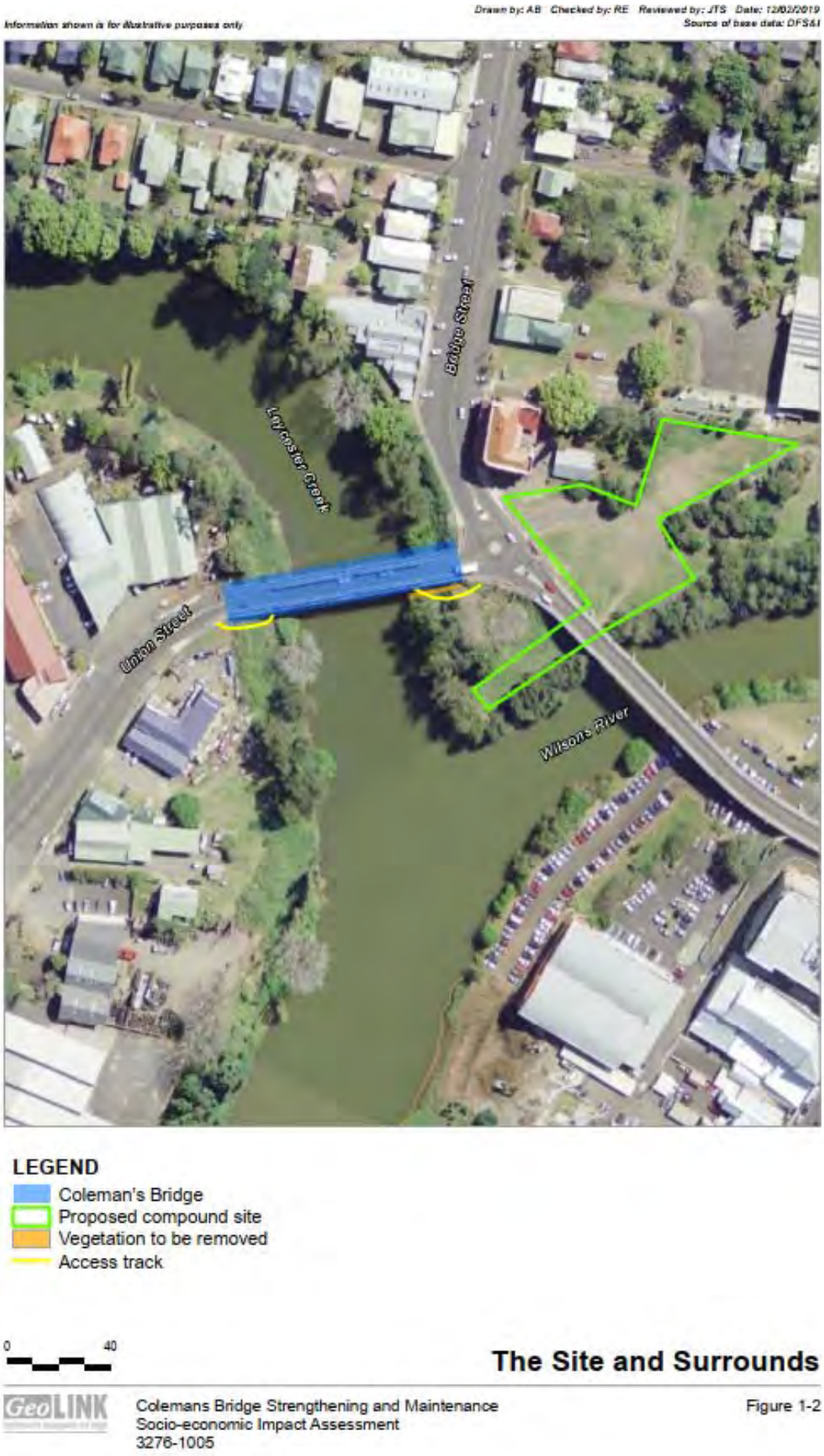
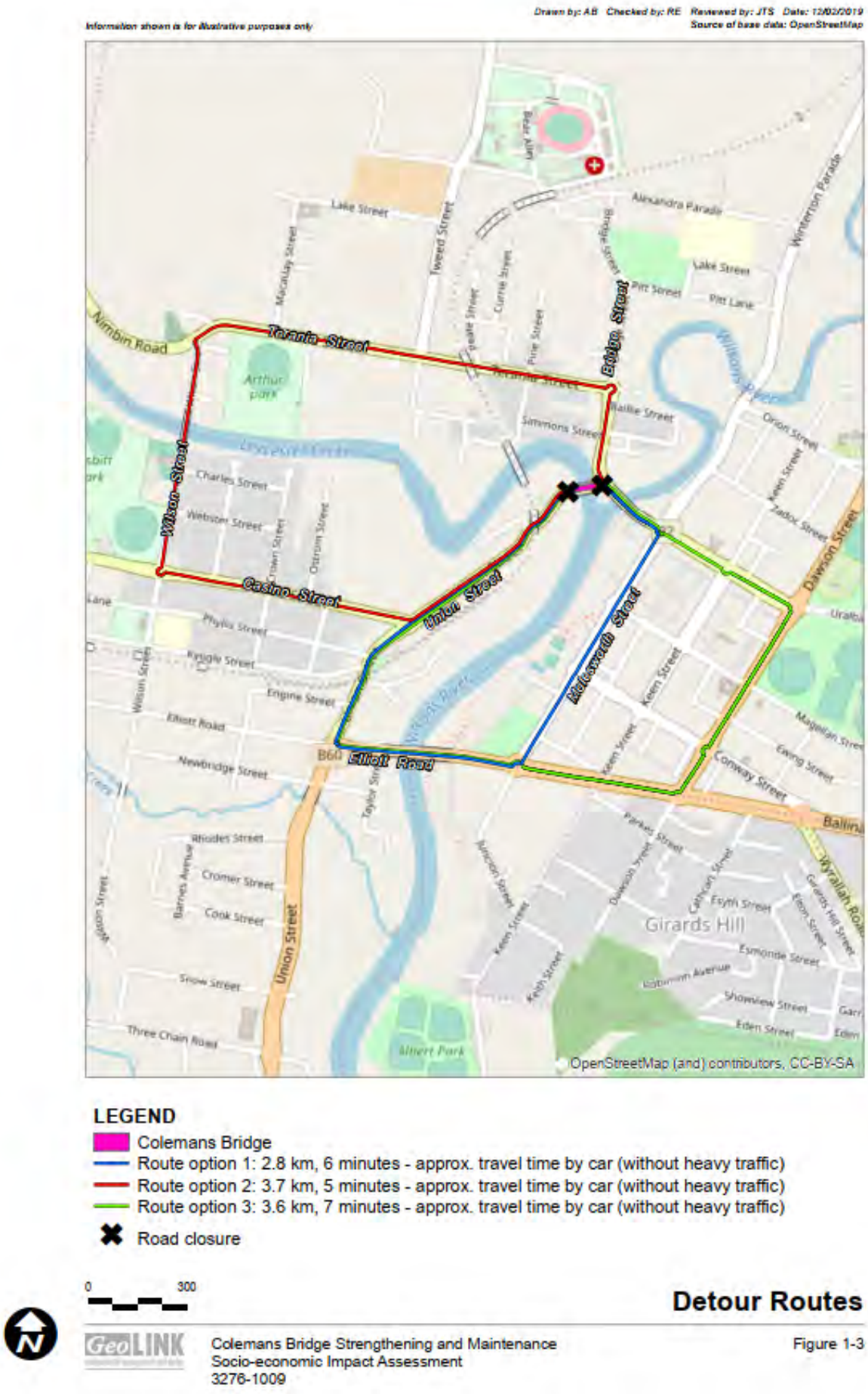


Figure 1-3 Detour Routes



2. Methods

2.1. Personnel

Qualifications and experience of personnel involved in the assessment is provided in Table 2-1.

Table 2-1 Qualifications and experience

Name	Qualification	Years of experience	Role
Jacob Sickinger	Bachelor of Urban and Environmental Planning (Hons)	9	Socio-economic impact assessment
Simon Waterworth	Bachelor of Urban and Regional Planning Masters in Business Administration	23	Review

2.2. Methodology

The socio-economic impact assessment was prepared in accordance with *Environmental Impact Assessment Practice Note - socio-economic assessment* (EIA-N05). Given the locality, scale/ scope of the proposal and the likely impacts anticipated, a moderate level of assessment was deemed appropriate (based on the Practice Note's assessment levels of basic, moderate and comprehensive). The *Draft methodology for assessing the significance of socio-economic impacts* has also been applied to the preparation of this assessment. The assessment of significance of socio-economic impacts considers sensitivity and magnitude impacts to determine the overall level of significance of the impact when compared to the baseline conditions as shown in Table 2-2 below.

Table 2-2 Roads and Maritime significance of impact matrix

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High Impact	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

To facilitate the assessment, a study area needs to be determined to guide the establishment of the socio-economic profile and assessment. The extent of the study area for the socio-economic impact assessment depends on the extent or scale of potential impacts, including both direct and indirect impacts, and the context of the area surrounding the project (ie whether it is in an urban, rural or regional setting).

The study area for this assessment has been derived based on the local urban context of the locality, the scale/ scope of the proposal and the anticipated impacts. The primary study area focuses on the main area of anticipated impact (generally a local level), including that which intersects with the bridge and the primary area of changed traffic conditions. In addition to this primary study area, this assessment also considers the broader context of the Lismore Urban Centre/ Locality (UCL), Lismore Local Government Area (LGA) and NSW.

Consideration of the primary study area allows for more refined, local analysis of the areas likely to be directly affected by the works and bridge closure, including traffic diversion. This was undertaken using atlas.id, The Population Experts Demographic Resources (which is also based on ABS data). The areas selected using the atlas.id for Lismore City were based on where the Statistical Area Level 1 (SA1) areas in 2016 intersected with Colemans Bridge and the primary area of changed/ diverted traffic conditions (namely the diversion from Colemans Bridge to Ballina Street Bridge – east and west of the river, and areas north of the river/ bridge and along the secondary detour via Wilson Street). For the purposes of this report, the relevant SA1 areas that intersect with the area of works and traffic diversion, forming the primary study area, are collectively referred to as the 'Project SA1'. This area comprises an aggregate of the following individually identified SA1s:

- 1124816
- 1124817
- 1124818
- 1124822
- 1124835
- 1124838
- 1124839.

Refer to Figure 2-1 for a depiction of the study area and associated statistical areas.

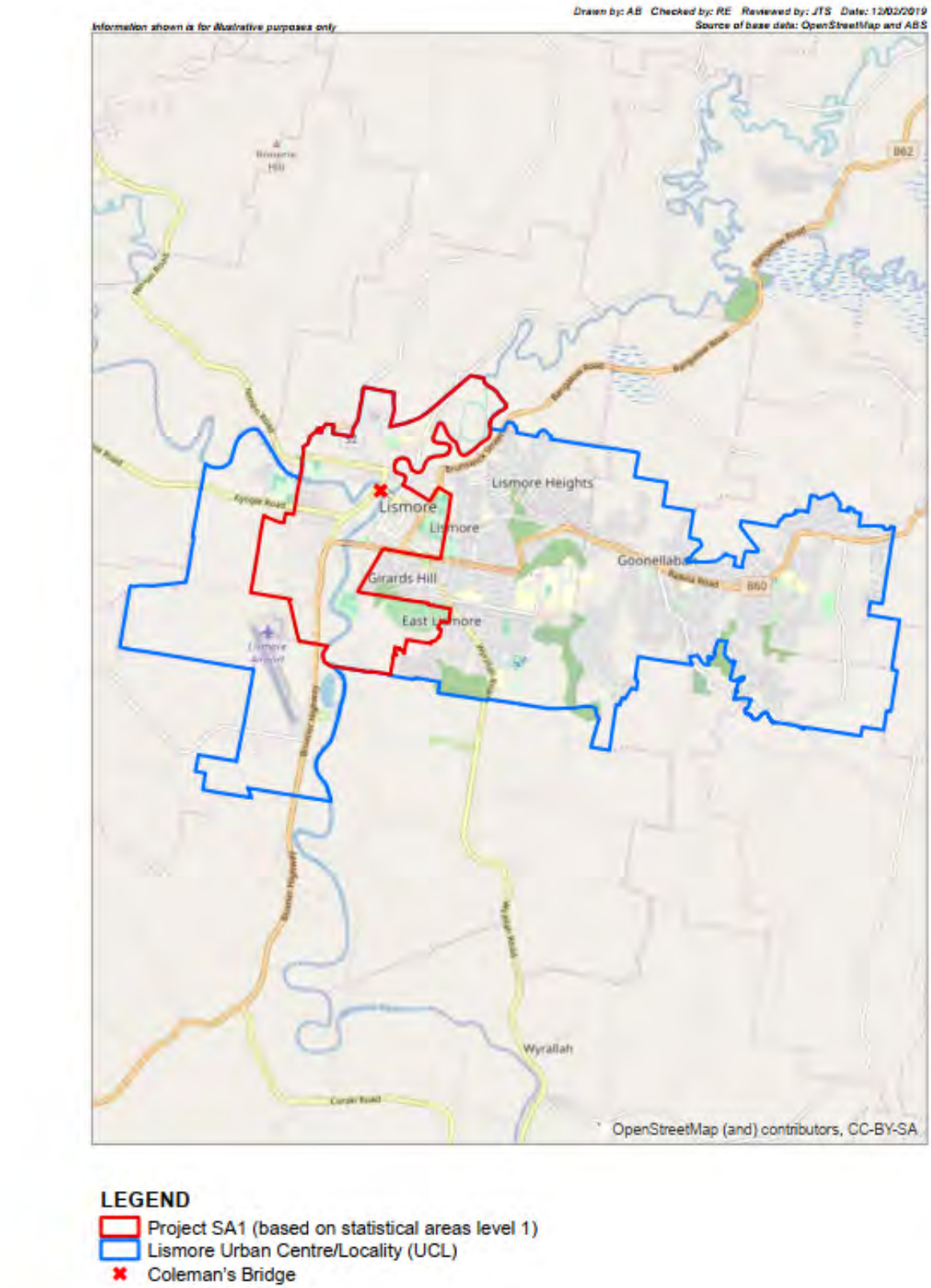
Not only does this approach provide for a set of area based statistical information relevant to the proposal footprint and immediately surrounding community, it encompasses the main area likely to be subject to anticipated impacts as a consequence of the proposal and can be compared to the broader contextual setting.

The preparation of the socio-economic assessment involved the following:

1. **Scoping:** identify the range of issues of concern relevant to the social and economic environment of the study area and the nature of the likely impact of the proposal.
2. **Social and economic environment:** describe the existing social and economic environment of the study area to provide an understanding of the potentially affected individuals, groups or communities. This can involve both quantitative and qualitative indicators to describe the socio-economic profile.
3. **Assessment:** identify and assess the social and economic benefits or impacts of the proposal, who is affected, to what extent and for how long.
4. **Developing management and mitigation measures:** including measures to enhance the proposal's benefits and avoid, minimise or mitigate its potential adverse impacts.

These steps are further described in the following sections.

Figure 2-1 Study Area



2.2.1. Scoping

Scoping of issues involves consideration of the range of potential socio-economic impacts that could form as a result of the proposal. The range of potential impacts was assessed through:

- Review and completion of a preliminary scoping checklist and consideration of potential or likely impacts and their effect
- Site visits of the study area and a desktop survey of land uses surrounding the existing bridge and its approaches and near to the proposal
- Consultation (undertaken by Roads and Maritime) with key stakeholders and potentially affected parties.

2.2.2. Social and economic environment

A description of the existing social and economic environment provides a basis for development of a community profile and predicting likely changes and impact management strategies. Socio-economic data/ information includes quantitative and qualitative indicators (also informed by consultation). These are relevant to establishing an understanding of the social and economic environment, and include:

- Review of existing State and local government, plus other organisations, strategies relevant to the existing and future land use and social and economic environment of the study area
- A description of the regional context of Lismore and the local context and surrounds near the bridge
- Key transport networks and travel patterns
- Key population, housing and demographic indicators, based on a review of data from the *Australian Bureau of Statistics (ABS) 2016 Census, id The Population Experts* demographic resources, and Department of Planning and Environment for the selected SA1 areas, the Lismore UCL, the Lismore LGA and NSW
- A review of existing land uses in the study area including commercial, residential, riverside, tourist and recreational land uses
- Analysis of the local and regional economy, including gross regional product, industry, employment and income and nature of local business within the study area
- Review of social infrastructure, including open space and community services and facilities closest to the proposal
- Identification of existing community values, including those relating to lifestyle and amenity, neighbourhood and local character, local access, connectivity and community.

Consultation regarding the proposal has been documented and would be undertaken as outlined in Section 1.3. Key findings of the consultation have and would continue to inform the proposal, the potential impacts and required impact avoidance, minimisation or mitigation measures.

2.2.3. Assessment

The assessment has been informed by various reports and demographic data as outlined previously, a site inspection, consultation (undertaken and ongoing) by Roads and Maritime and by considering and understanding relevant research and literature. The assessment involved identifying, analysing and assessing the likely social and economic impacts or benefits of the proposal.

2.2.4. Management and mitigation measures

Specific management and mitigation measures have been developed to address the identified socio-economic impacts for this proposal.

3. Existing environment

3.1. Policy context

This Section provides the socio-economic policy context for the proposal. There are a number of strategic planning and policy documents with relevance to the proposal and its potential socio-economic impacts.

3.1.1. North Coast Regional Plan 2036

The North Coast Regional Plan 2036 applies to 12 North Coast councils including Lismore City Council. The Plan provides the strategic policy, planning and decision-making framework to guide the region to sustainable growth over the next 20 years. It contains goals and directions for achieving the vision for the North Coast to be the best region in Australia to live, work and play thanks to its spectacular environment and vibrant communities. The goals include:

- The most stunning environment in NSW
- A thriving, interconnected economy
- Vibrant and engaged communities
- Great housing choice and lifestyle options.

The proposal is consistent with the overall intent of the NCRP 2036. It supports an interconnected economy and community through important maintenance of a bridge asset that connects business and the community either side of Leycester Creek in the Lismore urban area.

3.1.2. Lismore Growth Management Strategy 2015-2035

The Lismore Growth Management Strategy is an urban, village and rural land release strategy released in May 2015. The strategy identifies Lismore's strategic urban road network with Union Street and Colemans Bridge forming part of the main road network. The network was developed as part of the *Strategic Road Review (2013)*. Union Street and Colemans Bridge provides an important link over Leycester Creek and the Wilsons River. This link provides connections between Lismore's existing business, industrial and recreational lands. The bridge also provides a key link between the Bruxner Highway and rural land/ villages to the north of Lismore (including North Lismore Plateau). Maintenance and longevity of the bridge asset is therefore important and consistent with the proposal.

3.1.3. Lismore Strategic Road Review (2013)

The Strategic Road Review is a 20-year plan that defines the road network required to support future population growth and maintain a suitable level of service. The strategic road network was developed under financial, social and environmental sustainability perspectives. Union Street and Colemans Bridge are part of Lismore's key main road network. The strategic road network is designed to maximise the efficiency of the existing network and provides a permeable network of route choice resulting in less traffic delays and greater network efficiency.

The Review also identifies a strategic need to provide two additional crossings of the Wilson River to the Central Business District (CBD); based on traffic demands regarding the combined capacity of the Wilson River bridges. This provides further weight for the maintenance of existing main roads waterway crossings including Colemans Bridge.

3.1.4. Lismore City Sustainable Economic Advantage 2020

The *Sustainable Economic Advantage* sets a strategic approach for economic development combining the community's stated environmental, social and cultural wants and needs around building sustainable livelihoods. The framework acknowledges local challenges and builds on core strengths and areas of competitive advantage. It is intended that the strategy also provides guidance and reference for council, business, industry and the community on economic development issues. The economic development strategy was compiled within the context of four economic development themes, including:

- Regional Centre, the heart of leadership and sustainability
- Investment readiness and entrepreneurialism
- Industry development, jobs and sustainable business
- Thriving people, places, economies and environments.

The proposal would indirectly support implementation of the strategy by ensuring the key strategic transport link associated with the river crossing and main road status is maintained and is viable into the future.

3.1.5. Imagine Lismore: Community Strategic Plan 2017-2027

The Imagine Lismore Community Strategic Plan 2017-2027 details the community's 10-year aspirations for Lismore and sets the scene for what the community wishes for its future. Issues and objectives that are relevant to the proposal include:

- Our community is connected and convenient
- Our city and village services are well managed and maintained.

The strengthening and maintenance of Colemans Bridge to ensure ongoing connectively and safe use aligns with these objectives.

3.2. Regional context

Colemans Bridge is located in the Lismore LGA which has a dispersed settlement pattern over an area of 1233 square kilometres. In addition to a number of small villages and rural localities, settlement is based around the City of Lismore, which is the primary focus of commercial, industrial, recreational, institutional and administrative activities.

Lismore is a regional centre providing shopping centres, health services, education (early childhood, primary, secondary, tertiary and trades), recreation facilities and regional government services. Many of Lismore's services are focused in and close to the CBD.

The Lismore area is strongly reliant on road transport, with a road system which radiates out from Lismore and includes the Bruxner Highway and Bangalow Road. The Bruxner Highway links Lismore with other regional cities including Ballina, Casino and Tenterfield and the highway also provides an eastern link to the Pacific Highway at Ballina. Bangalow Road provides a northern link between Lismore and the Pacific Highway and connects significant village settlements and townships including Bexhill, Clunes, Bangalow and Byron Bay.

Lismore is situated on the confluence of the Wilsons River and Leycester Creek. The bridge provides an important link for the crossing of both Leycester Creek and the Wilsons River and forms part of a permeable road network between Lismore's existing business, industrial and recreational lands. The bridge represents a key link between the Bruxner Highway and rural land/ villages to the north of Lismore (including North Lismore Plateau). Union Street and Colemans Bridge is identified as part of Lismore's strategic main road network within various council policy documents including the *Lismore Growth Management Strategy* and *Strategic Road Review*.

3.3. Environmental amenity

The landscape surrounding the Project SA1 study area and that immediate to the proposal is predominantly an urban context, comprising residential areas, the CBD, commercial/ business uses, industrial uses and recreational facilities/ open space. The landscape is relatively flat to gently undulating, with low-lying areas subject to periodic flooding. Vegetation is generally limited to along the edge of watercourses, recreational areas or ornamental street and garden trees.

The surrounding area presents a typical regional city setting within north-eastern NSW. Land immediately around Colemans Bridge is commercial and industrial, with residential also occurring nearby. Union Street is generally industrial in nature and supports various businesses. Leycester Creek and the Wilsons River provide for local amenity values.

3.4. Heritage

Colemans Bridge is listed under the NSW *Heritage Act 1977* and the Lismore Local Environmental Plan (LLEP) 2012 as State significant. The following is the statement of significance:

Colemans bridge was completed in 1908 and is an early example of Dare timber truss bridges. In 1998 it was in good condition.

As a timber truss road bridge, it has many associational links with important historical events, trends, and people, including the expansion of the road network and economic activity throughout NSW, and Harvey Dare, the designer of this type of truss. Dare trusses were fifth in the five stage design evolution of NSW timber truss road bridges. They were similar to Allan trusses, but contain improvements which make them stronger and easier to maintain. This engineering enhancement represents a significant evolution of the design of timber truss bridges, and gives Dare trusses some technical significance. Colemans bridge has particular technical significance, having iron piers, the only two-lane Dare truss, footways, and long spans. In 1998 there were 27 surviving Dare trusses in NSW of the 40 built, and 82 timber truss road bridges survive from the over 400 built. The Colemans bridge is a representative example of Dare timber truss road bridges, and is assessed as being Nationally significant, primarily on the basis of its technical and historical significance.

The area is in the vicinity of a watercourse. Aboriginal heritage can be associated/ found within such contexts. However, a search of the Aboriginal Heritage Information Management System (AHIMS) in February 2019 found no recorded items of Aboriginal heritage. Given the highly disturbed nature of the proposal footprint and surrounding landscape, it is unlikely that 'in situ' (original location) Aboriginal sites or objects would exist. The Roads and Maritime PACHCI undertaken for the proposal found that the proposal was unlikely to have an impact on Aboriginal cultural heritage.

3.5. Socio-economic profile

In order to better understand the composition and dynamics of Lismore and in particular the community around Colemans Bridge and the associated diversion route during works, including social, economic and lifestyle influences, a socio-economic and demographic analysis is undertaken.

This section describes the key socio-economic characteristics of the area including population, demographic, household and economic characteristics. Data is provided for the primary local study area based on an aggregate of SA1s that generally intersect the bridge and diversion route (the Project SA1). Data is also presented for the Lismore UCL, the LGA and State of NSW for a baseline and comparison.

Whilst ABS Census data for Lismore UCL provides a broader base of statistical information and comparison, more refined, local analysis of the areas likely to be directly affected by the works and bridge closure, including traffic diversion, was undertaken using .id, The Population Experts

Demographic Resources (which is also based on ABS data). The areas selected using the atlas.id for Lismore City were based on where the relevant SA1 areas in 2016 intersected with Colemans Bridge and the area of changed/ diverted traffic (namely the diversion from Colemans Bridge to Ballina Street Bridge – east and west of the river, and north of the river/ bridge and along the secondary detour route via Wilson Street). For the purposes of this report, the relevant SA1 areas that generally intersect with the area of works and traffic diversion are collectively referred to as the Project SA1. The Project SA1 comprises the following individual SAs:

- 1124816
- 1124817
- 1124818
- 1124822
- 1124835
- 1124838
- 1124839.

The information in this section provides a demographic overview of the Project SA1 forming the primary study area, compared to Lismore UCL as the broader inner urban area, the LGA as a whole and NSW (as a State and regional NSW where relevant/ data available). This helps provide indicators that highlight different aspects of the social and economic structure of the community, locality and region. In turn, it helps to identify the profile and composition of the local community and relative susceptibility to social impact resulting from the proposal. The relationship between these indicators can be complex. It is generally accepted that no single socio-economic factor can predict a person's or community's susceptibility to impact.

3.5.1. Population and age structure

In 2016, Lismore UCL had a population of 27,569 people. This population was made up of 14,424 females and 13,143 males. There were 6686 families in the locality with an average of 1.8 children in each family. The largest number of residents were in the 55 to 59 year bracket (seven per cent) followed by the 20 to 24 year bracket (seven per cent). This is compared to the broader Lismore LGA where the largest number of residents is also in the 55 to 59 year bracket (eight per cent). The Project SA1 had a population of 2611 in 2016.

Lismore UCL has a higher proportion of people 65 years and older (19 per cent) compared to Lismore LGA (18.2 per cent). Whereas the Project SA1 has a lower proportion of people of 65 years and over (13.19) per cent. This is compared with NSW which has 16.2 per cent of people aged 65 years and over.

The median age of the residents of Lismore UCL is 41, which is lower than the median age of 43 in the LGA. The Project SA1 represents an averaged median age of approximately 43 years.

Table 3-1 shows the population trend of Lismore UCL in comparison to the Lismore LGA, NSW, and the Project SA1 between 2011 and 2016. As can be identified from the table, Lismore UCL has grown at a slightly lower rate than the Lismore LGA for this period and significantly less than NSW. However there has been a modest decrease within the areas that represent the Project SA1.

Table 3-1 Population trend 2011-2016 (Source ABS)

Region	Population 2011	Population 2016	Change 2011-2016	Percentage change
Project SA1	2698	2611	-87	-3.2
Lismore UCL	27,474	27,569	95	0.35
Lismore LGA	42,766	43,135	369	0.85
New South Wales	6,917,658	7,480,228	562,570	8.1%

3.5.2. Cultural diversity

In 2016, the proportion of the population who were Aboriginal and/or Torres Strait Islander people made up 6.2 per cent of the population in the Lismore ULC, which was higher when compared with the proportion in the LGA (five per cent) and NSW (2.9 per cent). The Project SA1 area has an Aboriginal and/or Torres Strait Islander population of approximately 8.73 per cent (based on an average of the selected statistical areas), which is higher than the other statistical areas.

The most common non-English speaking background (NESB) groupings in Lismore UCL were Italian (0.7 per cent), followed by German and Mandarin (each 0.3 per cent). This is similar to the Lismore LGA with the most common NESB groupings being Italian (0.7 per cent), German (0.5 per cent), and French Spanish and Mandarin (each 0.2 per cent).

In 2016, households that identified that a non-English language is spoken in the Lismore ULC was 6.9 per cent. At a project scale, the Project SA1 shows that an average of 5.51 per cent of this population are from a non-English speaking country/background. However, only a small percentage of people in this area (0.79 per cent averaged across the aggregate SA1s that form the Project SA1) were recorded as not fluent in English.

3.5.3. Household family structure

Respectively, there were 12,269 and 19,022 private dwellings in the Lismore ULC and LGA in 2016, with an average household size of 2.3 and 2.4 people per household. This is comparable to the average people per household for NSW (2.6) and also the Project SA1 (average of 2.35).

In 2016, of the families in Lismore UCL, 37.3 per cent were couple families with children, 35 per cent were couple families without children and 25.9 per cent were one parent families, with the majority being female single parents (81.7 per cent). The proportion of couple family households in the LGA (37 per cent) was comparable, whereas one parent families were lower (21.7 per cent) and 39.8 per cent of people in the LGA were couple families without children.

The majority of NSW recorded couple families with children at 45.7 per cent, compared to couple families without children at 36.6 per cent and one parent families comprising 16 per cent. Single parents in NSW were also predominantly female (82.2 per cent).

The percentage of families with children across the Project SA1 varied between 7 per cent and 30 per cent amongst the individual SA1s, with the average for the Project SA1 being 16 per cent. The average one parent families with children across the Project SA1 was approximately 17.5 per cent. These proportions are lower than the Lismore UCL and LGA.

3.5.4. Education, workforce and occupation

In Lismore (Urban Centres and Localities 2016), 32.4 per cent of people were attending an educational institution. Of these, 24.9 per cent were in primary school, 19.3 per cent in secondary school and 22.7 per cent in a tertiary or technical institution. This is compared to 31.8 per cent and 31.1 per cent of people attending an educational institution in Lismore LGA and NSW respectively.

On average based on data presented by id. Social Atlas, the Project SA1 had a higher proportion of people who had not completed Year 11 or equivalent compared to the Lismore LGA (49.01 per cent to 45.2 per cent respectively). This is moderately higher than regional NSW (47.9 per cent) but notably higher than NSW overall (35.4 per cent).

In 2016, Lismore LGA and the Project SA1 had a labour force participation of 55.6 per cent and 50.5 per cent respectively. Unemployment rates were varied in the Project SA1 with an average of 15.87 per cent compared to 8.8 per cent in Lismore UCL. The labour force participation in the Project SA1 was lower than regional NSW (56.4 per cent) and NSW (59.7 per cent).

Youth (aged 15 to 24 years) unemployment in 2016 was 16.4 per cent for the LGA, compared to 13.6 per cent in NSW. Youth unemployment for the Project SA1 was recorded as an average of 23.2 per cent, being notably higher than other comparisons.

An outline of the workforce's occupation responses in the Lismore UCL in comparison to the LGA and NSW is provided in Table 3-2.

Table 3-2 Occupation 2016

Region	Lismore UCL (%)	Lismore LGA (%)	NSW (%)
Professionals	19.2	20.1	22.2
Community and Personal Service Workers	13.7	12.6	10.8
Technicians and Trades Workers	13.5	13	13.5
Labourers	13.5	12.4	9.5
Clerical and Administrative Workers	13.1	12.7	13.6
Sales Workers	11.7	10.6	9.4
Managers	8.5	11.6	13.0
Machinery Operators And Drivers	5.5	5.5	6.3

Source: ABS 2016 Census.

Based on available information (2016 Census data) the most common occupations included Professionals, Community and Personal Service Workers, Technicians and Trades Workers.

Industry is discussed in Section 3.6 of this report.

3.5.5. Income

Household income is one of the most important indicators of socio-economic status. Low income households refer to those receiving less than $650 per week (before tax in 2016). High income households refer to those receiving more than $2500 per week (before tax in 2016).

In 2016, the median weekly household income for Lismore UCL was $1011. This was marginally lower than the median weekly household income for the LGA, which was $1067, but considerably lower than the NSW average ($1486). For the Project SA1, the median weekly household income (averaged data provided by id. Social Atlas) was notably lower at $823.

3.5.6. Mortgage and rental stress

Mortgage stress is defined as per the NATSEM (National Centre for Social and Economic Modelling) model as households in the lowest 40 per cent of incomes who are paying more than 30 per cent of their usual gross weekly income on home loan repayments. Similarly rental stress, relates to households in the lowest 40 per cent of incomes who are paying more than 30 per cent of their usual gross weekly income on rent (id. 2019).

In 2016, 12.7 per cent of households in the LGA were experiencing mortgage stress compared to 9.8 per cent in regional NSW. Similarly, for the Project SA1 area, 11.5 per cent of households on average were experiencing mortgage stress.

In 2016, 39.9 and 40.6 per cent respectively of urban Lismore and the LGA were experiencing rental stress. Data for the Project SA1 was varied between individual SA1 areas, however on average rental stress was experienced by 41.7 per cent of households. These statistics for Lismore are all notably higher than the 32.5 per cent recorded for regional NSW.

3.5.7. Dwelling characteristics

Lismore UCL was recorded as having a higher proportion of occupied private dwellings in 2016 (92.2 per cent) compared with the LGA 91.4 per cent) and NSW (90.1 per cent). 92.5 per cent of dwellings were occupied in the Project SA1. The majority of dwellings in the Project SA1 area (83.6 per cent) and Lismore UCL were separate detached houses (76.6 per cent). The proportion recorded in the LGA was 82.8 per cent.

Approximately 32 per cent of homes were owned outright in the Lismore UCL, while 29.5 per cent owned their home with a mortgage and 34.7 per cent rented. A higher proportion of residents rent in Lismore UCL when compared with the LGA (28.9 per cent) and NSW (30.9 per cent). 30.2 per cent rent privately in the Project SA1, with an average of 2.26 per cent renting social housing.

3.5.8. Need for assistance and unpaid care

This population is defined as people in Lismore who need assistance in their day to day lives with any or all of the following activities – self-care, body movements or communication – because of a disability, long-term health condition, or old age (id. 2019).

In 2016, on average 6.2 per cent of the population in the Project SA1 reported needing assistance due to disability, similar to the 6.4 per cent recorded for the LGA and 6.2 per cent for regional NSW.

On average, 13.46 per cent of the population within the Project SA1 provided unpaid care to a person with a disability or old age. This is compared to 13.1 per cent within the Lismore UCL and LGA and 12.6 per cent in regional NSW.

On average, 23 per cent of the population within the Project SA1 provided unpaid child care. This was moderately lower compared to 26.4 per cent within the LGA and 27.1 per cent in regional NSW.

3.5.9. Socio-Economic Indexes for Areas (SEIFA)

The ABS has developed four indexes, known as Socio Economic Indexes for Areas (SEIFA), which provide an indication of the socio-economic conditions of people living in an area, relative to other areas. For each index, every geographic area in Australia is given a SEIFA number, which shows how disadvantaged that area is compared with other areas in Australia. Each index summarises a different aspect of the socio-economic conditions of people living in an area.

The Index of Relative Socio Economic Disadvantage is a general socio-economic index created using measures of relative disadvantage. It has been constructed so that relatively disadvantaged areas have low index values. It accounts for disadvantage within an area as it relates to income levels, degree of educational/ training attainment, unemployment, proportion of unskilled workers and variables that reflect disadvantage rather than measuring specific aspects of disadvantage (eg Indigenous and separated/ divorced). All areas are ordered from lowest to highest score, the lowest 10 per cent of areas are given a decile number of one and so on, up to the highest 10 per cent of areas, which are given a decile number of 10. A low score on this index indicates a higher proportion of relatively disadvantaged people in an area. For Statistical Areas Level 1 (SA1s) across Australia, the average (population weighted) SEIFA score on the index of disadvantage is 1000. Therefore areas with an index above 1000 are above the Australian average and so relatively less disadvantaged; while index figures below 1000 indicate areas of relatively greater disadvantage when compared to the nation (id. 2019).

In 2016, NSW had a SEIFA score of 1001, with regional NSW recorded 971. The Lismore LGA had a score of 954, meaning it had higher disadvantage than regional NSW on average.

Analysis of the areas likely to be directly affected by the works/ bridge closure, including traffic diversion, using .id Social Atlas, found that the Project SA1 had an averaged SEIFA index of disadvantage of 817. This means that this specific area was notably more disadvantaged than the LGA and regional NSW.

3.5.10. Internet access and digital communication

In terms of internet access, quantifying broadband access assists in gauging the extent to which people have embraced communication technology and the ability for communities to gain access to service and information delivery via electronic means. In 2016, the percentage of households with a broadband internet connection was 66.9 per cent when averaged across the Project SA1. This is less than 73.7 per cent of Lismore City's households that had an internet connection and 73.1 in Regional NSW.

3.5.11. Transport

In 2016, on average approximately 10.5 per cent of households in the Project SA1 (percentages varied between 4.5 to 14.3 across individual SA1s) did not have a private motor vehicle (car), compared to 35.9 per cent having two or more vehicles. The rate of vehicle ownership in the Project SA1 is lower compared to Lismore UCL where 8.7 per cent of households did not have a registered motor vehicle, and 6.5 per cent recorded across the LGA. This compares to regional NSW recording 5.8 per cent without a car.

According to the .id Social Atlas for 2016, within the Project SA1 70.5 per cent of people travelled to work by car, zero per cent travelled to work by public transport and on average 1.3 percent cycled, whereas 10.8 per cent on average walked to work.

Analysis of residents in Lismore UCL in 2016 shows the most common methods of travel to work for employed people were: 78.7 per cent used car (either as driver or as passenger) and four per cent walked. Other common responses were worked at home 3.2 per cent and truck 1.0 per cent. Only 0.8 per cent of employed people used public transport.

Based on this most people in the local area drive or walk to work.

3.5.12. Population and projections

In 2016 the Department of Planning and Environment (DP&E) released population projections for the State and LGAs. These projections show that population growth would be modest and by 2036 Lismore's population is projected to grow to 51,750. The projections indicate that Lismore's population growth rate will slowly decrease from 0.8 per cent in 2011-2016 to 0.4 per cent in 2031-2036 (refer to Table 3-3).

Table 3-3 Population projections Lismore 2011-2036

Year	Population	% Growth p.a.	Extra persons p.a.
2011	44,350	-	-
2016	46,200	0.8	1850
2021	47,850	0.7	1650
2026	49,350	0.6	1500
2031	50,700	0.5	2350
2036	51,750	0.4	1050

Source: NSW Dept. Planning and Environment 2016

3.6. Business and industry

In 2016 there were 12,171 people who reported being in the labour force in the week before Census night in Lismore UCL and 19,698 in the LGA. An analysis (id 2019a) of the jobs held by the local workers in the LGA in 2017/18 shows the three largest industries were:

- Health Care and Social Assistance (5442 people or 22.9 per cent)
- Education and training (2973 people or 12.5 per cent)
- Retail trade (2725 people or 11.5 per cent).

In combination these three industries accounted for 11,140 people in total or 47.0 per cent of the local workers.

In comparison, NSW employed 13.3 per cent in Health Care and Social Assistance; 9.1 per cent in Education and Training; and 10.0 per cent in Retail Trade.

Of the employed people in Lismore UCL, 6.3 per cent worked in Hospitals (except Psychiatric Hospitals). Other major industries of employment included Other Social Assistance Services 3.8 per cent, Aged Care Residential Services 3.4 per cent, Supermarket and Grocery Stores 3.4 per cent and Secondary Education 2.7 per cent.

In the Project SA1 based on 2016 data, 23.9 per cent of people were employed as professionals or managers. Approximately 11.6 per cent were employed as technicians or trade workers and 19.6 per cent were labourers. An average of 20.3 per cent were volunteers.

3.6.1. Gross regional product

The gross regional product (GRP) for Lismore City LGA was $2.14 billion at 30 June 2018, growing 3.2 per cent since the previous year. This was higher than the growth rate (1.9 per cent) of NSW for the same period. Lismore contributed 0.38 per cent to the GRP of NSW ($559.45 billion) in 2018 (id 2019a).

In the Lismore LGA, Rental, Hiring and Real Estate Services had the largest output by industry, generating $575 million (or 14.5 per cent) in 2017/18 (id 2019a). This was followed by Health Care and Social Assistance with $438.5 million (or 11 per cent) and then Manufacturing with $389.7 million (or 9.8 per cent). In combination these three industries accounted for $1404 million in total or 35.3 per cent of the total output by total industry in the Lismore LGA. In comparison, the same three industries in New South Wales accounted for 14.0 per cent in Rental, Hiring and Real Estate Services; 4.1 per cent in Health Care and Social Assistance; and 9.1 per cent in Manufacturing.

Output by industry sector in 2017/18 is shown in Figure 3-1 and change in output by industry is shown in Figure 3-2.

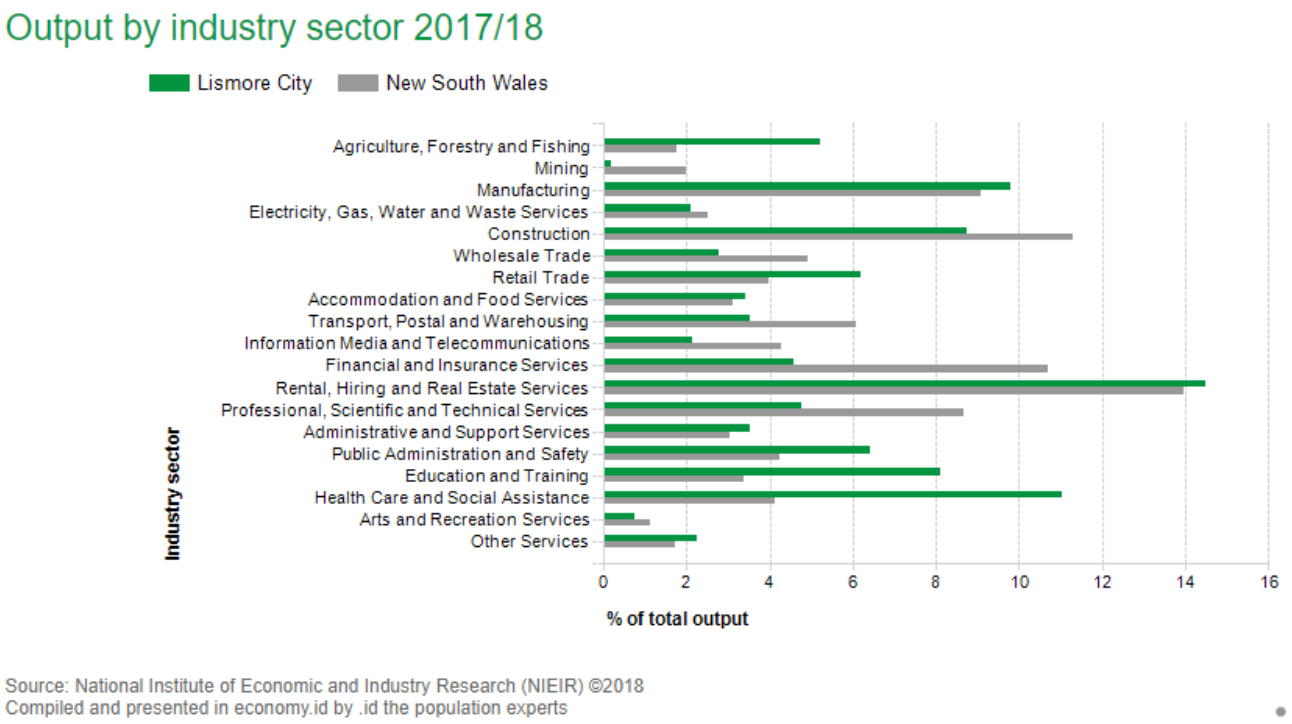


Figure 3-1 Output by Industry, 2017-2018 (% of total output)

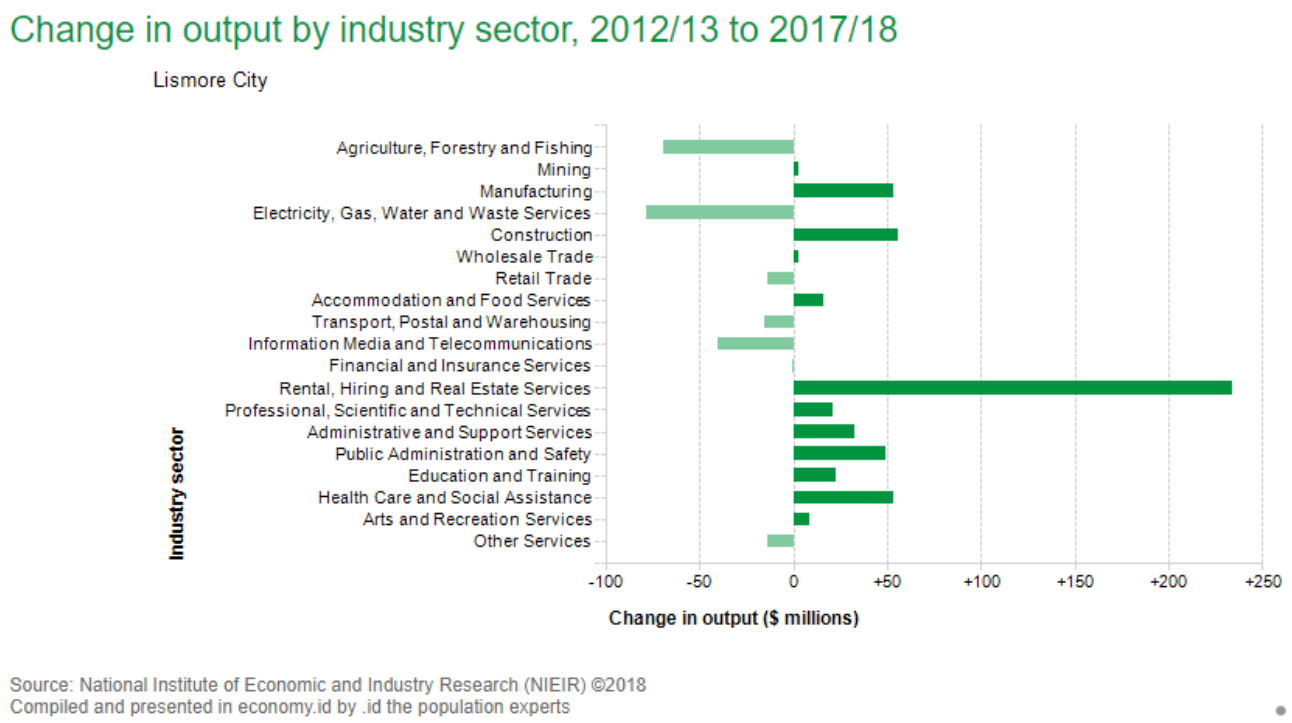


Figure 3-2 Change in output by sector from 2012/13 to 2017/18

3.6.2. Rental, hiring and real estate

The largest change in the output by industries between 2012/13 and 2017/18 sector in terms of output was Rental, Hiring and Real Estate Services (+$234 million). This sector accounts for 14.5 per cent of economic output. Despite the large growth and output, this industry only employs 1.8 per cent (full-time equivalent (FTE)) (id. 2019a).

3.6.3. Health and education

A major difference between output by industries in the Lismore LGA and NSW includes a larger percentage of output by Health Care and Social Assistance (11 per cent compared to 4.1 per cent) and Education and Training (8.1 per cent compared to 3.4 per cent). Health Care and Social Assistance are by far the largest employer in the LGA (20.5 per cent FTE). This is nearly double the NSW rate of 11.4 per cent (id. 2019a).

The Health Care and Social Assistance is the most productive industry in Lismore LGA, generating $334 million in 2017/18 (id. 2019a).

3.6.4. Agriculture

Agriculture, forestry and fishing contributed $207 million to the Lismore economy in 2017/18 and traditional agricultural industries, such as timber and wood products, sugarcane, dairying and cattle farming remain important, however this industry has reduced in output between 2012/13 and 2017/18 in the order of -$69 million. Traditional sources and agricultural products are being augmented by emerging industries such as coffee, tea tree, berry fruit, stone fruit and macadamias (LSC 2013).

3.6.5. Retail

The retail sector is a major contributor to the regional economy and a major employer. Lismore is identified as a major regional centre in the North Coast Regional Plan 2036 and is to be the focus of settlement. The strategy expects that Lismore would take the majority of future commercial development in the Lismore LGA as it has greatest capacity for redevelopment.

As a major regional centre, it attracts shoppers from a wide area. There are three main shopping centres in Lismore:

- Lismore Shopping Square is the Northern River's biggest shopping centre. The Lismore Shopping Square is fully air conditioned and has over 75 specialty retailers and four major stores.
- The Goonellabah Centre has been recently opened and is set on approximately four acres and contains parking for 250 cars mostly under shade sail for protection. Retailers include a modern high-tech Woolworths, Dollars and Sense, Petrol station, McDonalds and gym.
- Lismore Central is located in the centre of Lismore. It caters for most shopping needs with a full sized Woolworths Supermarket, Rivers, Homeart, Chemist and a host of specialty stores dealing in fashion, take away food, cafe's, pet needs, a fruit and vegetable shop and a butchers. Lismore Central has been established in the city for over 25 years.

The retail sector provided the second largest employment sector at the time of 2011 census, however based on 2016 data this industry is now third with 9.7 per cent FTE (id. 2019a).

3.7. Existing land uses

This section describes the existing land uses in Lismore LGA and within the study area.

3.7.1. Lismore LGA

The Lismore LGA comprises an area of 1,267 square kilometres encompassing the major city of Lismore and many more towns and villages and rural, mountain and forested environments. The community predominantly lives in the urban area (around 65 per cent) while around eight per cent live in villages and the remainder live in rural residential estates, small rural communities and on farms. Lismore's villages, ‘hamlets’ and rural communities were settled for a range of historical reasons and vary in population and facilities, but all have a unique and strong sense of community (LSC 2015).

Outside of the main city area, farming dominates the landscape. Farming provides not only a way of life for many but is a notable contributor to the local and regional economy and helps maintain the landscape and green spaces the community values so highly. These green spaces also support an incredible diversity of flora and fauna.

As a regional centre, Lismore provides shopping centres, excellent health services, education and recreation facilities, regional government services and a diversity of urban, village and rural living choices. Many of Lismore's services are focused in and close to the CBD, which represents the commercial, recreation and social heart of Lismore.

3.7.2. The site and surrounds

The proposal is located on land that is covered by the LLEP 2012. The site comprises the following zones:

- RE1 Public Recreation (site compound/stockpile site and part bridge)
- W2 Recreational Waterway (bridge and surrounds)
- IN1 General Industrial (bridge approach and surrounds).

The study area and main area to be affected by a detour route and potentially temporarily by-passed (along Union Street) comprises IN1 General Industrial, R2 Low Density Residential and B1 Neighbourhood Centre (business) land use zones.

The zone objectives for each of these zones are:

Zone RE1 Public Recreation

- *To enable land to be used for public open space or recreational purposes*
- *To provide a range of recreational settings and activities and compatible land uses*
- *To protect and enhance the natural environment for recreational purposes*
- *To ensure the community has adequate access to open space to meet the needs of all residents and improve amenity and quality of life.*

W2 Recreational Waterway

- *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*
- *To provide for activities that are compatible with, and complement, the scenic and ecological qualities of the waterway.*

Zone IN1 General Industrial

- *To provide a wide range of industrial and warehouse land uses*
- *To encourage employment opportunities*
- *To minimise any adverse effect of industry on other land uses*
- *To support and protect industrial land for industrial uses*
- *To ensure that development does not adversely affect the flooding characteristics of the area or increase the hazard of flooding on adjoining land.*

Zone R2 Low Density Residential

- *To provide for the housing needs of the community within a low density residential environment*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents*
- *To limit the density of residential development to ensure that development is compatible with the flood hazard associated with the land.*

Zone B1 Neighbourhood Centre

- *To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood*
- *To ensure that development is of an appropriate scale and is compatible with the character of the surrounding neighbourhood.*

Land uses around the site include:

- The waterbodies of Leycester Creek and Wilsons River and adjoining riparian areas
- Commercial and industrial businesses
- Low density residential development
- Recreational land/ public open space
- Car parking areas
- Urban infrastructure.

More specifically, there are a number of land uses, including residential and local businesses in the vicinity of Colemans Bridge and along the diversion route (including Union Street) to the Ballina Street Bridge. These include:

- Immediately north-north-east of Colemans Bridge is a B1 Zone – Neighbourhood Centre, which accommodates local business, including the former Winsome Hotel (now known and operated as the Winsome and Lismore Soup Kitchen), automotive repairs, some retail shops and services, and private recreation in the form of a roller-skating rink. West of this zone is a low density residential area of North Lismore.
- Immediately west and south-west of Colemans Bridge is the IN1 - General Industrial Zone which accommodates local business, including a number of automotive repairs/ service centres, rural/ feeling supplies, and a community centre. This industrial zoning extends in a south-west direction along Union Road to the locality of the Ballina Street Bridge and is traversed by the railway line and Lismore Train Station. On the northwest side of Union Road is a B1 Zone – Neighbourhood Centre which supports various local and small businesses.
- South-east of Colemans Bridge, on the opposite side of the river is the CBD area of Lismore City, being the B3 – Commercial Core Zone. This area hosts a variety of development and land uses which provides access to goods, services, leisure and entertainment for the local community.

No schools are within the immediate vicinity of the proposal or directly along the proposed main diversion route. The nearest schools include:

- Richmond River High School – located approximately 750 m north of Colemans Bridge
- St Carthage's Primary School – located approximately 950 m north-east of Colemans Bridge
- Lismore South Public School – located approximately 1.3 km south-west of Colemans Bridge
- Our Lady Help of Christians Parish School – located approximately 1.45 km south-west of Colemans Bridge.

Lismore Parish Centre Preschool is located approximately 550 m east of Colemans Bridge.

3.8. Social infrastructure

Social infrastructure generally includes:

- Education facilities
- Health, emergency and aged care services
- Sport, recreation, and cultural and civic facilities
- Community support services
- Transport facilities, including key roads, pedestrian and cycle networks, public transport facilities and school bus routes.

Social infrastructure is generally concentrated around the main urban centre of Lismore and surrounding urban areas, with limited presence in the immediate locality; however, that which exists in the immediate area includes:

- Schools (mentioned above) in the broader urban area within 550 m to 1.3 km of Colemans Bridge
- General open space along the river edge and nearby sporting clubs (Italo-Australian Sports and Recreation Club 350 m west of Colemans Bridge (north of Leycester Creek) and the South Lismore Bowling Club 1.2 km to the west of Colemans Bridge
- The Winsome and Lismore Soup Kitchen (former Winsome Hotel) located directly north-east of Colemans Bridge. It serves meals to people doing it tough and provides low cost accommodation for those seeking pathways out of homelessness
- Lismore train station 800 m south-west of Colemans Bridge along Union Road
- The surrounding roads support school bus routes and public transport via bus services. According to Northern Rivers Buslines town services map and consultation with four local bus service providers, no bus routes directly use Colemans Bridge.

3.9. Access and connectivity

The project is situated near the confluence of the Wilsons River and Leycester Creek. Colemans Bridge provides an important link for the crossing of both Leycester Creek and the Wilsons River and forms part of a permeable road network between Lismore's existing business, industrial and recreational lands. The bridge provides a route for cars, heavy vehicles, pedestrians, cyclists and school buses and represents a key link between the Bruxner Highway and rural land/ villages to the north of Lismore (including North Lismore Plateau). Union Street and Colemans Bridge is identified as part of Lismore's strategic main road network within various council policy documents including the *Lismore Growth Management Strategy* and *Strategic Road Review*.

Given the size and function of Lismore as a regional city, there are a full range of transport services that utilise the street network, including Colemans Bridge. These include a range of trucks (including long haulage trucks), cars, buses, taxis, bicycles and pedestrians. Over 75 per cent of work trips by residents in the Lismore LGA are by private vehicle either as a driver or passenger. Similarly, a high percentage of tourism trips are by car (ABS 2018).

A review of the Northern Rivers Buslines services map for Lismore City found that no public bus routes directly use Colemans Bridge. Consultation with four local bus service providers confirmed that no bus routes (public transport or school) directly use Colemans Bridge. Other bus operators exist in the region; however, they generally service outer areas for school related transport.

A sign at the intersection of Bridge Street and Coleman Bridge indicates that Colemans Bridge is part of the route from Lismore North to access the Lismore Regional Airport (located approximately 3.8 km south of Colemans bridge). An alternative river crossing for North Lismore exists at the Robert White

Bridge, along Wilson Street. This provides a three kilometre diversion to connect back to Union Road, on the southern side of Colemans Bridge.

Site investigations indicate that there is no formal vehicle or pedestrian access to either side of the bridge due to steep terrain. The subject section of Leycester Creek would be used infrequently for water-based recreation including boating/ canoeing/ kayaking. The river channel below the bridge is not expected to be restricted as works are more than likely not to be in or undertaken from the river. If work is required from or in the river Roads and Maritime will have controls and buoys in place that will keep the channel open for any waterway traffic. The channel will more than likely be fully open after hours of construction to ensure the safe operation of the waterway.

3.10. Recreational facilities

Lismore City Council undertook an investigation of its Sport and Recreation facilities as part of the preparation of a Shire wide Sport and Recreation Plan 2011-2021 (LSC 2011). The main findings of the report include:

- Lismore's centrally located playing fields and regional standard sporting facilities position the city well to host regional and higher-level sporting tournaments and championships
- There is strong community support for maintaining and developing facilities to continue Lismore's competitive advantage as a regional sporting hub for northern NSW
- Lismore's main sporting facility, Lismore Park is a major asset to the region for sport; however, there are opportunities to increase the recreational value to the broader community of this park
- The majority of sports in Lismore are well catered for and this view was supported by the community
- There is generally a more than adequate supply of land for sport
- There is strong community demand for more/ better connected/ better maintained/ better lit walk/ cycle paths in the Lismore LGA
- There are a number of small 'pocket parks' in Lismore that have limited value for recreation purposes as they are too small to accommodate a range of uses, equipment and play experiences and their proliferation is less functional from a maintenance perspective
- There is a desire for better parks – eg more playgrounds, BBQ's, shelters, shade and better maintenance
- Some parks need master planning to best position them to meet community needs. Others require further assessment of the viability of major upgrades
- The river and surrounds are underutilised for recreation purposes.

The proposed site compound will be located east of Colemans Bridge on an area of public open space that also boarders the Wilsons River to the south-east. This area of open space is un-named and forms informal public open space. It does not accommodate any community facilities or equipment, but rather is an open grassed area of land along the banks of the Wilsons River, with trees along the river edge. Its recreation value would be low and it does not support formal types of recreation. Whilst some informal recreation activities (such as walking) could be supported by this area, there are no formal paths and the useable area is restrained in size. This area of public open space would generally fall into the above category of a small 'pocket park' with limited recreation value, however the open space and tree lined river bank would provide for general amenity.

Nearby sporting clubs include Italo-Australian Sports and Recreation Club 350 m west of Colemans Bridge (north of Leycester Creek) and the South Lismore Bowling Club 1.2 km to the west. These clubs would not be directly impacted but patrons may need to utilise the detours during bridge closure.

3.11. Community values

In 2013 Lismore City Council prepared a 10-year plan to transition Lismore to financially, philosophically and practically align Council's goals and actions with the community's vision for their places. This plan was updated in 2017 and is called *Imagine Lismore: Community Strategic Plan 2017-2027*. The plan contains a detailed description of the community values, informed by a community satisfaction survey and community consultation. A summary of which is provided below.

Key matters that are important to the community include:

- Maintaining sealed and unsealed roads
- Consulting with the community
- Council responsiveness to community needs
- Encouraging new business
- Stormwater management
- Quality of CBD and public spaces
- Encouraging tourism
- Crime prevention
- Overall health of the Wilsons River
- Relationships with Indigenous residents
- Land use planning
- Affordable housing.

Using the feedback from the community consultation, the Council through the Imagine Lismore plan developed five key priority areas that encompassed the community aspirations and objectives, including:

- An inclusive and healthy community
- A prosperous and vibrant city
- Our natural environment
- Our built environment
- Leadership and governance.

3.12. Implications for the socio-economic assessment

Key findings from the social and demographic analysis include:

- The Project SA1 has a higher proportion of people who have not completed Year 11 or equivalent compared to the Lismore LGA and NSW overall
- Unemployment rates were varied in the Project SA1 with an average of 15.87 per cent which was high compared to the Lismore UCL. Youth (aged 15 to 24 years) unemployment in 2016 in the Project SA1 (recorded as an average of 23.2 per cent) was also notably higher than other comparisons
- The Project SA1 population has a higher proportion of Aboriginal and/or Torres Strait Islanders compared to the LGA and NSW
- There is high car dependence and most people in the local area drive to work. However, the rate of vehicle ownership in the Project SA1 is lower compared to Lismore UCL. A notable proportion of people in the Project SA1 (10.8 per cent on average) also walk to work
- Only a very small percentage (0.79 per cent) of people in the Project SA1 were recorded as not fluent in English

- For the Project SA1, the median weekly household income was notably lower than other baselines
- The SEIFA index for the Project SA1 shows areas in the Project SA1 are more disadvantaged than the LGA and regional NSW
- Broadband internet access is not universal in the Project SA1 and lower than in Lismore LGA and regional NSW
- Health Care and Social Assistance was the largest employer of local workers in Lismore
- There are socially disadvantaged and potentially vulnerable (homeless) people in the vicinity of the bridge
- Opposite the bridge is a premises (Winsome and Lismore Soup Kitchen) that provides meals and accommodation to those in need
- Colemans bridge is a key road link/ river crossing and the road network is highly valued community asset.

4. Socio-economic impact assessment

4.1. Introduction

A preliminary scoping assessment of the proposal has concluded there may be social and economic impacts to the local community from the proposal. This socio-economic impact assessment has been prepared to address all likely impacts, including:

- Local access and connectivity
- Local business
- Tourism
- Local amenity
- Property and land use
- Social and recreational infrastructure
- Population and employment
- Distribution of social impact and housing affordability
- Community health and safety
- Community values
- Cultural values
- Cumulative impacts.

This section examines the social and economic impacts of the proposal, both during the construction phase and the operational phase of the proposal.

4.2. Impacts on access and connectivity

The proposal has the potential to impact on access and connectivity for road users, including private and heavy vehicles, emergency services, and pedestrians and cyclists. The proposal also has the potential to impact access and connectivity for some users of community and social activities, local businesses and residents during the period of construction when the bridge is closed.

Work that reduces the number of connections from an area or imposes barriers that make established patterns of travel more difficult present a potential negative impact on access for the community. The occasional closure of Colemans Bridge on some weekends and occasional Mondays following weekend closures would create some inconveniences for residents, local businesses, road users and transport providers however these should be minor. Closures of Colemans Bridge would restrict traffic between Union Street and the Lismore CBD/ North Lismore, however pedestrian and cyclist access is proposed to be maintained via at least one of the bridge's walkways at any one time remaining open during the works. The closure to general traffic has the potential to present more impact to less financially advantaged residents in the local area.

Occasional closures of Colemans Bridge will require diversions, with the main detour route being the use of the Ballina Street Bridge to the south, which provides direct access to and from the Lismore CBD, as well as a link to Fawcett Bridge and Bridge Road (that is intersected by Colemans Bridge). The length of the detour from one side of Colemans Bridge to the other is approximately 2.8 km. A secondary detour route, in the order of approximately 3.7 km, is also possible via Robert White Bridge, along Wilson Street. Despite these distances, the length of detour would vary depending on the travel origin and destination. Ultimately the worst-case diversion distance is not significant for those with private vehicle access and would generally result in inconvenience, requiring minor additional travel time and associated travel/ fuel costs.

Those most affected by the connectivity/ access change would be residents and business located along the north-east section of Union Street, as from this locality, the use of Colemans Bridge provides the shortest route to the Lismore CBD and North Lismore. The main impact experienced would be additional (albeit minor) travel times and distance, along with associated inconvenience for vehicle-based road users. Whilst some impacts would be experience, road users will generally tolerate short-term impacts and inconvenience, provided they are given adequate notice of closures and information regarding the works and detour routes. Given the distances involved, the impact is not considered significant, however the level of impact caused by a potential detour would be greater for pedestrians and cyclists and therefore pedestrian access (via at least one walkway) will be maintained and open to the public during works.

As will also be discussed later in this report with regard to the disadvantaged, without use of a private car, the walking distance from the residential locality along Union Street (eastern end) to the edge of the CBD (intersection of Bridge and Molesworth Streets) via Colemans Bridge is approximately 550-650 m (or seven to eight minutes). During any closure of Colemans Bridge that also affects pedestrian access, the approximate walking distance to the edge of the CBD via the Ballina Street Bridge (intersection of Bruxner Highway and Molesworth Street) would be in the order of 1.5 km (or 20 minutes). From here, dependant on a person's destination within the CBD or surrounds, the distance would vary. For example, accessing the north part of the CBD (Woodlark Street) would involve a 2.5 km walk from the west side of Colemans Bridge. This distance is not expected to be prohibitive for most, however it is up to approximately four to five times the normal distance, compared to using Colemans Bridge.

To mitigate the potential impact to pedestrians and cyclists at least one of the Bridge's walkways would remain open for use at any one time. If closure of the Bridge included walkways, based on the worst-case scenario it would take approximately 35 minutes (up to approximately 2.8 km) to walk the proposed detour route via Ballina Street Bridge and gain access to the opposite side of Colemans Bridge. This would be medium to high level of inconvenience. However, given Lismore's relatively high private vehicle dependence and the temporary closure timeframe, this is not expected to be a significant impact and public bus transport services the local area. Furthermore, this impact is not expected to eventuate as Roads and Maritime would maintain access to and use of one of the Bridge's walkways during works for pedestrian connectivity.

As part of the communication/ consultation process to the public and affected stakeholders, Roads and Maritime should provide information regarding alternative transport modes in the local area, along with approximate additional travel times to help inform affected persons and so they can more effectively plan their journey. This should include information about local bus services. Importantly, Northern Rivers Buslines has a route (no. 684 – Lismore Loop) which services the nearby affected area, and it does not rely on the use of Colemans Bridge and can assist in supporting those without private vehicles and where walking is not a feasible option. This route operates Monday to Saturday, with a number of services throughout the day.

Emergency services are generally regarded with high community value and play a critical role in the community. The temporary closure of the bridge could also affect the route emergency services take when responding to an incident, depending on their origin and destination. This may also affect emergency response times if they are unable to use what would normally be the most direct route. Nonetheless, the detour available is not significant and would maintain access to the local surrounding communities. Emergency services would be consulted to ensure any impacts and use of the detour is appropriately planned for and managed.

Occasional closures of the bridge would also reduce the number of waterway crossings and access within Lismore leading up to or during flood events. Whilst such access would likely be affected/ restricted by large floods irrespective of the bridge works/ closure, reduced bridge access could influence evacuation routes during high rainfall and flood warnings. Nonetheless, two alternative

accesses are available via short detours and notification of the works and any closure periods would ensure the community is informed about the works and available detours.

As discussed in further detail in the following sections of this report, there would be some businesses and residential areas temporarily bypassed during bridge closure and detours. Whilst there may be some impacts and inconvenience, the short duration of bridge closures and the length of the available detours providing alternative access are not considered to be significant or prohibitive. With appropriate notification and consultation with affected stakeholders, impacts should be able to be minimised or satisfactorily managed. Consideration needs to be given to those businesses who could be temporarily bypassed and the influence on revenue potential, as well as changes to access for customers and also service vehicles (eg delivers). Generally short-term impacts, that are well communicated and managed, can be tolerated. It is also likely that mainly of the local business receive regular trade from repeat or pre-planned business, compared to trade generated by opportunistic passers-by.

Some increased traffic volumes and intersection/ roundabout wait times could occur along the detour route when active. This is most likely to occur at peak times related to business and or school times, however the extent of likely impacts are not expected to be significant and would be in the order of short delays and inconvenience. With appropriate advanced notice and warning signage, affected parties can take these matters into account and plan this into their trips. Traffic and parking are discussed further later in this report.

The occasional bridge closures would occur throughout the construction period of approximately eight months. Upon completion of the works and reopening of the bridge, connectivity and access conditions would be restored. The works however would improve the longevity and future use of the bridge, and therefore result in a long-term positive outcome for the maintenance of access and connectivity of this river crossing. Upon completion of the works and bridge reopening, any socio-economic impacts experienced during the closure, would be removed and there are no anticipated long-term adverse socio-economic impacts associated with the proposal.

The sensitivity of the community to access and connectivity is moderate due to the dependence of locals on their vehicles, local roads and easy access to the CBD and surrounding services. The magnitude of impacts is considered to be low due to the short duration of impact and the availability of two relatively short detour routes, availability of public transport and retention of pedestrian access over the bridge. Overall, the level of significance of impacts on access and connectivity during construction is considered to be moderate-low.

4.3. Impact on local business, industry and economy

There are no local businesses that would be directly affected by the footprint of the proposal. Local businesses however would be affected by closures of the bridge on some weekends and occasional Mondays following a weekend closure. These closures would cause temporary inconvenience and reduce transport links across Leycester Creek and potentially increasing traffic across Robert White Bridge and Ballina Street Bridge, however the proposal does not completely sever access or result in long-term bypassing. Subsequent effects of the temporary bridge closure and detours on business and local economic activity can relate to reduced efficiency, increased travel time, fuel costs and the need for additional logistics planning or resourcing.

The industrial area immediately west and south-west of Colemans Bridge, along Union Street, is the area of local businesses most likely to be affected by the temporary closure of Colemans Bridge and associated detour(s). This is because, without the connection over Colemans Bridge, the approximate 650 m long north-eastern section of Union Street which links to Colemans Bridge could be by-passed by normal traversing traffic. Whilst this could affect opportunistic or ‘drop-in’ trade, the impact is not expected to be significant due to the temporary timeframe and given the specific role of these businesses in a regional area which would remain accessible via modest detours. This is because it is likely that locals would still seek out and attend these businesses for specific goods/ services and

access along the south-western section of Union Street (that also connects to the Bruxner highway) would remain open. The length of detour is limited to a few kilometres, which would only add a minor amount of additional travel time.

Some businesses at the north-east end of Union Street (between the railway overpass and Colemans Bridge), including a local heavy vehicle repairer, could be further impacted if high vehicles cannot access these services due to the closure of Colemans Bridge and given a railway overpass crosses Union Street (150 m south-west of Coleman Bridge) with a low clearance of 3.4 m. However, there is an adjacent detour for high vehicles off Union Street via Frank Street with a clearance height of 4.5 m that can be used in instances where the clearance on Union Street is too low. Nonetheless, these businesses should be consulted to ensure the closure would not unreasonably restrict access by large/ high vehicles and they should be notified in advance of the bridge closure.

Businesses located north-north-east of Colemans Bridge, including the Winsome and Lismore Soup Kitchen, automotive repairs, retail shops and services, and private recreation facility (skating facility) may experience some changes to traversing traffic due to the closure of Colemans Bridge. However, the main nearby link to the CBD will remain accessible, as well as use of Robert White Bridge (located 1.3 km to the west). Whilst some traffic from South Lismore would be diverted from using Colemans Bridge during the closure, it is probable that a proportion of traffic from this locality typically use the Ballina Street Bridge for CBD access. These businesses would continue to service and receive trade from those within the North Lismore locality and the diversion is not expected to have a significant adverse impact as the detours are modest and provide for access.

Nonetheless, consideration needs to be given to those businesses who could effectively be temporarily bypassed or experience access changes, as this could influence revenue potential, as well as result in changes to access for customers and also service vehicles (eg delivers and high vehicles). It is generally accepted that suitable planning and appropriate notice would enable affected businesses to adapt to the short-term change, which would occur only when the bridge is closed. The proposal does not sever access completely. Detours are available and maintain access.

South-east of Colemans Bridge, on the opposite side of the river is the CBD of Lismore City. This area would likely experience some increase in traffic during closure of Colemans bridge and implementation of the relevant detour(s). Molesworth Street is likely to experience this the most, as it provides the shortest and most direct connection between the Ballina Street Bridge and Fawcett Bridge (adjacent to Colemans Bridge), providing for access to the east or west side of Wilsons River. Other than some additional traffic and possible short increased delays at intersections, the detour is not anticipated to adversely affect business in this area. On the contrary, additional traversing traffic has the potential to result in additional use of goods and services along the detour routes or within the CBD.

On this basis, and given the analysis provided in Section 4.2 regarding access and connectivity, while there would be disruption to the normal road network, businesses are expected to continue to service and receive trade within the locality, including tourist facilities (see Section 4.4 regarding tourism). The diversion would cause impacts and require adaptation and advanced planning, yet the scale of impact is not expected to significant and can be managed.

With a minor increase in workers in the area during the construction phase, there may be an increase in demand for local goods and services and associated economic stimulus.

Upon completion of the works, the local road network would operate as normal and no long-term impact to business or the local economy is predicted.

The sensitivity of local business, industry and economy are considered to be moderate. The magnitude of impacts is considered to be low, due to the temporary impacts during construction and the availability of effective detours during the bridge closure. The level of significance of impacts is moderate-low.

4.4. Tourism

As outlined previously, the proposal would impact access and change local connectivity during occasional closures of Colemans bridge. While this may alter the route taken to access a tourist facility or business (eg accommodation or attraction), these places would still be readily accessible via the detours. This would ensure that tourism places and businesses remain accessible. While some inconvenience could be experienced, it is not expected to be significant. People planning to visit a particular place would continue to be able to readily access it.

The sensitivity of tourist sites in the area is considered to be low. The magnitude of the impacts is considered to be low due to the short-term nature of the impacts and availability of short detours. The level of significance of impacts on tourism is low.

4.5. Impacts on local amenity

Some minor amenity related impacts to adjoining and surrounding properties are possible during the proposal. These could include and have been comprehensively addressed in the REF:

- Noise and vibration (refer to Section 5.5 of REF)
- Air quality (refer to Section 5.10 of REF)
- Visual impacts (refer to Section 5.8 of REF)
- Traffic and parking (refer to Section 5.4 of REF).

4.5.1. Noise and vibration

Construction noise and vibration impacts have been assessed by a qualified noise consultant as part of the REF (refer to Section 5.5 of REF). The proposal is for the maintenance and strengthening of the existing bridge and would not vary noise associated with the bridge's operation. Therefore, no increase in operational traffic noise levels is predicted. Construction works associated with the proposal will result in construction activities in close proximity to residential and commercial receivers. Based on the Noise and Vibration Assessment, construction noise levels at sensitive receivers have been predicted for a number of typical construction scenarios, and in a number of instances, are likely to exceed the established noise management levels. Noise levels are not predicted to exceed the highly affected level of 75 dBA at nearby residences. Mitigation measures outlined in the Noise and Vibration Assessment and REF for the works will need to be implemented and incorporated into the project construction environmental management plan (CEMP). No significant vibration emitting plant is anticipated to be required and therefore negligible impacts are expected.

Closures of the bridge on some weekends and occasionally on Mondays following a weekend closure will require detours and would result in some additional traffic utilising local roads, including the Ballina Street Bridge. The roads most likely to experience changed and increased traffic volumes include Union Street, the Bruxner Highway and Ballina Street Bridge, Molesworth Street, as well as Terania and Wilson Streets. Whilst there would be an increase, the volume of additional traffic using the detour routes is not expected to be significant and would be primarily confined to local traffic movements. Hence, some increased traffic noise may subsequently occur, however this is not expected to be significant or exceed the reasonable operational capacity of the local road network.

The sensitivity of the nearby sensitive receivers to noise associated with the bridge works is considered to be high given some noise management levels would be exceeded. The magnitude of the impacts is considered to be low to moderate due to the short-term nature of the impacts and no significant night works are proposed. The level of significance of impacts associated with noise is moderate and management measures as detailed in the Noise and Vibration Assessment, REF and this socio-economic impact assessment would be implemented.

4.5.2. Air quality

There would be some potential air quality impacts for the proposal from construction works including exposure of soil (dust) and operation of plant and equipment. Mitigation measures as part of the REF addressing air quality would be prepared and implemented as part of the project CEMP

As discussed previously, some additional traffic would be experienced on local roads, particularly around the immediate detour routes. This however is not expected to be significant and is unlikely to result in any notable change in air quality based on vehicle emissions.

The sensitivity of the community to air quality impacts is low during the construction phase as the works are unlikely to notably impact air quality and potential risks can be managed. The magnitude of impacts is also considered to be low due to the temporary duration. Overall, the level of significance of impacts on air quality would be low.

4.5.3. Visual impacts

The aesthetic qualities or value of the locality are not expected to be adversely impacted by the Proposal. Some minor visual amenity impacts could result, including the presence of the works and establishment/ use of the site compound on adjacent public land, however this would be temporary and the character of the general area would remain the same post-construction and no significant visual impact is expected.

The sensitivity of the community to visual impacts associated with construction is low to moderate due to the visual presence of site compounds, structures, machinery and staff located around the site and within an urban area. The magnitude of impacts is considered to be moderate due to the clearly visible yet temporary nature of the impact. Overall, the level of significance of visual impacts would be moderate.

4.5.4. Traffic and parking

Occasional closure of Colemans Bridge will require detours, with the main detour route being the use of the Ballina Street Bridge to the south, which provides direct access to and from the Lismore CBD, as well as a link to Fawcett Bridge and Bridge Road (that is intersected by the Colemans Bridge). A secondary route is available via Robert White Bridge.

This would result in additional traffic utilising local roads. The roads most likely to experience changed and increased traffic volumes include Union Street, the Bruxner Highway, Ballina Street Bridge, Molesworth Street, Wilson and Terania Streets. Whilst there would be an increase, the volume of additional traffic using the detours is not expected to be significant and would primarily be confined to local traffic movements.

Some increased wait times at local intersections and roundabouts are likely; notably for traffic accessing the Bruxner Highway and Ballina Street Bridge at peak times. However, given the limited distance of the diversion and number of properties that front Union Street directly, as well as the temporary period of the closure, such impacts are not expected to be significant or unreasonable.

Some increased traffic volume may also be experienced through the Lismore CBD along Molesworth Street. This too may result in some minor traffic delays; however, this is not anticipated to be unreasonable.

Given the locality of the works and nature of the detour, no unreasonable impacts to parking are expected.

The sensitivity to traffic and parking impacts is considered to be moderate due to potential minor increases in delays and disruption. The magnitude of impacts would be low due to the short-term nature of the impact. Overall, the level of significance is considered to be moderate-low.

4.6. Property and land use impacts

Some temporary acquisition would be required for the proposal. The site compound and stockpile would be located on adjoining Crown Land to the north-east of the bridge. Lismore City Council currently hold the lease of this Crown Land and have been consulted regarding the proposal, including use of the site compound and as part of the ISEPP consultation for the Project in February 2019. Roads and Maritime have been granted permission to lease the relevant portion of land. Furthermore, a flat section directly behind the Winsome Hotel (owned by the Winsome Hotel) will be temporarily acquired as extra site compound space. Roads and Maritime has had discussion with the owner of the Winsome Hotel in March 2019 and the owner has granted permission for Roads and Maritime to use the parcel of land.

The area to be used for the site compound and stockpile is an existing area of public open space, adjacent to the Wilsons River and is directly east of Colemans Bridge (also known as Pritchard Park). The area does not form formal parkland or support formal recreational equipment or activities. It has low recreation value given its limited size and lack of recreational facilities. The compound would be visible to road users and from adjoining properties located north of Wilsons River. Visibility of the compound would be very limited, if at all, from the southern side of the river and CBD due to landscape features and riverside vegetation.

Although the area would be visible, given the temporary nature of the works and low recreational value of this area of open space, the visual and land use impact is not anticipated to be significant. The main direct views would be from the road carriageway itself or the nearby Winsome and Lismore Soup Kitchen. Whilst the roadway (Bridge Street) provides a key link and river crossing into Lismore's city centre, this section of roadway does not form a 'gateway' to the city of Lismore. Furthermore, the ground level where the compound would be located extends below the level of the carriage which would aid in reducing its prominence. For these reasons, whilst visible from some directions, the compound would not dominate view-lines, nor would it block views of any important landscapes or landmarks.

The Colemans Bridge project will be sharing the site compound with a separate but concurrent bridge project at Fawcetts Bridge. Work is expected to start within similar timeframes, however the Fawcett Bridge project is expected to run longer and therefore decommissioning of the site compound would occur upon completion of those works. If for some adverse reason the Colemans Bridge gets delayed the compound will be removed by the Colemans Bridge project team and returned it to its original condition. On this basis the visual appearance and accessibility of this parcel of land and open space would be restored.

The sensitivity of property and land use to the proposal is therefore low as is the magnitude of impacts. Overall, the impact on property and land use is considered to be low.

4.7. Impact on social and recreational infrastructure / services

4.7.1. River access and use

Colemans Bridge would be a designated construction site during the construction phase. Access around the bridge would be restricted during construction. There are no formalised river access points at the site. The river channel below the bridge is not expected to be restricted as works are more than likely not to be in or undertaken from the river. If work is required from or in the river Roads and Maritime will have controls and buoys in place that will keep the channel open for any waterway traffic. The channel will more than likely be fully open after hours of construction to ensure the safe operation of the waterway.

As outlined earlier, the river and surrounds are underutilised for recreational purposes. The exact level of water-based recreational use of Leycester Creek is not known, however infrequent recreational activity, including boating, is assumed to occur. The Far North Coast Canoe Club and Lismore Rowing Club are local groups which use Wilsons River and surrounding waterways for water-based sports and recreation. Based on desktop analysis, some reference to occasional use of Leycester Creek has been identified. Although not expected, any potential closure of the channel during works would limit the use of Leycester Creek, however there are ample alternative locations (both in the immediate and broader area) for water-based recreational activities to occur. Any potential closure of the channel during certain times of the day is not expected to have any significant impact. It is also expected that the mostly likely recreational use of the waterway would be during the day, hence it is not imperative to keep the channel open under the bridge after hours, however this would be implemented when practical and appropriate channel warnings (for day and night time as relevant) would need to be employed. If the works require any associated channel restriction or closure this would need to be communicated to the users of the waterway as part of the consultation phase of the proposal.

The sensitivity of the community requiring river access in this particular area is considered to be low. The magnitude of the impacts is considered to be low due to the short-term nature of the impacts and alternative water-based recreational areas that can be utilised in the broader area. The level of significance of impacts on river access and recreation is low.

4.7.2. Recreational and community facilities

No sport recreation facilities would be directly impacted upon by the proposal. The bridge closure will not restrict access to sports fields located in North Lismore; however, the bridge closure will reduce transport links between North Lismore and South Lismore, yet alternative access would be available.

Restricted access under the bridge may impact water-based recreational activities in the area including boating and the Lismore Rowing Club.

Access to the South Lismore Bowling Club and Italo-Australian Sports and Recreation Club may also be affected by temporary closure of Colemans Bridge. However, the alternative routes would maintain access to these and other recreation/ community facilities and only result in minor inconvenience.

Pedestrian and cyclist access have been discussed in Section 4.2.

The sensitivity to and magnitude of these impacts are considered to be low. The level of significance of impacts on recreational and community facilities is therefore low.

4.7.3. Social support services and vulnerable people

The Winsome and Lismore Soup Kitchen is located adjacent to Colemans Bridge. It provides meals for those in need and accommodation to assist vulnerable and homeless people. It is noted that areas west of the river and Colemans Bridge exhibited higher disadvantage and it is probable that disadvantaged members of the community utilise Colemans Bridge to access support services on the opposite side, including the Winsome and Lismore Soup Kitchen. Keeping at least one of the bridge's walkways accessible during the works would ensure that access for pedestrians is maintained and that support services remain accessible.

An area of Crown Land adjacent to Pritchard Park would be used for the site compound and similarly public access to this area will be restricted. This area, including the area directly under the bridge, is known to be frequented by some members of the community, including the disadvantaged and homeless. To facilitate the works and for safety purposes, such members of the community would need to be moved from the bridge site and this would be undertaken with the support of relevant agencies. Any relevant community support institutions/ services (eg Roads and Maritime is currently liaising with the Winsome and Lismore Soup Kitchen Inc) should be informed and consulted with regard to providing appropriate support and shelter for disadvantaged persons who may be displaced by the bridge closure.

Where appropriate, Roads and Maritime, in consultation and with the support of relevant agencies, would consult any potentially affected homeless people and assist in putting them in touch with a relevant agency to support them.

The sensitivity to potential displacement would be high given it could affect potentially vulnerable people. The magnitude is considered to be low given relevant agencies would be involved and support offered to any persons potentially displaced by the works. The level of significance is therefore moderate.

4.7.4. Public transport

Occasional bridge closures would not impact public transport routes as Lismore's main public bus routes do not utilise the Colemans Bridge link. Consultation with four local bus service providers confirmed that no bus routes (public transport or school) directly use Colemans Bridge. Other bus operators exist in the region; however, they generally service outer areas for school related transport. On this basis, no impact to public transport or school bus services is expected to occur during temporary bridge closure. If impacts arise, Roads and Maritime would consult with the affected bus service provider and school(s) to determine the level of impact and any required management and mitigation measures.

The sensitivity to and magnitude of potential impacts, and the overall significance of impact on public transport, is therefore negligible.

4.8. Impact on population and employment

The proposal would take approximately eight months and result in a small increase in workers in the Lismore region. The works would be completed by a Roads and Maritime bridge crew and would be managed by Roads and Maritime project management personnel. This does not amount to an influx of workers to the local area; however, it would provide some modest economic short-term stimulus locally. Additional indirect jobs could be created as a result of multiplier effects in associated industries supplying goods and services for road and bridge construction.

Overall, there may be a minor short-term positive effect on employment and economic stimulus for the local area. Given the nature of the works, they would not influence population or employment growth or decline. Population distribution would also not be influenced.

The sensitivity to and magnitude of these impacts are low. The level of significance is low.

4.9. Distribution of social impact and housing affordability

Social impact is distributed and experienced differently among different groups in society. In general, less advantaged residents possess less resources to cope with social impact (be it financial, educational, or social support networks).

The locality immediately surrounding the proposal and affected streets supports sections of the population which may exhibit higher levels of disadvantaged, including those without a private motor vehicle or internet access and lower household income. This can affect both alternative transportation options as well as communication channels regarding the project. As discussed previously, alternative transport, detours and at least one walkway over the bridge maintained at any one time would provide suitable access during the works.

As part of the communication/ consultation process to the public and affected stakeholders, Roads and Maritime could provide information regarding alternative transport modes in the local area, detour route(s), confirmation that a walkway across the bridge would remain open for pedestrians and cyclists, along with approximate travel times to help inform affected persons and in turn assist them to effectively plan their journey. Given that there remains a proportion of households without broadband

internet, communication modes regarding the project need to be diverse enough to capture those affected.

Disadvantaged or homeless members of the community that frequent the bridge site would be supported by relevant agencies to assist in their relocation during works. This could include Family and Community Services NSW, including the Link2home service. This is a state-wide homelessness information and referral telephone service (toll free - 1800 152 152) that provides callers with information, assessments and referrals to homelessness support and accommodation services across NSW. Community organisations such as the Winsome and Lismore Soup Kitchen Inc are also being consulted by Roads and Maritime about assistance that can be offered. Roads and Maritime would consult potentially affected homeless people and assist by putting them in contact with relevant support services.

Given the temporary nature of the proposal, and the on-going future operation of the bridge once the works are complete, it is not considered there would be any change on the distribution of social impact or housing affordability.

The sensitivity to these types of impacts is considered to be moderate given that area of lower socio-economic advantage that could be affected. However, the magnitude of these impacts are considered to be low due to the short-term duration and the availability of alternative routes and transport options. The level of significance of impact is therefore moderate-low.

4.10. Impacts on community health and safety

It is considered that health and safety issues could arise if road users are not aware of the road closure. These issues would be addressed through advanced warning signage and a community consultation program.

Discarded needles are common in the area directly under the bridge. Workers and contractors engaged to undertake the works will need to have suitable PPE and work methodologies to avoid needlestick and subsequent associated health risks. This would be standard Work Health and Safety practice.

Council and any relevant community support institutions/ services should be informed and consulted with regard to providing appropriate support and shelter for disadvantaged persons who may be displaced by the bridge closure.

When operational, the proposal is likely to have benefits for the health and safety of the local community by way of safe and well-maintained road infrastructure.

The sensitivity to and magnitude of these impacts is low. The level of significance of impacts on community health and safety is therefore low and can be effectively managed.

4.11. Impacts on community values

According to the *Imagine Lismore Community Strategic Plan*, the maintenance of existing roads network is a key value area and aligns with the key objective of ensuring that the city and village services (including road network) are well managed and maintained. In this sense the bridge maintenance is consistent with community value regarding the importance of quality roads and the local built environment.

4.12. Impacts on cultural values

4.12.1. Non-Aboriginal heritage

Colemans Bridge holds local and State heritage significance and is listed under both the Lismore LEP 2012 and NSW State Heritage Register. It is also listed on the Roads and Maritime Section 170 heritage register. A Statement of Heritage Impact (SoHI) has been prepared for the proposal as part of the REF. The SoHI for the proposal describes the social significance of the bridge and references the Statement of Significance.

The findings of the SoHI are summarised below:

The proposed strengthening and maintenance of Colemans Bridge will see the structure enhanced and its functionality retained. The proposed works respect the heritage significance of the item; will ensure that bridge's most significant elements (the Dare Trusses) are conserved; and are consistent with the modern approach to timber truss bridge management espoused in the NSW Heritage Office-endorsed Timber Truss Bridge Overarching CMP (2018).

The proposed work will enhance rather than devalue the heritage significance of the bridge and is considered a timely and appropriate operational and conservation initiative overall.

On this basis, no significant impact to heritage or associated community values would occur.

Due to the heritage significance of the bridge and nature of proposed works the sensitivity is considered to be low-moderate. The magnitude of impacts is considered to be low, due to the works not devaluing the heritage significance of the bridge. The level of significance of impacts is moderate-low. The measures contained in the REF and SoHI would be implemented to ensure no adverse heritage impact.

4.12.2. Aboriginal and Cultural heritage

Colemans Bridge is located at the confluence of Leycester Creek and the Wilson River. Approximately 400 m north of the site is Slaters Creek which is of significance to the local Aboriginal community. Slaters Creek and the adjoining Wilson River area was historically the focus of cultural activities including corroborees, tribal battles and sourcing of fresh water. The area associated with Colemans Bridge has potential to hold cultural value to the local Aboriginal community. However, given the highly disturbed nature of the area, it is unlikely that 'in situ' (original location) Aboriginal sites would exist.

The site, including surrounding waterway and compound area, is located within Crown Land. Review of the National Native Title Tribunal (NNTT) Online Register (February 2019) identifies that the broader area is subject to an active and registered Native Title Claim NC2013/2018 - Widjabul Wia-bal People. The claim area is described as being located on the Far North Coast of NSW inland from the coast and commencing on the southern boundary of Border Ranges National Park, south to the western boundary of Tuckean Broadwater, east of the towns of Kyogle and Casino. Notification is required to any representative Aboriginal/ Torres Strait Islander bodies for an area concerned where an act is to take place and their consideration and comment taken into account prior to undertaking the works. Roads and Maritime have meet on-site with a representative of the Widjabul Wia-bal People on 1 March 2019 regarding the works. The relevant notification process will be followed, and a letter sent for use of the site compound.

Damage to heritage items could result from the proposal if such items occur undiscovered at the site; however, this is a low risk, particularly given the nature of the works and ground disturbance would be minimal. Safeguards are provided in the REF to ensure any undiscovered Aboriginal heritage items uncovered during the proposal are not significantly affected. The PACHCI has identified that the potential for Aboriginal impacts is low, therefore the sensitivity is low. The magnitude of impact is low, due to the PACHCI findings that the proposal was unlikely to have an impact on Aboriginal cultural heritage. The level of significance of impacts is low.

4.13. Cumulative socio-economic impacts

The proposal has the potential to result in cumulative environmental effects when other activities occur in the locality. Cumulative impact, including environmental and amenity related impacts can occur when other development or works concurrently occur nearby and contribute to (but not necessarily be limited to) changed or disrupted traffic conditions, construction noise, visual and air quality impacts. Given the local context, it is not expected that any other major work is likely to concurrently occur in the immediate vicinity during the bridge works, other than the concurrent works proposed for the adjacent Fawcetts Bridge which has also be subject to a REF assessment. These works would not contribute to cumulative traffic or accessibility issues as they would be undertaken offline from traffic. Some amenity impacts such as noise could cumulatively affect the area, however relevant measures for both projects would manage this and both projects are of a temporary duration. Hence no significant cumulative impacts are expected to impact the community or locality. If other works or development were to occur, given the regional context, typically the spatial concentration of work is not expected to be dense nor the scale significant.

If other development or works near the proposal did come online and occur concurrently, these should be considered, and measures developed as required to address additional or cumulative impacts. This process and adaption to potential cumulative impacts can be incorporated and managed through the CEMP, that would also include the specific measures and safeguards to avoid and minimise impacts related to the proposal as provided in the REF.

When finished the proposal would result in socio-economic benefits for the local and broader community (refer Section 4.14).

4.14. Socio-economic benefits of the proposal

The occasional bridge closure would be over a temporary period of approximately eight months. Upon completion of the works and reopening of the bridge, conditions would be restored to normal. Despite some short-term minor impacts, the works would result in improved longevity and future use of the bridge, including reduced need for future maintenance. Therefore, upon completion of the works and bridge reopening, any potential socio-economic impacts that were experienced during the closure would be removed, and there are no anticipated long-term adverse socio-economic impacts associated with the proposal.

The proposal would result in some long-term socio-economic benefits. The majority of these benefits accrue to the city of Lismore and road users. The benefits of the proposal would include:

- Improved road infrastructure
- Improved road safety outcomes
- Maintained serviceability of an important river crossing and town connection
- Continued access for service delivery and emergency services
- Reduced maintenance and improved bridge longevity.

5. Mitigation measures

This section provides a range of measures for avoiding, managing, or mitigating potential socio-economic impact and maximising or enhancing the proposal's benefits.

5.1. Objectives

The objectives of the proposal for managing potential socio-economic impacts during construction and operation include:

- Ensure effective consultation and ongoing communication occurs at all stages of construction
- Prepare and implement a community communication/ notification plan
- Minimise and manage impacts on local access and connectivity
- Minimise and manage impacts to business
- Minimise and manage impacts to amenity for nearby properties through measures such as noise, visual, and air quality controls (developed under the REF and CEMP)
- Manage social and recreational infrastructure/ services impacts relating to the restricted use of Pritchard Park and adjoining area directly under the bridge, waterway restrictions, access to the Winsome and Lismore Soup Kitchen
- Maintain community health and safety.

5.2. Summary of socio-economic safeguards and management measures

Recommended strategies to avoid, minimise and manage socio-economic impacts during the construction phase are provided in Table 5-1.

Table 5-1 Summary of safeguards and management measures

No	Impact/issue	Environmental safeguard/measure	Responsibility	Timing
1	Communication Plan	A Communication Plan (CP) would be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP would include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions. • Contact name and number for complaints. The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).	Roads and Maritime / Contractor	Pre-construction

No	Impact/issue	Environmental safeguard/measure	Responsibility	Timing
2	Notification	All businesses, residential properties and other key stakeholders (eg schools, council, bus operators) affected by the activity would be notified at least 10 working days prior to commencement of the activity. Project/ community updates would be provided throughout the duration of works as relevant. Notification would utilise both digital and conventional (non-digital) modes of communication (eg media release, letter box drops, newsletters and regular updates to a project website). Notification would include an information package, including contact name and number for enquiries or complaints, the expected timeframe of works and any planned or potential disruptions to utilities/ services and changed road and traffic conditions. The package is also to include details on the Colemans Bridge/ road closure, the available detours alternative transport and pedestrian access. As part of the notification process, advanced warning signage would be established prior to and during the work to ensure road users are aware of the road closure and detours. Directional signage is to be placed along the detour routes. Additional and immediate notification to all affected stakeholders would also be undertaken if walkway access across the bridge is restricted. As required, Roads and Maritime Services shall issue notification to representatives of the Native Title claim NC2013/2018 - Widjabul Wia-bal People, for their consideration and comment prior to undertaking the works.	Roads and Maritime project manager and communications officer	Pre-construction and during construction

No	Impact/issue	Environmental safeguard/measure	Responsibility	Timing
3	Consultation	Ongoing stakeholder and community consultation would be undertaken in accordance with the *Roads and Maritime Communication Toolkit*. Consultation would include: • Lismore City Council • Residents and businesses within 500 m of the proposal • Businesses at the north-east end of Union Street (between the low railway overpass and Colemans Bridge) who may require heavy/ high vehicle access • Fire and Emergency services • Bus operators • Local schools • Recreation waterway users, including Lismore Rowing Club/ Far North Coast Canoe Club • Operators of community services and facilities, including Winsome and Lismore Soup Kitchen • Vulnerable and homeless people that could be directly affected by the works	Roads and Maritime project manager and communications officer	Pre-construction and during construction
4	Noise and vibration specific notification and consultation	Implement notification and community consultation measures with regard to airborne noise and ground-borne vibration impacts from the works, including: • Periodic notification of all identified receivers (monthly letterbox drop or equivalent). Notifications should provide advanced warning of upcoming activities, particularly relating to highly noise emitting activities and activities scheduled outside standard construction hours • Website • Project information line • Construction Response Line • Email distribution list.	Roads and Maritime project manager and communications officer	Pre-construction and during construction
5	Traffic	As per the notification process, advanced warning signage would be established prior to and during the work to ensure road users are made aware of changed traffic conditions and detour directions. Excluding the required detours, where possible, current traffic movements and property accesses would be maintained during the work. Any disturbance would be minimised to prevent unnecessary traffic delays.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction
6	Pedestrian access	Pedestrian access to, and use of, at least one of the bridge's walkways at any one time is to be maintained and remain accessible during the works.	Roads and Maritime project engineer and works supervisor	Pre-construction and during construction

No	Impact/issue	Environmental safeguard/measure	Responsibility	Timing
7	Waterway	As required, advanced warning signage and/or beacons (appropriate for any applicable day and night time maritime requirements) would be established prior to and during the work to ensure any users of the local waterway(s) are aware of restricted access, changed navigational conditions or hazards within the work area and waterway.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction
8	School bus services	If a potential impact to a school bus service arises or becomes known, undertake and maintain ongoing consultation and cooperation between Roads and Maritime and any potentially affected school bus service providers prior to and for the duration of the project, to ensure no adverse or unmanageable impact to important services.	Roads and Maritime project manager and communications officer	Pre-construction and during construction
9	Complaints	A complaint handling procedure and register would be included in the CEMP and would include that all complaints would be responded to within 24 hours.	Roads and Maritime project manager and communications officer	During construction
10	Health and safety	Suitable site induction relating to site specific hazards would be undertaken for all contractor and Roads and Maritime staff. The work would be undertaken in accordance with all NSW health and safety legislative requirements and relevant Australian Standards.	Roads and Maritime project engineer and work supervisor	Pre-construction and during construction
11	Vulnerable and homeless people	Where appropriate, Roads and Maritime, in consultation and with the support of relevant agencies and community services (eg Family and Community Services; the Winsome and Lismore Soup Kitchen Inc), would consult homeless people that could be directly impacted/ displaced by the works and assist in putting them in touch with a relevant support service.	Roads and Maritime project manager and communications officer in consultation with relevant agencies/ organisations	Pre-construction

6. Conclusion

This report provides an assessment of potential social and economic impacts associated with the strengthening and maintenance of Colemans Bridge, Lismore; including occasional closure of the bridge (to vehicle-based transport) and use of alternative routes by the public for approximately eight months. The assessment of social and economic impact included:

- Scoping the potentially affected groups and individuals, including potential issues of concern and the nature of the likely impact
- Profiling the nature of the individuals or groups likely to be affected
- Identifying the social impact associated with the proposal, who is affected and to what extent
- Assessing the likelihood of the impact and its significance
- Identifying and recommending measures to avoid, manage, or mitigate potential impact.

Overall, some temporary/ short-term works and amenity related impacts would be experienced. One of the key impacts would be to access and connectivity due to occasional bridge closures. The level of significance of impacts on access and connectivity during construction is considered to be moderate-low given the availability of detours, retained pedestrian access and occasional nature of closures (ie on some weekends and occasional Mondays after weekend closures). With implementation of the mitigation measures proposed this is likely to be limited to a low-level residual impact. Local residents and businesses would need to plan for and adapt to the changed road connectivity in the short-term; during temporary closure of the bridge. However, the potential impacts associated with the closure are manageable with appropriate advanced planning and notification. Most of the other potential impacts have been assessed as moderate to low levels of significance. With implementation of the recommended management measures, impacts would be manageable and most residual impacts are expected to be moderate-low or low in significance.

Overall, the proposal is expected to provide a net long-term benefit for the community and road users including:

- Improved road safety and infrastructure longevity
- Maintenance of historically significant infrastructure
- Maintaining ongoing operational access for road users and pedestrians.

The proposal's potential impacts can be managed by implementing safeguards and management measures presented in this report, the REF and subsequent CEMP. Overall, while the short-term impacts cannot be avoided completely, they can be managed, and no significant or long-term adverse impacts are likely. The proposal is necessary to maintain the long-term function of the bridge which is important to the local community and road network.

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Terms and acronyms

Urban Centre and Locality (UCL)	An Urban Centre is a cluster of contiguous SA1s with an aggregate population exceeding 1000 persons contained within SA1s that are 'of urban character'.
Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Mitigation measure	A measure or action to reduce the severity of an impact.
State Suburb (SSC)	State Suburbs (SSCs) are an ABS approximation of localities gazetted by the Geographical Place Name authority in each State and Territory. SSCs are built from Mesh Blocks (MBs) that form an approximation of Gazetted Localities. SSCs cover most of Australia. Presently there remain areas of rural South Australia and rural Australian Capital Territory that are undefined. Various islands offshore from New South Wales, Victoria and Tasmania and some inshore water areas and islands are also undefined.
Statistical Area Level 1 (SA1)	The Statistical Area Level 1 (SA1) is the second smallest geographic area defined in the Australian Statistical Geography Standard (ASGS) Main Structure, with the smallest being the Mesh Block. SA1s are built from whole Mesh Blocks. Whole SA1s aggregate directly to SA2s in the ASGS Main Structure, as well as Commonwealth and State Electoral divisions in the Non-ABS Structure. For the 2016 Census, SA1s would also be the basis of output for most data, the exception being some place of work destination zones and usual residence one and five years ago. For 2016, SA1s also serve as one of the building blocks in the ASGS and are used for the aggregation of statistics to larger Census geographic areas. SA1s are designed to remain relatively constant over several Censuses. Future change would largely be dealt with by splitting existing SA1s. SA1s cover the whole of Australia with no gaps or overlaps. SA1s have a population of between 200 and 800 people with an average population size of approximately 400 people
Study area	The area directly affected by the proposal and any additional areas likely to be affected by the proposal, either directly or indirectly. For this socio-economic assessment, the study area is covered by the Lismore urban area and Project SA1 area, inclusive of the site, nearby businesses and residents.
The site (works/ proposal footprint)	The area of land that is directly impacted by the proposal. This includes Colemans Bridge and site compound (refer to Figure 1-1).

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Customer feedback
Roads and Maritime
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February 2019
RMS XX.XXX
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Appendix J

ISEPP Consultation Records

14 March 2019

David Havilah
Senior Ecologist
GeoLINK

Email to: dhavilah@geolink.net.au russell.h.leong@rms.nsw.gov.au

Dear Mr Havilah

Proposed rehabilitation of strengthening and maintenance of Coleman's Bridge - Lismore

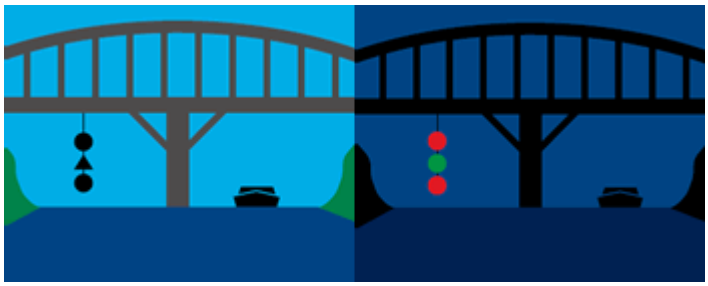
The Roads and Maritime - Maritime Division is responsible for the ongoing maintenance of safe navigation throughout NSW. As such, proposals like this are reviewed to ensure that any disruption to navigation for commercial and recreational vessels is minimised as much as is practical during construction works bearing in mind our full understanding of the importance of such projects.

Leycester Creek and the Wilson River in the vicinity of Coleman's Bridge is predominantly used by small powered recreational vessels and passive craft.

RMS Maritime has considered the proposal and from the information provided wishes to advise that we have no objections to the proposed works subject to the below conditions;

1. Any work vessels involved in the project must comply with the relevant NSW Marine Legislation (i.e. day shapes, lights etc.).
2. Barge, work vessels and crew involved with the project must comply with the Marine Safety (Domestic Commercial Vessels) National Law Act 2012.
3. A minimum of one navigable channel span must be open to navigation at all times unless approved by RMS Maritime.
4. Any submerged hazards must be marked with yellow aqua buoys sign written "Warning Submerged Hazard". These aqua buoys must be lit with yellow flashing lights if hazards present before sunrise and after sunset.
5. Twenty Eight (28) days prior to works commencing the applicant must provide Roads and Maritime with a full scope of works including maps noting all obstructions to navigation associated with the proposed works, (vessel / barge anchoring, scaffolding and silt curtain locations etc.) so a Marine Notice can prepared and advertised. In addition and if required a Water Traffic Management Plan will be prepared.
6. A minimum 14 days' notice is if works are to continue past the advertised completion date.
7. Channel blocked day shapes and lights to be suspended in the centre of all blocked spans of the bridge. i.e. any works that impact the current bridge navigation channel must be closed. Example below

Channel Blocked / Closed



These signals mean vessels should NOT attempt to navigate in that part of the channel: Bridge span blocked or Channel is blocked.

Standard Channel Blocked Navaid Shapes

- Shapes will consist of 3 x 300mm diameter black plastic navaid shapes.
- These shapes will be mounted vertically (ball, triangle, ball) in a channel blocked navaid configuration.
- The shapes can be attached to the bridge handrail.
- Channel Blocked Fixed Night Lights
- Solar Channel Blocked Lights mounted vertically
- The lights will be red, green, red.
- Damaged lights and buoys responsibility of contractor and all navaids to be repaired within 12 hours of reported outage.

For your information Roads and Maritime – Maritime contracted supplier for Aids to Navigation supplies contact details are below. They are able to supply and install if required.

Solar Tech Australia
www.solartech.com.au
02 95552042

Roads and Maritime will arrange a Marine Notice to be advertised on the Roads and Maritime Services websites.

If you foresee any difficulty with complying with our requirements or if you wish to further discuss the proposal, please contact me on *navigationadvicenorth@rms.nsw.gov.au.* If required, during works you can contact the local Boating Safety Officer, Darren Watson on 0418 660 769.

Yours sincerely

LMyHourigan

Lynda Hourigan
Project Officer North
Operations and Compliance | Maritime

Our ref: DF:19.2017.2.1: CI19/5003

Contact: Mr R C Mallam

15 March 2019

NSW Roads & Maritime Services
Locked Bag 928
NORTH SYDNEY NSW 2059

russell.h.leong@rms.nsw.gov.au

Dear Sir

SEPP Notification No. 19.2017.2.1
Property 9836 Unit 1, 1/2 Union Street SOUTH LISMORE

I refer to your letter to Council dated 14 February 2019 regarding the proposed strengthening and maintenance of Colemans Bridge.

In response to your letter Council identifies the following issues that should be addressed in the Review of Environmental Factors (REF):

1. **Heritage Impact –** Colemans Bridge is listed as a heritage item under the Lismore LEP 2012. In this regard, Council recommends that a suitably qualified heritage consultant be engaged to consider the effect of the proposed works upon the heritage significance of the bridge. To assist in this process, please find **attached** the inventory sheets for the Colemans Bridge from the Lismore Heritage Study 1995. As noted in the attached inventory, it is recommended that the site should be recorded (in writing and with photos) prior to any disturbance. Please submit a copy of this archival record to Council for its records.

2. **Ecological impacts –** as the proposed works includes vegetation removal within 3m of the bridge, Council requests that a suitably qualified ecological consultant be engaged to address the flora and fauna impacts of the proposed works. In relation to the likely ecological impacts of the proposed works, Council provides the following general comments:
    - the river banks on the southern sides of the Coleman bridge (east & west ends) have received bush regeneration in the past. In this regard, Council requests the proposed works minimise disturbance to native vegetation in these areas where possible; and
    - the underside of bridges are commonly used as temporary and maternity roost for various species of micro bats. In this regard, please consider:
        - micro bat exclusion;
        - provision of temporary habitat boxes; and
        - daily pre-construction checks –training provided as to what to do if micro bat is found roosting on site.

3. **Flooding –** the site of the bridge is highly flood prone and is mapped as ‘floodway’ under the Lismore Floodplain Risk Management Plan. In this regard, Council requires that the proposed works do not adversely impact upon flood behaviour (i.e. do not additionally impede the flow of flood waters). In addition, it is requested that the siting and design of the site compound have adequate regard to flooding impacts.

4. **Aboriginal Significance –** It is recommended that the REF consider the potential impacts on any Aboriginal places of significance or Aboriginal objects.

NB: ***To comply with the Native Title Act 1993, Council has completed a Native Title Manager's Advice and sent a Future Act Notification to the native title claimant group today giving them until 25 March 2019 to comment. Once the notice period expires Council able to grant a short-term licence to the RMS. The licence fee will be the crown land minimum of $498 + GST.***

5. **Drinking Water Catchment –** Colemans Bridge is located within the Wilsons River Drinking Water Catchment. In this regard, any works disturbing the existing ground are to be managed by appropriate soil and water arrangements / controls.

6. **Geotechnical –** the proposed works are not to compromise the geotechnical stability of the banks of the Wilsons River.

7. **Construction Management –** The REF is to include a Construction Management Plan that appropriately addresses matters such as: traffic control, the timing of work, different work stages and the location of work areas.

8. **Rehabilitation –** the REF is to ensure that all work areas are appropriately rehabilitated.

In addition to the above, Council also requests that the following matters are taken into consideration by the RMS as part of the project.

9. **Scheduling of Work –** It is requested that the works be preferably scheduled around Council's major events. In this regard, **attached** is a list of Council's events with the ones highlighted yellow having the biggest impact if Colemans Bridge was closed.

10. **Lighting of Bridge –** Council has previously and continues to request the RMS investigate installing lights (both pedestrian and vehicle) on Colemans Bridge. In this regard, it is noted that:
    - the bridge is a major thoroughfare for both pedestrians and vehicles and there is currently no lighting on the bridge;
    - the lack of lighting makes the route is extremely dark and unsafe; and
    - Council's preference is that the bridge be lit to the applicable Australian Standard.

Should you require any further information regarding this matter please contact me.

Yours faithfully

Mr R C Mallam
Senior Development Assessment Officer

Copy to: dhavilah@geolink.net.au David Havilah GEOLINK

Lismore Local Government Area Calendar of Events 2019

The dates below may change!! Please check our calendar

www.visitlismore.com.au

Event	Venue	Event Date
2019 Under 15 & 16 NSW Country Champ	Crozier/Oakes Oval	May 18 -19
Lismore Gemfest	Lismore Showgrounds	May 18-19
PSSA Girls State Football Champ.	Southern Cross Football Cent	May 20 - 24
Australian Little League Champ.	Albert Park	June 5-10
Vikings Festival	Jolley Field	June 22-23
Lismore Lantern Parade	The Quad	June 22
Friendship Festival - Piazza In the Park	Spinks Park	June 23
NAIDOC Celebration Day	Lismore Showgrounds	TBC
Outdoor Leisure Show	Lismore Showground	July 12-14
National U21 Men's Hockey Tourn.	Hepburn Park	July 11-18
FNC Timberjacks Tournament	Albert Park	July 12-14
Lismore Aviation Expo	Lismore Regional Airport	July TBC
Lismore Eisteddfod	Workers Club, City Hall, NR	7 Aug - 17 Sep
MLB Academy	Albert Park	TBC
Darrel Chapman Fun Run	Woodlark St, Lismore	Sep 7
Nimbin Roots Music Festival	Nimbin	Sep 13-15
Nimbin A&I Show	Nimbin Showground	Sep 21-22
Aboriginal Knockout Rugby League	Oakes Oval/Crozier Field	Sep TBC
Lismore Cup	Lismore Turf Club	Sep 19
Lismore Masters Games	Sporting field in the Lismore	Sep 27-29
North Coast National A&I Show	Lismore Showgrounds	Oct 18-20
Marist Cricket Carnival	Lismore Park	Dec TBC
Carols in the Heart	Crozier Field	Dec 8
Tropical Fruits	Lismore Showgrounds	Dec 29- Jan 2

NSW School Holidays

School Commences 29 January 2019

April	13/04/2019 - 28/04/2019
July	06/07/2019 - 21/07/2019
Sept/Oct	28/09/2019 - 31/10/2019
December	21/12/2019 - 03/02/2020

rms.nsw.gov.au/

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Customer feedback
Roads and Maritime
Locked Bag 928,
North Sydney NSW 2059

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