Transport Roads & Maritime Services

NSW GOVERNMENT

Bolivia Hill upgrade
REF submissions report

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February 2016

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Roads and Maritime Services

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Prepared by Arcadis

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Executive summary

This submissions report relates to the review of environmental factors (REF) prepared for the New England Highway Bolivia Hill upgrade between Glen Innes and Tenterfield, and should be read in conjunction with that document.

Roads and Maritime Services (Roads and Maritime) proposes to upgrade about two kilometres of the New England Highway (HW9) at Bolivia Hill, primarily to improve road safety. This section of the highway lies about 58 kilometres north of Glenn Innes.

The proposal includes building a bridge about 320 metres long, and widening the road reserve to straighten out bends in the steepest section of the highway.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Roads and Maritime Services. The REF was exhibited between 28 September 2015 and 26 October 2015 at various locations in Tenterfield, Glen Innes and Armidale.

The documents were also available on the Roads and Maritime website at www.rms.nsw.gov.au/projects/northern-nsw/bolivia-hill-new-englandhighway/

A total of 15 submissions were received in response to the exhibition of the REF. This included nine submissions from government agencies and six submissions from the community. Key comments raised by members of the public were related to:

- The strategy for existing roadside memorials
- The need for an overtaking lane
- Local traffic access
- Traffic impacts during construction
- Project justification.

The main issues raised by government agencies were related to:

- The need for an overtaking lane
- Biodiversity protection
- Aboriginal Heritage protection and the level of investigations undertaken
- Traffic impacts during construction

The proposal was strongly supported with only one submission received against the proposal. Where required, additional environmental safeguards have been included to manage and address comments raised in submissions.

Further Aboriginal Heritage investigations were carried out in response to the Office of Environment and Heritage submissions. The proposed buffer zone around an artefact scatter located within the project boundary has been enlarged as a precautionary measure. The proposed project boundaries have also been altered to increase the buffer zone to nearby Potential Archaeological Deposit (PAD) sites.

Next steps: Roads and Maritime will assess the proposal and submissions and make a determination on the REF.

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Contents

1 Introduction and background

1.1 Purpose

This submissions report relates to the review of environmental factors (REF) prepared for the New England Highway Bolivia Hill upgrade, and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Roads and Maritime Services. This submissions report:

- Summarises the issues raised during the REF display and provides responses to each issue (Chapter 2)
- Details investigations carried out since finalisation of the REF (Chapter 3)
- Describes and assesses the environmental impact of changes to the proposal (Chapter 4)
- Identifies new or revised environmental management measures (Chapter 5).

1.2 The proposal

Roads and Maritime Services (Roads and Maritime) proposes to upgrade about two kilometres of the New England Highway (HW9) at Bolivia Hill (the proposal), primarily to improve road safety. This section of the highway lies about 58 kilometres north of Glen Innes.

The proposal includes building a bridge about 320 meters long, and widening the road reserve to straighten out bends in the steepest section of the highway.

Key features of the proposal include:

- Upgrading 2.1 km of the New England Highway
- Widening of the existing two-lane highway to provide a minimum shoulder width of two metres
- Building a bridge about 320 m long to realign the highway between chainage 57705 and 58025
- Realigning the highway (horizontally and vertically) between chainage 58150 and 58600 using imported fill
- Removing the existing rest area at chainage 57675, which would be used for the southern end approach for the proposed bridge on the new alignment
- Building a temporary compound site accessible from Pyes Creek Road, which would allow for a concrete batching plant, site office, laydown and stockpile areas during construction
- Access tracks five metres wide connecting the compound site and the highway to the bridge pier locations via the valley floor
- Retaining the existing road between chainages 57650 to 58100 for ongoing maintenance purposes.

1.3 REF display

Roads and Maritime prepared an REF to assess the environmental impacts of the proposed work. The REF was publicly displayed from 28 September 2015 to 26 October 2015 at eight locations, as detailed in Table 1.1. The REF was also available to download from Roads and Maritime's project website.

The display locations, website link and drop-in sessions were advertised in:

- The Northern Daily Leader (28 September and 13 October 2015)
- The Tenterfield Star (30 September and 14 October 2015)

- The Armidale Express (30 September and 14 October 2015)
- The Glen Innes Examiner (29 September and 15 October 2015)

Additionally, radio advertising was used to promote the drop-in sessions in the preceding days on:

- Gem FM – six spots
- 2NZ – three spots
- Rebel FM – six spots
- Ten FM – six spots

The REF display was also promoted via:

- On the Roads and Maritime Have Your Say website (www.rms.nsw.gov.au/projects/planning-principles/have-your-say.html)
- A media release issued to local outlets
- An invitation to comment and link to the REF on the Roads and Maritime website was emailed to all stakeholders on the project database who had expressed an interest in the project during earlier planning phases.
- An invitation to comment and copy of the REF was sent directly to several identified stakeholders (Appendix A).

Table 1.1: Display locations

Location	Address
Tenterfield Shire Council	247 Rouse Street, Tenterfield
Tenterfield Visitor Centre	157 Rouse Street, Tenterfield
Shell Service Station	69 Rouse Street, Tenterfield
Tenterfield Motor Registry	Courthouse Building 94 Molesworth Street, Tenterfield
Glen Innes Severn Council	136 Church Street, Glen Innes
Glen Innes Visitor Centre	152 Church Street, Glen Innes
Glen Innes Motor Registry	Cnr of Grey and Ferguson streets, Glen Innes
Armidale Dumaresq Council*	135 Rusden Street, Armidale

* This location was added at the request of a local resident after the display period began and consequently was not advertised.

1.4 Community information sessions

Two community information sessions were held to provide an opportunity for interested parties to view and discuss the concept design and REF. No formal presentations were made, however members of the project team were available to discuss the proposal and potential impacts.

Community information sessions were held on:

- 15 October from 3-7pm at the Sir Henry Parkes School of Arts, corner of Rouse and Manners streets, Tenterfield
- 16 October from 11am-1pm at the Glen Innes Severn Library, 71 Grey Street, Glen Innes.

Eighteen interested parties registered their attendance at the information sessions with nine submissions (via feedback forms) completed.

2 Response to issues

Roads and Maritime received 15 submissions, including nine from government agencies and six from community members. Roads and Maritime received a submission from the Office of Environment and Heritage on 9 December 2015. Table 2.1 lists the respondent's issues and each respondents' allocated submission number. The table also indicates where the issues from each submission have been addressed later in this chapter.

Table 2.1: Respondent's issues

Respondent	Submission No.	Section number where issues are addressed
Individual	1	2.2 and 2.5
Tenterfield Shire Council	2	2.3.2 and 2.3.4
Individual	3	2.3.1, 2.3.3 and 2.3.4
Individual	4	2.3.1
Glen Innes Severn Council	5	2.3.1, 2.3.4, 2.3.5 and 2.5
Individual	6	2.4
Individual	7	2.3.4 and 2.3.5
Glen Innes Severn Council	8	2.6.1
Individual	9	2.2 and 2.5
Department of Primary Industries - Lands	10	2.6.2, 2.6.4, 2.8.1, 2.8.2, 2.10.1 and 2.10.2
Tenterfield Shire Council	11	2.3.4, 2.3.5 and 2.6.4
Office of Environment and Heritage	12	2.6.2, 2.6.4, 2.9 and 2.11
Department of Primary Industries - Fisheries	13	2.6.3
NSW Government - Local Land Services	14	2.6.4
Office of Environment and Heritage	15	2.7.2, 2.7.3, 2.7.4 and 2.7.5

2.1 Overview of issues raised

A total of 15 submissions were received in response to the display of the REF report and drop-in sessions comprising five from state government agencies, four from local government and six from the community.

Each submission has been examined individually to understand the issues being raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and Roads and Maritime's response to these issues forms the basis of this chapter.

Eleven submissions supported the proposal, one objected to the proposal and three did not offer a position for or against the proposal. A number of information session attendees did not leave any feedback but were in general support of the proposal.

The main issues raised by stakeholders and the community at the information sessions were about the need for the project, the design not including an overtaking lane as part of the project, traffic and transport considerations and how the construction of the project would affect other new developments/projects in the local area.

The main issues raised by a Glen Innes Severn Council representative at the information sessions were about the lack of an overtaking lane in the design, how any traffic impacts would affect local businesses and the potential effect on delivery of turbine components (oversize vehicles) during the building of a planned local wind farm project.

The main issue raised by a Tenterfield Council representative at the information session was about how the proposal would affect access for a new development at the southern end of the project.

The Department of Primary Industries (Fisheries) submission was about the classification of the Brickyard Creek tributary. The submission indicated that due to the tributary classification (first order stream), no approvals or concurrence would be required from Fisheries should the work involve any activities within or adjacent to the tributary. No issues were raised in the submission.

The Department of Primary Industry (Lands) submission identified a number of issues. The main issues raised were about Crown Land Reserves, Aboriginal land claims, acquisition of crown land, environmental impacts on crown land, bushfire risks and biodiversity offsets.

The Office of Environment & Heritage (OEH) submission identified a number of issues. The issues were about:

- Quantifying direct and indirect impacts to ensure a suitable offset package can be developed
- Mitigation measures addressed in the REF are included in the Construction Environmental Management Plan (CEMP) to reduce biodiversity impacts during construction and operational phases
- The need for a biodiversity offset strategy to be developed
- The need for a rehabilitation plan to be developed
- The need for further assessment to be carried out in the form of archaeological survey and a consolidated Aboriginal assessment report
- Providing the REF to the Environment Protection Authority (EPA) for its comment on the proposal in regards to noise, air and water quality and licensing requirements.

The Heritage Division of the OEH submission identified a number of issues including potential impacts to the travelling stock route and the level of assessment conducted for this heritage item,

and the need to reassess potential impacts to heritage items should the scope of the project change.

The formal submission from Tenterfield Shire Council identified a number of issues. The main issues were about protection of the Bolivia wattle and traffic impacts during construction.

2.2 Justification for the Project

Submission number(s): 1

Issue description

In summary the respondent does not support the project and raised concerns about the need for the project. The respondent commented that other roads in the area were in greater need of upgrade than this section of the New England Highway.

Response

The upgrade of this section of the New England Highway is proposed due to its poor safety record, in comparison with other undivided rural roads in New South Wales, and strategic importance as a major link between the Hunter region and the New England area and beyond. The proposal would improve safety by straightening hazardous horizontal curves, widening the road shoulders, and providing better visibility. It would also improve road transport productivity, efficiency and reliability of travel. The option selected would result in the least impact on the natural, cultural and built environment of all options investigated and would provide the greatest value for money.

2.3 Traffic transport and access

2.3.1 Overtaking lane

Submission numbers: 3, 4 and 5

Issue description

In summary, the respondent(s) raised the concern that the design of the project did not include an overtaking lane.

Response

In the strategic concept stage it was found that no overtaking (or climbing) lane was warranted, based on criteria stipulated in Roads and Maritime Services Network Performance Measures and Network Planning Targets (2010). There is an existing overtaking lane for southbound traffic located 100 meters south of the project, while the nearest northbound traffic overtaking lane is about four kilometres north of the project.

2.3.2 Access to new development

Submission number: 2

Issue description

In summary, the respondent raised the issue of potential impact to access to the new development on the southern end of the project.

Response

The REF indicated it was not anticipated that property access would be affected at any time during construction of the proposed upgrade. If any property access were to be impacted there would be

discussions with the property owner prior to any impacts occurring. The safeguards and management measures are identified in Table 5.1 numbers 20 and 95.

2.3.3 Pyes Creek Road intersection

Submission number: 3

Issue description

In summary, the respondent raised the issue of the layout of the Pyes Creek Road intersection and queried if there would be any improvement to the intersection layout.

Response

The intersection of the New England Highway and Pyes Creek Road does not form part of the proposal.

2.3.4 Traffic delays

Submission numbers: 2, 3, 5, 7 and 11

Issue description

In summary, the respondents were concerned with how the construction of the project would delay traffic through the area and how traffic would be managed during construction.

The respondent was also concerned about how the project would impact the construction of a proposed new windfarm to the west of Glen Innes. The windfarm project is currently investigating delivery routes which may involve transporting turbine components on oversize vehicles through the proposal area.

Response

The REF identified there would be an increase in travel times during construction. Travel times would increase due to:

- The reduced speed limits around the construction site
- Increased truck and construction machinery movements
- Temporary partial closure of the New England Highway and Pyes Creek Road with potential for related increases in travel times due to the need for detours
- Traffic switching in areas where the upgrade impacts part of the existing road surface.

A Traffic Management Plan (TMP) would be prepared for the worksite. The TMP would include:

- Identification of all public roads to be used by construction traffic
- Management methods to direct construction traffic to use identified roads
- Identification of all public roads that may be partially or completely closed during construction, and the expected timing and duration of closures
- Details of likely impacts on existing traffic
- Traffic controls to manage and regulate traffic movements, including minimising traffic switching
- Maintenance of continuous, safe and efficient movement of traffic for both the public and construction workers
- Details on access to construction sites, including entry and exit locations, and measures to prevent construction vehicles queuing on public roads.

The safeguards and management measures are identified in Table 5.1 numbers 20 and 92.

2.3.5 Traffic diversions

Submission numbers: 5, 7 and 11

Issue description

In summary, respondents raised the following issues:

- The amount of traffic diverted to the Pacific Motorway, thereby impacting on business for the local towns
- Delayed traffic taking detours and potentially getting lost.
- How Roads and Maritime and the contractor will manage the condition of local roads used as detour routes.

Response

Any closure to the New England Highway or Pyes Creek Road would be temporary and for short durations during construction. It is not anticipated that traffic would be diverted away to the Pacific Highway corridor as a result, given the additional travel distance this would require.

The amount of traffic that is diverted to local roads during construction, either voluntarily to avoid traffic management measures or through temporary closures, is not expected to cause any deterioration of the road conditions. In the event that temporary diversions are required, the contractor will be responsible for ensuring adequate signage is in place.

The contractor would also be responsible for repair of dilapidation to roads resulting from construction activity.

The safeguards and management measures are identified in Table 5.1 numbers 20, 23 and 92.

2.4 Topography, geology and soils

Submission number: 6

Issue description

In summary, the respondent raised the issue of an area adjacent to the project that appears to have a land slip that may affect the stability of the existing road embankment.

Response

Further detailed geological assessments of the area are to be carried out; the area of the potential slip will be included in the proposed investigations. Roads and Maritime will continue to monitor the road for signs of any deterioration.

2.5 Cost of the project

Submission numbers: 1 and 5

Issue description

In summary, the respondents raised concerns over the cost of the project. The community member's concern was over the actual need for the project and the cost of the project when other upgrade works may be more justified.

The Glen Innes Severn Council representative's issue was regarding the possible perception in the community that the project was more expensive than the current estimated cost.

Response

The upgrade of this section of the New England Highway has been prioritised due to its poor safety record and strategic importance as a major link between the Hunter region and the New England area and beyond. A range of alternative routes were considered in the strategic concept phase of the project, and option 7b was found to best meet the project objectives, which include providing value for money. The project team has developed the concept design based on option 7b, and refined the alignment and bridge design in order to maximise value for money.

Due to discussion in the REF and previously published documents regarding various route options that were investigated in the strategic concept stage, there may be a perception in the community that the cost of the proposal is higher than currently anticipated.

2.6 Biodiversity

2.6.1 Local species

Submission number: 8

Issue description

In summary, the respondent was interested if there was a certain threatened flora species (*Homoranthus croftianus*) in the project area.

Response

The likelihood of the occurrence of *Homoranthus croftianus* within the proposal area was reported as low in the Hyder Consulting Flora and Aquatic Assessment (2015). A number of plants were identified within 10km of the project in previous studies, however the field studies undertaken for this project did not identify this species in the proposal area. The safeguards and management measures to avoid impact for threatened flora species are identified in Table 5.1 numbers 8 and 13.

2.6.2 Biodiversity offsets

Submission number: 10 and 12

Issue description

In summary, the Department of Primary Industries – Lands submission requested liaison regarding the development of the planned biodiversity offset strategy, and the incorporation of nearby or adjacent land.

The Office of Environment and Heritage concurred with the REF recommendation that a biodiversity offset strategy be developed and suggested that:

- The total impacts from the proposal, including direct and indirect, should be quantified to ensure that a suitable offset package is developed
- A detailed rehabilitation strategy be developed to ensure that at least part of the offset package relates to the subject area where the rehabilitation can benefit the ecological values that are proposed to be impacted.

Response

Indirect impacts

It was assumed for the purpose of the impact assessment that all vegetation in the project area would be cleared. It is likely that this clearance area would be reduced following detailed design. The total area of direct and indirect impacts of the project would be recalculated following detailed design; direct impacts would be offset through the Biodiversity Offset Strategy and indirect impacts would be addressed through mitigation measures set out in the Biodiversity Management section of the Construction Environmental Management Plan (CEMP). The collection of seeds from the Bolivia wattle would be considered as part of the Biodiversity Offset Strategy. As noted in the flora impact assessment, the areas of native vegetation to be removed from the existing edge of the New England Highway are currently subject to edge effects, with disturbed soils and presence of weedy exotic species, particularly close to the road edge.

Acacia pycnostachya – indirect impacts

The 30 metre indirect impact measure discussed in the assessment refers to the potential extent of edge effects associated with the creation of new road and track edges. Indirect impacts on Acacia pycnostachya considered in the assessment were from shading by the proposed bridge. Although one individual of the species was mapped directly beneath the proposed bridge, up to eight individuals were assessed as being potentially indirectly impacted by shading from the bridge, based on margin of error associated with GPS co-ordinate capture in the field. The 30 metre measure is not applicable to the area of shading impact from the bridge.

The proposal also includes a five metre-wide access track connecting the compound site and New England Highway to the bridge pier locations via the valley floor; this access track and the bridge pier footprints will be the only impacts requiring clearing of native vegetation in the vicinity of the *Acacia pycnostachya* (Bolivia wattle) population. Six individuals of the species have been identified within 30 m of the access track to the south; these are all upslope of the proposed clearing on a steep incline, and are unlikely to be subject to indirect impacts from the clearing. Another 15 individuals of Acacia pycnostachya have been identified within 30 m of the access track to the north, downslope of the proposed access track. These individuals could be subject to indirect impacts from the nearby vegetation clearance. Detailed mitigation measures to reduce impacts to threatened species and their habitat were included in the assessment. Implementation of these measures should minimise indirect impacts to the species.

Roads and Maritime's Biodiversity Offset Guideline (2011) will be followed when the biodiversity offset strategy is prepared. Offsets may be delivered through a range of mechanisms, including securing offset properties under an appropriate legal instrument, or purchasing and retiring biobanking credits. Roads and Maritime will consult with the Office of Environment and Heritage, the Lands Department and other relevant government departments when preparing the biodiversity offset strategy, and will incorporate the proposed rehabilitation areas within the offset strategy.

The preparation of a Biodiversity Offset Strategy is included as a site specific environmental safeguard in Table 5.1 number 122.

2.6.3 Impacts to watercourses and fish habitat

Submission number: 13

Issue description

The respondent noted that the single watercourse affected by the proposal (tributary of Brickyard Creek) is not considered key fish habitat. Therefore there will be no approvals or concurrence required from the Department of Primary Industries – Fisheries should the detailed design involve any work within or adjacent to the creek.

Response

The licensing and approval requirements for the project have been updated accordingly (refer Table 5.2).

2.6.4 Protection of Bolivia wattle

Submission number: 10, 11, 12 and 14

Issue description

In summary, the respondents raised the issue of protecting the Bolivia wattle (*Acacia pycnostachya*) during the construction and post construction phases of the project.

Response

Detailed flora studies of the project study area were included in the REF identifying the location of Bolivia wattle within the project area, which included 30 individuals potentially affected by the proposal. The locations of these individuals was recorded using GPS. The type of bridge structure and locations of the bridge piers were selected to avoid the identified Bolivia wattle. Prior to the start of construction the location of each of the Bolivia wattle trees will be confirmed by a suitably qualified ecologist and fenced off to ensure there is no direct impact to these trees. Collection of seeds from the Bolivia wattle is to be considered as part of the development of the Biodiversity Offset Strategy.

The safeguards and management measures are identified in Table 5.1 numbers 7, 8, 10, 13 and 122.

2.7 Non-Aboriginal heritage

2.7.1 Memorials

Submission number: 9

Issue description

In summary, the respondent was concerned with regard to the roadside memorials and asked if a temporary memorial could be placed on the roadside during December.

Response

Roadside tributes are typically placed by the side of a road to acknowledge the death of a person who may have been involved in road trauma. These tributes are an important part of the grieving process for the families involved.

Roads and Maritime Services has developed guidelines to assist community members to plan and prepare roadside tributes to ensure they do not present a safety risk for other drivers or those visiting the tribute.

During the preparation of the REF Roads and Maritime made attempts to contact the owners of all existing roadside tributes within the project area to seek their feedback. We will continue to work with the owners of these tributes as the project progresses.

If, during construction, Roads and Maritime needed to move a roadside tribute we would:

- Endeavour to identify tributes that may be affected by the work
- Contact the family, if known, and work with them to safely store the tribute until work is complete. Some families may opt to relocate the tribute permanently at that time
- Consider the family's views on how best to re-create or relocate the tribute.

If a tribute's owner cannot be located, Roads and Maritime will store the tribute off site for an appropriate length of time.

The safeguards and management measures are identified in Table 5.1 numbers 31 and 32.

2.7.2 Travelling stock route

Submission number: 15

Issue description

In summary, the respondent was concerned with the level of non-Aboriginal heritage assessment that has been conducted with regard to the travelling stock route and that the appropriate safeguards would be implemented.

Response

Potential impacts to the travelling stock route area comprise a temporary work access track and widening of the existing New England Highway. These areas are already disturbed from previous quarrying activity and the access track to this quarry. The alignment of the temporary works access track will be close to that of the existing track to minimise impacts in this area. No relics associated with the travelling stock route were located during a recent survey of the proposal area. The impact on Non-Aboriginal heritage values of the item would be minor in the context of its large geographical extent. The REF requires that a Non-Aboriginal heritage management plan be prepared as part of the CEMP. If potential archaeological relics are identified during construction, The Roads and Maritime Standard Management Procedure for Unexpected Heritage Items (updated March 2015) would be implemented. Roads and Maritime believe that the level of assessment of the travelling stock route and the associated safeguards are appropriate given the small potential impact on the item and low likelihood of discovering relics during construction. As part of the additional heritage assessment extensive walk overs were carried out in this area.

The safeguards and management measures are identified in Table 5.1 number 32.

2.7.3 Former Bolivia township

Submission number: 15

Issue description

In summary, the respondent was concerned with regard to any change of design or change of work having potential impact on the former Bolivia township and the need for further assessment in the event of changes.

Response

The current design does not impact the former Bolivia township with the work involved in the proposal being within the road corridor. Additional environmental assessment would be required if design changes resulted in potential impacts to the former township. The safeguards and management measures are identified in Table 5.1 number 32.

2.7.4 Heritage interpretation

Submission number: 15

Issue description

In summary, the respondent supported the investigation of opportunities to install interpretation during the project.

Response

A Heritage Interpretation Plan will be prepared, with consideration of the location, safety of access, and style of interpretation appropriate to the project

The safeguards and management measures are identified in Table 5.1 number 123.

2.7.5 Additional impacts through scope change

Submission number: 15

Issue description

In summary, the respondent was concerned in regards to the REF requiring amendment if any project changes may potentially impact heritage items.

Response

Any design changes in the areas of heritage significance would be assessed for potential impacts to the heritage items, with the REF updated accordingly.
The safeguards and management measures are identified in Table 5.1 number 32.

2.8 Land use, property and socio-economic impact

2.8.1 Acquisition of Crown Land

Submission number: 10

Issue description

In summary, the respondent was aware that acquisition of Crown Land would be a necessary part of the progress of the project.

Response

Roads and Maritime will provide the Department of Primary Industries Lands with a copy of a draft acquisition plan for comment before impacts of this acquisition on the residual area of affected reserves can be determined.

The amended safeguards and management measures are identified in Table 5.1 (number 97).

2.8.2 Aboriginal land claims

Submission number: 10

Issue description

In summary, the respondent raised the issue of Aboriginal land claims that exist on Crown land that may be affected by the project. Land claims would need to be dealt with by Roads and Maritime prior to the start of work, or as part of the acquisition process.

Response

As part of the Roads and Maritime process to acquire land from the Crown in relation to Aboriginal land claims under the State Act, and native title under the Commonwealth Act, Roads and Maritime ensures these matters are dealt with appropriately. The safeguards and management measures are identified in Table 5.1 number 97.

2.9 Aboriginal heritage

Submission number: 12

Issue description

In summary, the respondent recommended that the current proposed route should be subject to further assessment in the form of an archaeological survey and a final consolidated report, correcting the errors and anomalies within the current documents, be submitted to the Office of Environment and Heritage (OEH) for review.

Response

A letter of advice for the project in relation to the preferred road design and the location of identified Aboriginal sites and areas of Potential Archaeological Deposit (PAD) has been prepared following further site investigations carried out by Artefact, Moombahlene Local Aboriginal Land Council and Roads and Maritime. The Aboriginal sites and areas of PAD were identified during previous archaeological investigations, further assessed and PAD boundaries refined. As a result of the assessment the following recommendations have been made:

- A larger buffer zone is added around the northern margin of site Bolivia Hill AS1
- The proposed northern compound location boundary is refined to avoid impact to PAD 2
- The location of Bolivia Hill AS1, PAD 2 and PAD 4 are included in the CEMP for the proposed works to ensure no direct or indirect (such as erosion) impact to those areas
- The location of BH AS1, PAD2 and PAD4 will be included in an induction to all workers to ensure that those areas are not impacted
- In addition to inclusion in the CEMP and inductions for all workers, no-harm areas are established around the perimeter of Bolivia Hill AS1 and around those portions of PAD 2 and PAD 4 that are closest to the construction work
- The Roads and Maritime Standard Management Procedure for Unexpected Heritage Items (updated March 2015) would be implemented where unexpected finds or human skeletal remains are encountered during construction.

As a result of the assessment the buffer areas beside AS1, PAD2 and PAD4 have been modified. A larger buffer zone has been added around the northern margin of site Bolivia Hill AS1. The proposal project boundary has been moved beside PAD2 and PAD4 to allow the larger buffer areas. The CEMP will include the locations of AS1, PAD2 and PAD4 to ensure no direct or indirect impacts to those areas. The amended safeguards and management measures are identified in Table 5.1 numbers 24 to 30.

A copy of the investigation findings is provided in Appendix B.

2.10 Environmental management

2.10.1 Environmental concerns on Crown Land

Submission number: 10

Issue description

In summary, the respondent raised a number of environmental concerns on how the project will impact Crown land. The main concerns raised were:

- The potential increased fragmentation of the landscape and the disturbance and clearing of land
- Cleared vegetation retained and to be used as fauna habitat in rehabilitation
- Removal of Bolivia wattle exclusion fencing at the end of the project
- Use of only topsoil from the site during rehabilitation and
- Ensuring that any exotic grass seeds used during hydromulching are sterile.

Response

The need to remove fencing at the end of the project has been added into the safeguards and management measures.
Any hydromulching to be used throughout the project will use seeds from native local species with any exotic species seeds used being of a sterile variety.
The REF acknowledges the potential environmental impacts identified in the submission. Safeguards and management measures that address these concerns are identified in Table 5.1 (numbers 13, 16, 17, 19, 47 and 51).

2.10.2 Bushfire risk

Submission number: 10

Issue description

In summary, the respondent raised the issue that there was no mention in the REF of bushfire management planning or activities to reduce bushfire likelihood of construction work was included in the REF.

Response

A Bushfire Management Plan would be included in the Project Health and Safety Plan that would be prepared prior to work starting. Bushfire risks from site work would be identified and provide mitigation measures for the identified risks. The plan would also include the response practices and site management in the event of a bushfire.

The requirement for a Bushfire Management Plan has been added to the safeguards and management measures in Table 5.1 (number 121).

2.11 Noise and vibration/air quality

Submission number: 12

Issue description

The respondent commented that matters relating to noise, air and water quality and any licensing requirements under the *Protection of the Environment Operations Act 1997* (*POEO Act*) should be addressed by the Environment Protection Authority (EPA).

Response

Roads and Maritime contacted the EPA with regard to the proposal and requested comment on the REF. The EPA responded stating that while the EPA is the appropriate regulatory authority with respect to the proposal the EPA does not need to be consulted on individual minor projects. The EPA commented that the road construction activities are the responsibility of Roads and Maritime and to ensure that all planning and implementation complies with the *POEO Act,* with consultation with the EPA not routinely required.

Under the *POEO Act* Schedule 1 the proposal does not require an Environmental Protection Licence (EPL) for road construction and is therefore not considered a major project according to the following criteria:

> *35 Road construction*
>
> *(1) This clause applies to road construction, meaning the construction, widening or re-routing of roads, but does not apply to the maintenance or operation of any such road.*
>
> *(2) The activity to which this clause applies is declared to be a scheduled activity if it results in the existence of 4 or more traffic lanes (other than bicycle lanes or lanes used for entry or exit) for at least:*
>
> *(a) where the road is classified, or proposed to be classified, as a freeway or tollway under the Roads Act 1993:*
>
> *(i) 1 kilometre of their length in the metropolitan area, or*
>
> *(ii) 5 kilometres of their length in any other area, or*
>
> *(b) where the road is classified, or proposed to be classified, as a main road (but not a freeway or tollway) under the Roads Act 1993:*
>
> *(i) 3 kilometres of their length in the metropolitan area, or*
>
> *(ii) 5 kilometres of their length in any other area.*

Under the POEO Act Schedule 1 the proposal may require an EPL for extractive activities. During the detailed design the volume of extractive activities to be carried out would be calculated and if the trigger value of 30,000 tonnes per year was exceeded an EPL would be sought prior to the start of work.

3 Additional assessment

Following the public display of the REF, Roads and Maritime received further specialist advice in relation to the impact of noise and vibration from the project on the local area and nearby sensitive receptors.

3.1 Noise and vibration impact assessment

3.1.1 Summary

A noise and vibration impact assessment was carried out after the REF was placed on public display. The assessment was conducted in order to assess the impact of noise and vibration on the nearby fauna and on local residences and buildings. The assessment considered potential noise impacts from operations, construction activities and blasting and potential vibration impacts from construction and blasting (Appendix C).

Operational noise is not anticipated to increase as a result of the project. The noise level is expected to remain below the base noise criteria prescribed by the *NSW Road Noise Policy*.

Construction noise was assessed in accordance with the NSW Interim Construction Noise Guideline for the recommended standard hours. Some minor exceedances of the noise management level are expected from the greatest noise generating activities such as impact piling and rock breaking. These exceedances are due primarily to the low criteria, which are in turn due to the low-background-noise environment surrounding the proposal. With the application of noise management measures detailed in the noise and vibration impact assessment report, minimal impacts would be expected to result from construction noise.

Construction noise is predicted to be well below the highly affected level and in fact the highest levels are predicted to be similar to existing traffic noise levels at the most-affected receivers.

Vibration from construction is predicted to be well within relevant criteria at surrounding receivers and vibration-sensitive structures.

The large distances between any potential blasting sites and the nearest sensitive receivers means that any practical blast designs would be expected to yield airblast overpressure and ground vibration levels within appropriate criteria. Nonetheless, the maximum instantaneous charge detailed in the noise and vibration impact assessment report serves as a starting point for detailed blast design, which would be undertaken at a later stage.

The noise and vibration impact assessment has been reviewed by the specialist who undertook the fauna impact assessment for the proposal, who noted that:

- While the project would create noise levels that are within thresholds identified to affect fauna the timing and duration of noise events are unlikely to have population level effects or cause fauna to permanently abandon habitat surrounding the construction site
- Some temporary avoidance of the construction site by fauna may occur during peak noise levels
- The assessment of noise impacts included in the New England Highway Upgrade Bolivia Hill: Impact Assessment – Terrestrial Fauna (Appendix C of the REF) accurately reflect the likely effect of the upgrade on native fauna.

The noise and vibration impact Assessment has also been reviewed by the specialist who undertook the Aboriginal and non-Aboriginal assessments for the project who noted that:

- On the understanding that physical impacts, such as from blasting and vibration, are contained within the currently assessed proposal site boundary, the specialist did not identify any heritage constraints resulting from noise and vibration.

3.1.2 Additional management and mitigation measures

The additional assessment undertaken for the noise and vibration impact requires no changes to the safeguards and management measures identified in the REF.

3.2 Aboriginal heritage assessment

The current proposed route was subject to further assessment in the form of targeted archaeological site investigations. A letter of advice for the project in relation to the preferred road design and the location of identified Aboriginal sites and areas of (PAD) has been prepared following further site investigations undertaken by Artefact, Moombahlene Local Aboriginal Land Council and Roads and Maritime. The Aboriginal sites and areas of PAD were identified during previous archaeological investigations, further assessed and PAD boundaries refined.

As a result of the assessment the buffer areas beside AS1, PAD2 and PAD4 have been modified. A larger buffer zone has been added around the northern margin of site Bolivia Hill AS1. The proposal project boundary has been moved beside PAD2 and PAD4 to allow the larger buffer areas. The CEMP will include the locations of AS1, PAD2 and PAD4 to ensure no direct or indirect impacts to those areas.

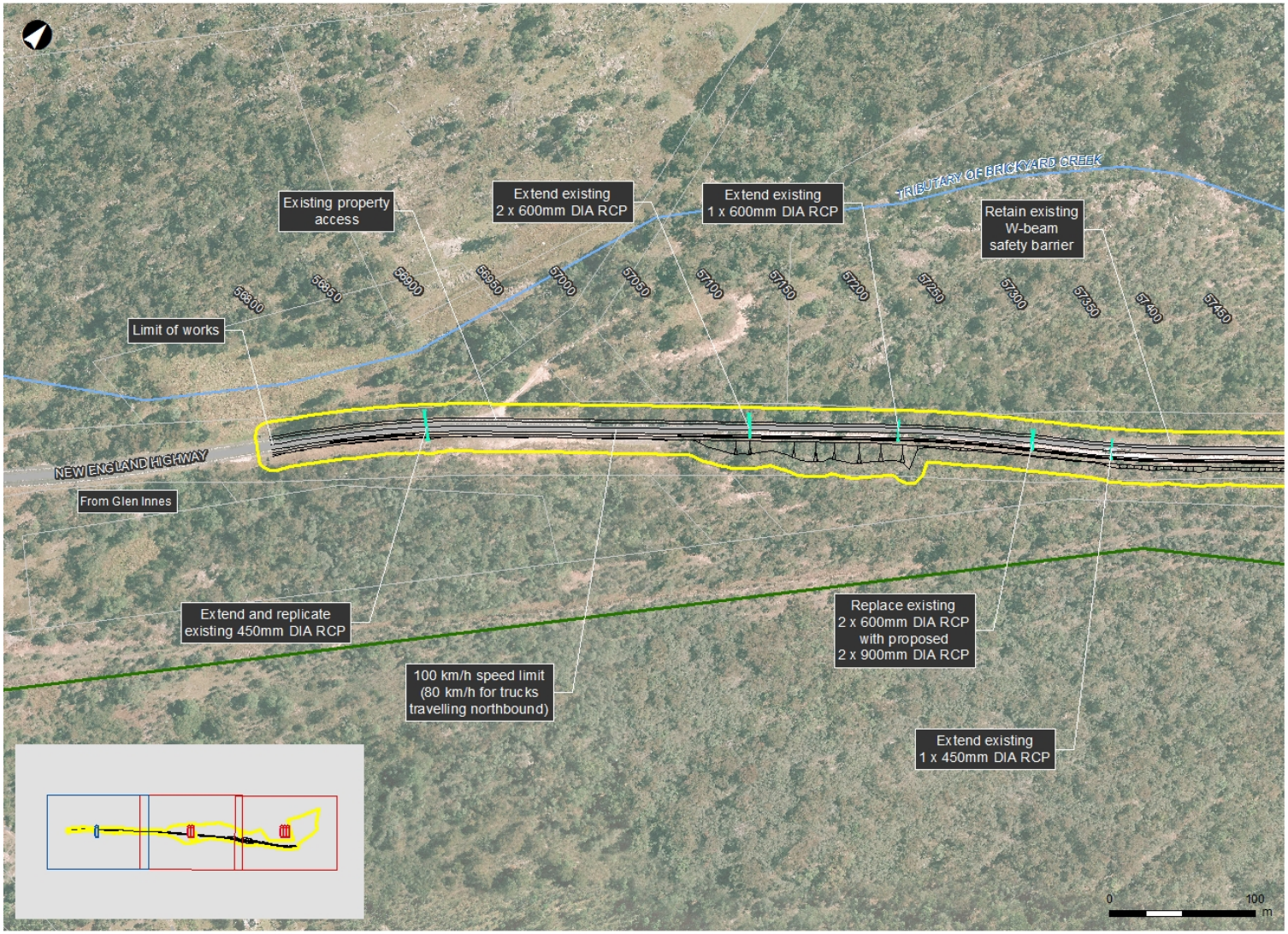
A copy of the investigation findings is provided in Appendix B.

The safeguards and management measures have been modified to include the changes mentioned above. These changes are identified in Table 5.1 (numbers 24 to 30).

4 Changes to the proposal

As a result of the recommendations made in the Aboriginal heritage assessment the proposal project boundaries have been altered. A larger buffer zone has been added around the northern margin of site Bolivia Hill AS1. The western boundary of the compound area has been moved east to allow for a buffer area around PAD2. The proposal project boundary next to PAD4 has also been moved to the south to allow a buffer zone around PAD4. The amended Figure 1.2 below indicates the changes to the proposal project area boundaries.

No other changes to the proposal were made in regard to the submissions received. However safeguards have been amended to reflect issues raised in submissions received.



LEGEND

- Proposal Area
- Concept Design
- Site Office, Compound and Batch Plant
- Potential Laydown Area / Construction Facility
- Proposed G4 W Beam Safety Barrier
- Proposed Retaining Wall
- Culvert
- Property Boundary
- Bolivia Hill Nature Reserve
- Waterway

DIA = Diameter
RCP = Reinforced Concrete Pipe

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Scale: 1:4,000 @A4

DATA SOURCES
RMS, LPI

Transport Roads & Maritime Services NSW

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Hyder

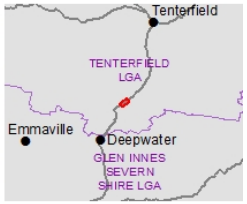

Figure 1-2i: The proposed New England Highway upgrade at Bolivia Hill - Chainage 56800 to 57450

Note: Design subject to refinement at detailed design stage

Date: 4/12/2015 Path: \\HC-AUS-ED-FS-01\Jobs\AA006996\L-GIS\A_Current\B_Maps\Submissions\AA006996_Subs_F001-2_ProjectDescriptionPlan_A4_3pg_r1v1.mxd
Created by : GC
QA by : MR

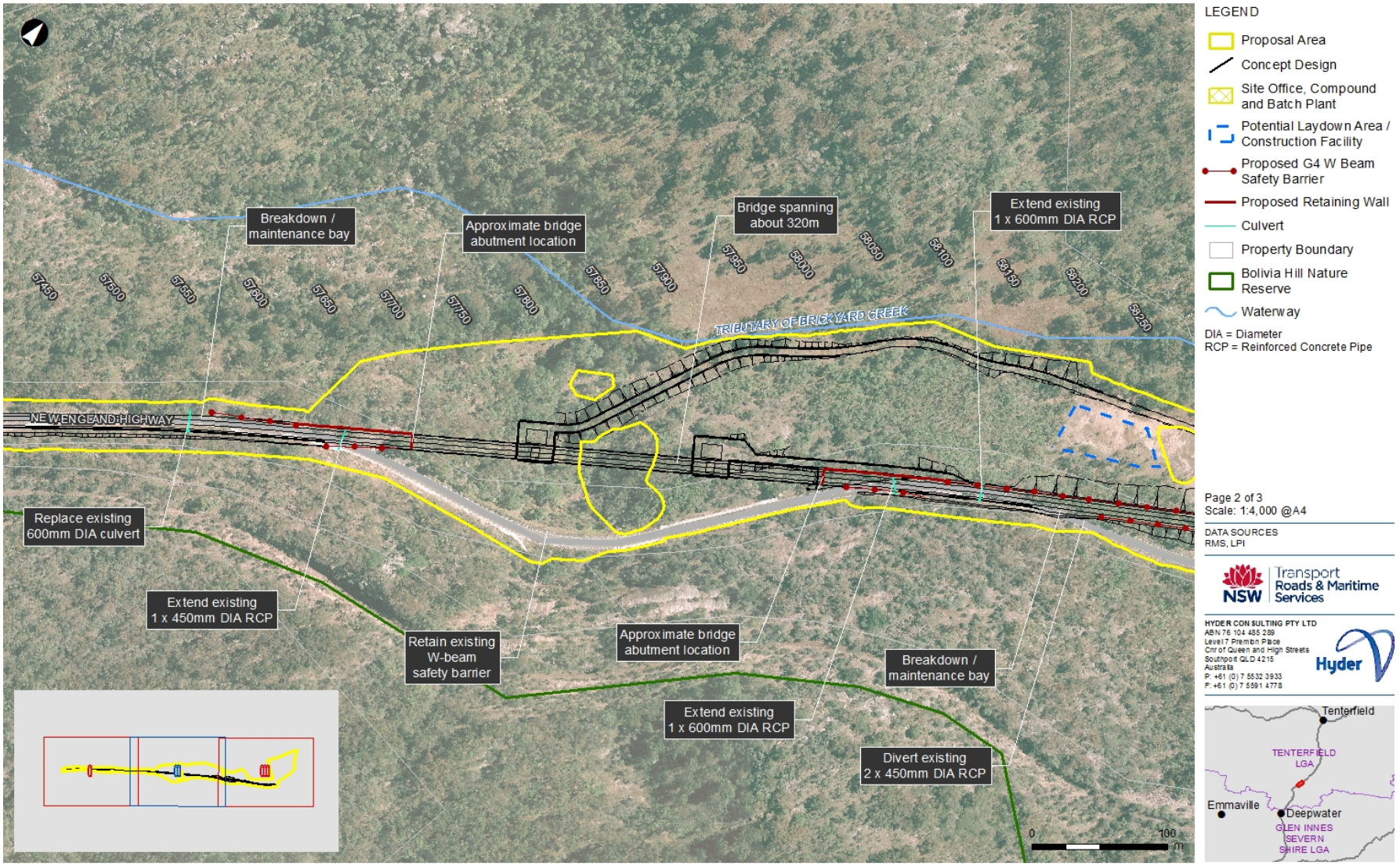

Figure 1-2ii: The proposed New England Highway upgrade at Bolivia Hill - Chainage 57450 to 58250

Note: Design subject to refinement at detailed design stage

Date: 4/12/2015 Path: \\HC-AUS-ED-FS-01\Jobs\AA006996\L-GIS\A_Current\B_Maps\Submissions\AA006996_Subs_F001-2_ProjectDescriptionPlan_A4_3pg_r1v1.mxd
Created by : GC
QA by : MR

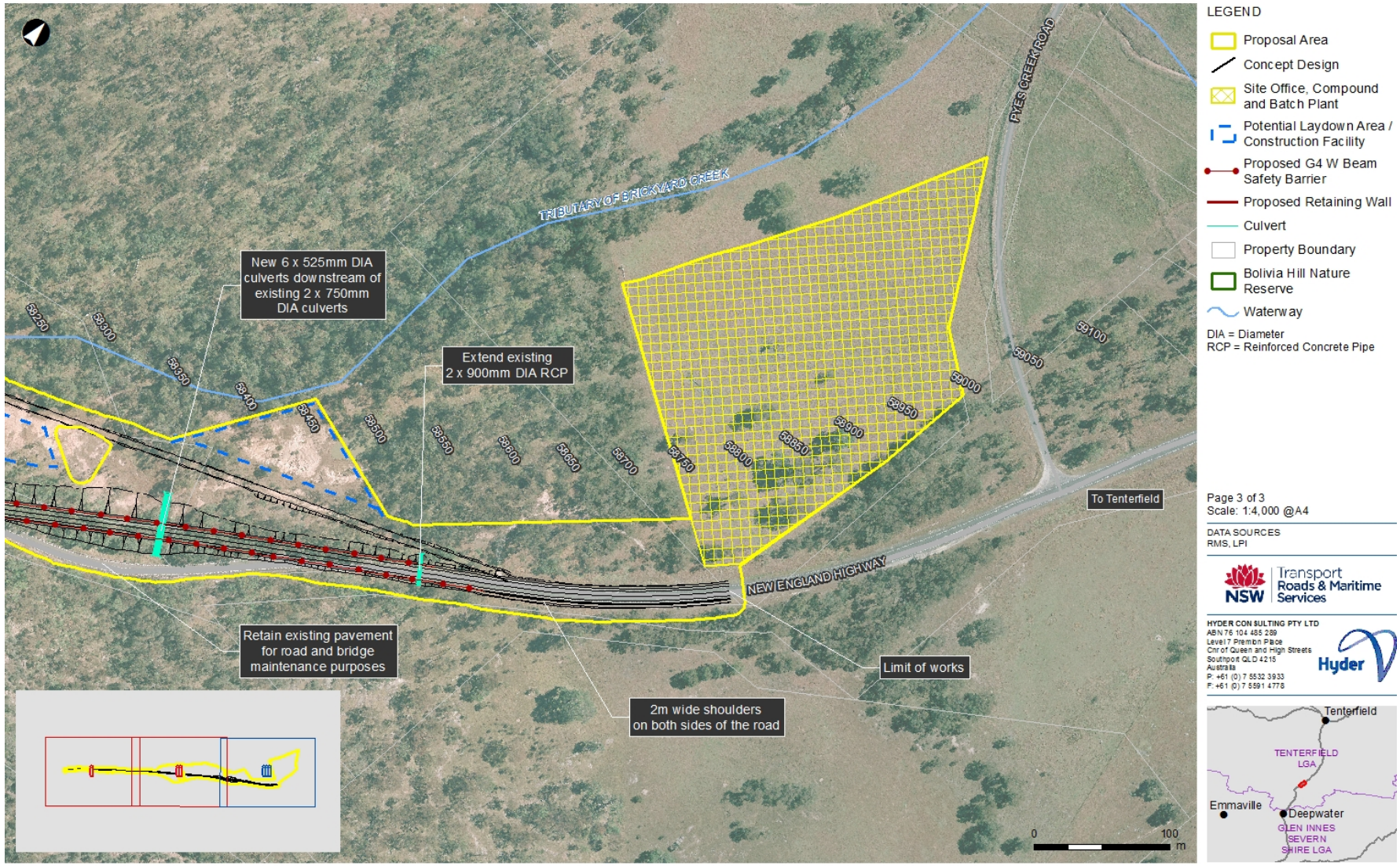

Figure 1-2iii: The proposed New England Highway upgrade at Bolivia Hill - Chainage 58250 to 59100

Note: Design subject to refinement at detailed design stage

5 Environmental management

The REF for the Bolivia Hill upgrade identified the framework for environmental management, including management and mitigation measures that would be adopted to avoid or reduce environmental impacts (Section 7 of the REF).

After consideration of the issues raised in the public submissions and changes to the proposal, the management and mitigation measures have been revised.

Should the proposal proceed, environmental management would be guided by the framework and measures outlined below.

5.1 Environmental management plans (or system)

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

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

The plans would be prepared prior to construction of the proposal and must be reviewed and certified by environment staff, [Roads and Maritime, Northern Region], prior to the start of any on-site work. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan) and the QA Specification G40 – Clearing and Grubbing.

Refer to section 7.1 of *Preparing a project REF guidance note* (EIA-P05-G02) for further assistance if required.

5.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposed work on the surrounding environment. The safeguards and management measures are summarised in Table 5.1 below.

Table 5.1: Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
1	General	All environmental safeguards must be incorporated within the following: • Project Environmental Management Plan • Detailed design stage • Contract specifications for the proposal • CEMP	Project manager	Pre-construction
2	General	A risk assessment must be carried out on the proposal in accordance with the Roads and Maritime Services Project Pack and PMS risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented. A review of the risk assessment must be undertaken after the initial audit or inspection to evaluate if the level of risk chosen for the project is appropriate. Any work resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration.	Project manager and regional environmental staff	Pre-construction After first audit
3	General	A contractual hold point must be maintained until the CEMP is reviewed by the Roads and Maritime Services Environment Manager for Freight and Regional.	Project manager	Pre-construction
4	General	The Roads and Maritime Services Project Manager must notify the Roads and Maritime Services Environmental Freight and Regional office at least five working days prior to work commencing.	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
5	General	All businesses and residences likely to be affected by the proposed works must be notified at least five working days prior to the commencement of the proposed activities.	Project manager	Pre-construction
6	General	Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors.	Contractor	Pre-construction and during construction as required.
7	Impacts on threatened flora species	There is to be no disturbance or damage to threatened species or critical habitat. (Refer Sections 2.6.4)	Roads and Maritime and construction contractor	During Construction
8	Impacts on threatened flora species	If unexpected threatened fauna or flora species are discovered, stop work immediately and follow the Roads and Maritime Services Unexpected Threatened Species Find Procedure in the Roads and Maritime Services Biodiversity Guidelines 2015 – Guide 1 (Pre-clearing process). (Refer Sections 2.6.1 and 2.6.4)	Roads and Maritime and construction contractor	During Construction
9	Impacts on threatened fauna species	Work is not to harm threatened fauna (including where they inhabit bridges or other structures eg timber fence posts).	Roads and Maritime and construction contractor	During Construction
10	Impacts on threatened flora species	Vegetation that has been protected or planted as part of offset work provided as part of an approved project (eg in association with fauna crossings) is not to be removed. (Refer Sections 2.6.1 and 2.6.4)	Roads and Maritime and construction contractor	During Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
11	Impacts on fauna	Fauna handling must be carried out in accordance with the requirements the Roads and Maritime Services Biodiversity Guidelines – Guide 9 (Fauna Handling).	Roads and Maritime and construction contractor	During Construction
12	Impacts on fauna	Construction work is not to create an ongoing barrier to the movement of wildlife.	Roads and Maritime and construction contractor	During Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
13	Impacts on threatened flora species	The CEMP in accordance with Biodiversity Guidelines, Protecting and managing biodiversity on ROADS AND MARITIME projects would include the following: • A map clearly showing vegetation clearing boundaries and sensitive areas/no-go zones • A site walk-over with site personnel including Roads and Maritime representatives to confirm clearing boundaries before the start of work. Clearing boundaries and location of exclusion zone fencing are marked out accurately with a surveyor due to the sensitive nature of Bolivia wattle population • Marking (for example, with flagging tape) of the clearing boundary and habitat features to be protected • A procedure for a suitably qualified ecologist to carry out pre-clearing flora and fauna surveys immediately before vegetation removal. Target species would include Bolivia Wattle (*Acacia pycnostachya*) • The 30 identified specimens of Bolivia Wattle are required to be protected prior to and during construction. There is to be no direct impact on these plants. These areas would need to be fenced off. **The protection fencing would be removed at the completion of site work.** • A staged clearing process in accordance with Roads and Maritime's Biodiversity Guidelines (2011) including the requirements of guides 1, 2, 4 & 9 • Identify control/ mitigation measures to prevent impacts on sensitive locations or no-go zones • Protocols to prevent the introduction or spread of pathogens (eg Phytophthora) in accordance with Guide 7 of Roads and Maritime's Biodiversity Guidelines (2011)	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
		• Provision of education to all personnel taking part in construction activities with regards to the importance of clearing limits, land uses and threatened species and communities; and the legislative responsibilities of personnel. (Refer Sections 2.6.1, 2.6.4 and 2.1)		
		If unexpected threatened flora are discovered, work would stop immediately and the RTA Unexpected Threatened Species Find Procedure in the Roads and Maritime's Biodiversity Guideline (2011) implemented. (Refer Sections 2.6.1 and 2.6.4)	Roads and Maritime and construction contractor	Construction
		The proposal design would be reviewed during detailed design to determine if it is possible to minimise clearing of native vegetation, particularly TECs. (Refer Sections 2.6.1 and 2.6.4)	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
14	Impacts to riparian areas	Riparian areas disturbed by the proposal would be rehabilitated as soon as practicable in accordance with Roads and Maritime Services Biodiversity Guidelines 2011 – Guide 10: Aquatic habitats and riparian zones. The project manager and/or environment manager should ensure that the following is considered during site rehabilitation: • Stabilising the banks of the waterway through revegetation and/or armouring according to available landscape plans • Banks are protected from stock and/or human access • Appropriate fencing is used during rehabilitation and maintenance. Temporary stabilisation techniques are used while long-term measures such as the revegetation are establishing (techniques are described in the Blue Book).	Roads and Maritime and construction contractor	Pre-construction, construction and monitoring post construction for establishment and weed invasion management
15	Impacts on the aquatic environment	Appropriate erosion and sediment controls would be established across the site and as a last line of defence to the Brickyard Creek tributary (refer to Section 6.1 of this REF).	Roads and Maritime and construction contractor	Construction
		A spill management plan would be prepared to minimise the risk of spills and ensure adequate provision of spill management equipment on site, particularly at waterways.	Roads and Maritime and construction contractor	Construction
		Waterways (namely, Brickyard Creek and its tributary) would be identified as no-go zones to site staff. These exclusion zones would need to be fenced off to keep personnel and equipment out of these areas. Exclusion zones will incorporate a 10m buffer from the watercourse bank.	Roads and Maritime and construction contractor	Construction
		No work would occur within 10 m of the edge of the channel banks of the Brickyard Creek tributary.	Roads and Maritime and construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
		No snags (coarse woody debris) or rocks are to be removed from within any waterway.	Construction contractor	Construction
16	Weeds and pathogens	Actions for weed management would be developed as part of the CEMP in accordance with the requirements of Roads and Maritime's Specification G36 and Specification G40. Actions would include, but not be limited to the following measures: • The identification of the type and location of weeds of concern (including noxious weeds) within the proposal area • The identification of sensitive receivers (such as native vegetation and waterways) within or near the proposal area • All pathogens (eg Chytid, Myrtle Rust and Phytophthora) would need to be managed in accordance with the Roads and Maritime Services Biodiversity Guidelines – Guide 7 (Pathogen Management) and DECC Statement of Intent 1: Infection of native plants by *Phytophthora cinnamomi* (for Phytophthora) • Measures to prevent the spread of weeds, fungi and pathogens namely *Phytophthora cinnamomi* and myrtle rust including hygiene procedures for equipment, footwear and clothing • A requirement that weeds (including declared noxious weeds) be managed and disposed of in accordance with requirements of the Noxious Weeds Act 1993 and Guide 6 of Roads and Maritime's Biodiversity Guidelines (2011) • Communication strategies to improve contractor awareness of weeds and weed management • **Any spray grass/hydromulching that incorporates exotic grass species must ensure that seeds are from a sterile strain.** (Refer Section 2.10.1)	Roads and Maritime and construction contractor	Pre-construction and post construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
		Any application of herbicide for weed management would be undertaken in accordance with the requirements of the *Pesticides Act 1999* and herbicide that is appropriate to the sensitivity of the area would be used. Approval by the Roads and Maritime's Regional Environmental Officer would be obtained prior to use.	Construction contractor	Pre-construction, construction and post construction. Especially in riparian areas adjacent to Brickyard Creek
17	Fauna protection	Install fauna exclusion fence on both sides and for the entire length of the proposed upgrade. Exclusion fence may be substituted with other natural features, such as vertical rock face, where these features occur in suitable locations. Gates should be installed where the exclusion fence crosses the former highway. An assessment shall be undertaken by a suitably qualified ecologist to determine the type and extent of exclusion fence, sections of the alignment where fence can be supplemented with natural barriers and suitable alternatives where there is a high risk of rock falls damaging the fence. Exclusion fence must tie into bridge and culvert underpasses to ensure it guides fauna to these structures. Returns should be installed at each end.	Roads and Maritime and construction contractor	Pre-construction and construction
		Signs would be installed warning motorists that quolls cross in the Bolivia Hill area.	Roads and Maritime and construction contractor	Pre-construction and construction
		A suitably qualified ecologist undertake targeted surveys during the breeding season to assess the status of the suspected little eagle nest. Surveys should aim to determine if the nest is active and confirm use by little eagle.	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
		If the subject nest is confirmed as an active little eagle nest, no high impact construction activities, such as blasting, rock cutting, rock splitting, crushing, dumping rock etc, should not occur within 100-200m to be determined by ecologist with respect to activity, of the nest site during the breeding season i.e. May to October. Following the commencement of construction the nest should be inspected for activity. If the nest is inactive during the construction period then no restrictions would apply.	Roads and Maritime and construction contractor	Pre-construction
		Construction vehicles would remain within designated work zone areas and not encroach outside of these areas. Strict access restrictions would be imposed on the travelling stock route areas at the northern end of the subject site to avoid disturbance to threatened woodland birds.	Construction contractor	Construction
18	Fauna connectivity	To improve connectivity assess the feasibility of remediating a section of existing highway adjacent to the proposed large bridge underpass. A feasibility assessment would be undertaken to see if this area can be revegetated. Remediation may be feasible in areas where the existing highway is situated on fill, such as the drainage line extending from the cliff face.	Roads and Maritime and construction contractor	Pre-construction and construction
19	Fauna habitat loss	Rocks and large logs removed from the alignment should be stockpiled and used to create additional habitat in rehabilitated areas and near the large bridge underpass. (Refer Section 2.10.1)	Construction contractor	Pre-construction and construction
		Detailed design would aim to further minimise vegetation removal. This can be achieved by restricting the clearing boundary to the area required for construction, placing stockpiles and ancillary facilities in cleared land and utilising existing access tracks for site access.	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
		A nest box management plan would be prepared that quantifies impacts on the extant hollow resource and determines the appropriate number and type of boxes required to compensate for removal of arboreal hollows on threatened species and important prey for threatened species. The nest box management plan would include a detailed survey to quantify impacts on hollow-bearing trees.	Roads and Maritime and construction contractor	Pre-construction
		~~The removal of mature Blakely's Red Gum would be minimised during construction of the access road.~~	~~Construction contractor~~	~~Pre-construction and construction~~
		The removal of mature Blakely's red gum would be minimised during construction of the access road. Also minimising removal of mountain banksia (Banksia canei) at the southern end of the project.	Construction contractor	Pre-construction and construction
		Existing vegetation beneath the bridge would be retained were possible, and ancillary sites disturbed during bridge construction would be rehabilitated.	Roads and Maritime and construction contractor	Pre-construction and construction
		Ancillary sites will be remediated upon completion of work. Planting of key nectar species such as Blakely's red gum, Mountain banksia and rough-barked apple in the revegetation of ancillary sites	Roads and Maritime and construction contractor	Construction and post-construction
		Implement standard clearing procedures in accordance with Roads and Maritime Services Biodiversity Guidelines 2011, including, but not limited to, daily pre-clearing survey, two-stage clearing protocol (non-hollow bearing trees and hollow bearing trees), hollow bearing tree inspection and fauna relocation.	Roads and Maritime and construction contractor	Construction and post-construction
		Where possible, current traffic movements and property accesses would need to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.	Contractor	During construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
20	Construction traffic management	A traffic management plan would be prepared and implemented for the work site as part of the CEMP. The traffic management plan would be prepared in accordance with Traffic Control at Worksites (Roads and Maritime 2010), Australian Standard AS1742 and the Roads and Maritime Specification G10 work site manual. The traffic management plan would include: • Identification of all public roads to be used by construction traffic • Management methods to direct construction traffic to use identified roads • Identification of all public roads that may be partially or completely closed during construction, and the expected timing and duration of closures • Details of likely impacts on existing traffic • Traffic controls to manage and regulate traffic movements, including minimising traffic switching • Maintenance of continuous, safe and efficient movement of traffic for both the public and construction workers • Details on access to construction sites, including entry and exit locations, and measures to prevent construction vehicles queuing on public roads • A response plan for any incident involving construction traffic • Provision of appropriate warning and advisory signposting • Mechanisms for monitoring, reviewing and amending the success of the plan. (Refer Sections 2.3.2, 2.3.4 and 2.3.5)	Contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
21	Vehicle movement	Vehicle movement plans and haulage route plans would be prepared. Drivers working on the project would be briefed on these vehicle movement plans during project induction. Deliveries would be planned to occur outside peak traffic periods, where possible.	Contractor	During construction
22	Road occupancy	Applications for Road Occupancy Licences (ROL) would be submitted to Roads and Maritime and the relevant council at least 10 working days prior to proposed occupancy.	Contractor	Pre-construction and during construction
23	Road damage	Pre-construction road dilapidation reports would be prepared by the contractor for this section of the New England Highway and Pyes Creek Road (and any other roads likely to be used by construction traffic). Post construction road dilapidation reports (including photographic records) would be prepared after the completion of construction for all roads assessed prior to construction Dilapidation resulting from construction activity would be repaired Copies of road dilapidation reports would be sent to the relevant road authority.	Contractor	Pre-construction, during construction and post construction
24	Impact on known Aboriginal heritage sites	The CEMP would specify the locations of BH AS1, PAD2 and PAD4 **for the proposed work to ensure no direct or indirect (such as erosion) impact to those areas.** (Refer Section 2.9)	Contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
25	Impact on known Aboriginal heritage sites	Site inductions would include Aboriginal heritage information including the locations of BH AS1, PAD2 and PAD4 to ensure all site workers know of the areas. **No-harm areas would need to be established around the perimeter of Bolivia Hill AS1 and around those portions of PAD 2 and PAD 4 that are closest to the construction work.** (Refer Section 2.9)	Contractor	Pre-construction and during construction
26	Impact on known Aboriginal heritage sites	High visibility fences/barricades would be placed around the BH AS1 exclusion area **and around those portions of PAD 2 and PAD 4 that are closest to the construction work.** This barricade will be constructed in consultation with a Roads and Maritime Aboriginal Heritage Officer. (Refer Section 2.9)	Construction contractor	Pre-construction and construction
~~27~~	~~Impact on known Aboriginal heritage sites~~	~~High visibility fences/barricades would be placed around the BH AS1 exclusion area. This barricade will be constructed in consultation with an RMS Aboriginal Heritage Officer. (Refer Section 2.9)~~	~~Contractor~~	~~During construction~~
28	Impact on known Aboriginal heritage sites	During detailed design, the proposed access track would be refined following survey to accommodate a three metre buffer zone **on all sides of** ~~for~~ BH AS1 ~~along the western border of that site~~. BH AS1 would be surveyed and pegged out in consultation with Roads and Maritime Aboriginal Heritage prior to being fenced with man proof fencing during survey fieldwork and geotechnical investigations. **The proposed northern compound location boundary would be refined to avoid impact to PAD 2.** (Refer Section 2.9)	Principal Consultant	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
29	Impact on unknown Aboriginal heritage sites	In the event of an unexpected find of an Aboriginal heritage item (or suspected item), work would cease in the affected area and Roads and Maritime's Regional Environmental Officer and Senior Environmental Specialist (Aboriginal heritage) would be contacted for advice on how to proceed. Roads and Maritime's Unexpected Archaeological Finds Procedure (2011) would be implemented. (Refer Section 2.9)	Construction contractor	Construction
30	Possible disturbance to known Aboriginal heritage	Detailed design would seek to minimise or avoid impacts on known heritage items. (Refer Section 2.9)	Principal consultant	Detailed design
31	Impacts on known non-Aboriginal heritage Items	Where impacts are to occur on identified heritage items, mitigation measures would be followed. The mitigation measures would include following Roads and Maritime's Roadside Tributes Policy. (Refer Sections 2.7.1)	Roads and Maritime	Pre-construction
32	Impacts on known non-Aboriginal heritage Items	A non-indigenous heritage management plan would be compiled as part of the CEMP. **If potential archaeological relics are identified during construction, Roads and Maritime's Unexpected Archaeological Finds Procedure 2015 would be implemented.** **Any design changes in the area of the former Bolivia township and other areas of heritage significance would be assessed for potential impacts and included in an addendum REF.** (Refer Sections 2.7.1, 2.7.2, 2.7.3, 2.7.4 and 2.7.5)	Roads and Maritime	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
33	Possible disturbance of unexpected skeletal remains	In the unlikely event that skeletal remains are identified during construction the area should be cordoned off so that the site/s can be adequately assessed and managed in accordance with the Roads and Maritime Standard Management Procedure – Unexpected Heritage Finds (2015).	Construction contractor	Construction
34	Impacts on non-Aboriginal heritage Items	Archival recording of impacted items would be undertaken in accordance with the Roads and Maritime Guidelines on *How to Prepare Archival Records of Heritage Items*.	Construction contractor	Construction
35	Community Involvement	The development of an Aboriginal Participation Program in consultation with a Roads and Maritime Aboriginal Heritage Officer.	Roads and Maritime and construction contractor	Construction
36	Possible disturbance to unknown non-Aboriginal heritage items due to construction activities	All relevant staff, contractors and subcontractors should be made aware of their statutory obligations for heritage under the NSW *Heritage Act 1977* and best practice outlined in the Burra Charter 1999, which may be implemented as a heritage site induction.	Construction contractor	Construction
37	Increased area of flood inundation and flood velocities for construction and maintenance access	Flooding impacts would be reassessed following finalisation of construction and maintenance access requirements.	Roads and Maritime	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
38	Erosion and scour at culvert outlets	The drainage system would be designed to control outlet velocities. Scour protection devices would be incorporated at culvert outlets.	Roads and Maritime	Pre-construction and construction
39	Erosion and scour at culvert outlets	The drainage system would be designed to control outlet velocities and minimise the footprint of scour protection measures.	Roads and Maritime	Pre-construction and construction
40	Erosion and sediment control	Erosion and sediment control measures would need to be implemented and maintained to: • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert clean water around the site. (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).	Contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
41	Erosion and sediment control	During detailed design, an erosion and sedimentation management report would be prepared. The report would include (as a minimum): - Identified site catchment and sub-catchments, high risk areas and sensitive areas - Sizing of each of the above areas and catchments - Proposed staging plans for the project to ensure appropriate erosion and sediment control measures are possible - The likely volume of runoff from each catchment and sub-catchment in accordance with the Managing Urban Stormwater: Soils and Construction, Volume 1 and 2 (Landcom 2004) - Direction of water flow, both off-site and on-site - Diversion of off-site water around or through the site or details of separation of on-site and off-site water - The direction of runoff and drainage points during each stage of construction - The locations and sizing of runoff and drainage points during each stage of construction - The location and sizing of sediment basins/sumps and associated drainage (as required) to direct site water to the basin or sumps - A mapped plan identifying the above at all major construction stages - A review process by a soil conservationist and a process for updating the report to address any recommendations.	Principal consultant	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
42	Erosion and sediment control	A soil and water management plan would be prepared prior to construction and would need to include (as a minimum): - Identified site catchments and sub-catchments, high risk areas and sensitive areas - Sizing of each of the above areas and catchments - The likely runoff from each sub-catchment - Separation of on-site and off-site water - The direction of run-off and drainage points during each stage of construction - Direction of flow of on-site and off-site water - The locations and sizing of sediment basins or sumps and associated catch drains and/or bunds - The locations of other erosion and sediment control measures - Control measures to be implemented on wet weather events, including a mapped plan - A dewatering procedure for on-site water and basins if applicable - A process for reviewing and updating the plan on a fortnightly basis and/or when work alters.	Contractor	Prior to construction
43	Risk and hazards	Environmental Work Method Statements would be prepared for high-risk activities, such as: - Clearing and grubbing - Earthworks - Temporary creek diversion - Drainage work, including culvert construction - Bridge construction.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
44	Risk and hazards	Environmental Work Method Statements include: - Description of work/activities and machinery - Outline of the sequence of the work/activities, including interfaces with other construction activities - Identification of potential environmental risk/impact, including potential risk/impact associated with wet weather events - Evaluation of methods to eliminate/reduce the environmental risk - Mitigation measures to reduce environmental risk - Any safeguards resulting from consultation with public authorities and other stakeholders, where appropriate - A map indicating sensitive locations, likely potential environmental impacts, and work areas - Identification of work areas and exclusion zones - Operational and monitoring measures to reduce environmental impact - A process for assessing and reporting the performance of the implemented environmental control measures - A process for resolving environmental issues or conflicts and reporting outcomes.	Construction contractor	Pre-construction and construction
45	Erosion and sediment control	Stabilisation would be carried out for areas exposed for two weeks or more (including stockpiles and batters); for example, by covering with geotextile fabric, stabilised mulch, soil binder or spray grass	Contractor	Construction
46	Erosion and sediment control	Work areas would need to be stabilised progressively during the work.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
47	Erosion and sediment control	Localised erosion and sediment control measures would be implemented to minimise erosion and the volume of sediment transported from disturbed areas. Measures would include: • Temporary revegetation/ rehabilitation work to reduce the extent of disturbed surfaces • Temporary surface treatments or blanketing on exposed earth surfaces • Sediment barriers and sumps, in series where necessary • Vegetated buffer strips where necessary. **All temporary erosion and sediment control devices would be removed once the permanent measures are sufficiently established.** (Refer Section 2.10.1)	Construction contractor	Pre-construction and construction
48	Erosion and sediment control	Erosion and sedimentation controls would need to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.	Construction contractor	Pre-construction and construction
49	Erosion and sediment control	Control measures would be implemented at construction access points to the New England Highway within the proposal area to minimise dirt and mud tracking.	Construction contractor	Construction
50	Erosion and sediment control	All stockpiles would be designed, established, operated and decommissioned in accordance with the Road and Maritime *Stockpile Management Procedures* (2011a). Stockpiles would be sited: • At least 50 m from the nearest waterway In an area of low ecological and heritage conservation significance • On relatively level ground • Outside the 1 in 10 year ARI floodplain.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
51	Erosion and sediment control	Topsoil would be stockpiled separately for possible re-use in landscaping and rehabilitation. (Refer Section 2.10.1)	Construction contractor	Construction
52	Erosion and sediment control	Any material transported onto road surfaces would be swept and removed at the end of each working day and before rainfall.	Construction contractor	Construction
53	Erosion and sediment control	An accredited soil conservationist would be engaged to regularly inspect work throughout the construction phase on a monthly basis and subsequent report to Roads and Maritime.	Construction contractor	Construction
54	Contamination identified during construction	If contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks of contamination, such as the diversion of surface runoff, capture of any contaminated runoff or temporary capping. All other work that may impact on the contaminated area would cease until the nature of the contamination is been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritme Environment Manager and/or EPA.	Construction contractor	Construction
55	Accidental spill	A site specific emergency spill plan would be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management and relevant EPA guidelines. The plan would 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)	Construction contractor	Pre-construction and construction
56	Water Quality	There is to be no release of dirty water into drainage lines and/or waterways.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
57	Water Quality	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 erosion and sediment controls.	Construction contractor	Construction
58	Water Quality	Water quality control measures would need to be used to prevent any materials (eg. Concrete, grout, sediment etc) entering drain inlets or waterways.	Construction contractor	Construction
59	Water Quality	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system.	Principal consultant	Detailed design
60	Water Quality	Potable water is used for wash down.	Construction contractor	Construction
61	Water Quality	Excess debris from cleaning and washing is removed using hand tools.	Construction contractor	Construction
62	Water Quality	Containment material is used to capture / filter water used in wash down.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
63	Construction noise and vibration	A construction noise and vibration management plan (CNVMP) would be prepared as part of the CEMP in accordance with the Interim Construction Noise Guideline (DECCW 2009). The CNVMP would detail mitigation, monitoring and community liaison measures and: • Identify potentially impacted locations and properties (including a detailed map) • Assess potential risk for activities likely to impact residents • Identify mitigation measures to reduce excessive noise and/or vibration during construction, including those associated with controlled blasting (if required) and truck movements • Outline a process for assessing the performance of implemented mitigation measures • Outline a process for resolving issues and complaints.	Construction contractor	Pre-construction
64	Construction noise and vibration	Work would be carried out during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Any work performed outside normal work hours or on Sundays or public holidays would need to minimise noise impacts.	Construction contractor	During Construction
65	Construction noise and vibration	Noise impacts would need to be minimised in accordance with Practice Note 7 in the Roads and Maritime Services Environmental Noise Management Manual and Roads and Maritime Services Environmental fact sheet No. 2- Noise Management and Night Works.	Construction contractor	During Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
66	Air Quality	An air quality management plan (AQMP) would be prepared as part of the construction environmental management plan (CEMP). The AQMP would include (as a minimum): • A map identifying locations of sensitive receivers • Identification of potential risks/impacts due to dust-generating activities • Management measures to minimise risk, including a progressive stabilisation plan • A process for monitoring on-site dust and weather conditions • A process for altering management measures as required. (Refer Section 2.10.2)	Construction contractor	Pre-construction
67	Air Quality	Measures (including watering or covering exposed areas) would need to be used to minimise or prevent air pollution and dust.	Construction contractor	Construction
68	Air Quality	Work (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.	Construction contractor	Construction
69	Air Quality	Vegetation or other materials are not to be burnt on-site.	Construction contractor	Construction
70	Air Quality	Stockpiles or areas that may generate dust would need to be managed to suppress dust emissions in accordance with the Roads and Maritime Services Stockpile Site Management Guideline (EMS-TG-10)	Construction contractor	Construction
71	Dust and odour	To minimise or prevent air pollution and dust, loads that may produce dust or odour would be covered, and water would be sprayed on unsealed access roads and open areas during conditions conducive to dust generation.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
72	Air Quality	Construction equipment (including all internal combustion engines) would be properly maintained and running efficiently to ensure exhaust emissions are minimised, where practicable, and comply with the *Protection of Environment Operations Act 1997*.	Construction contractor	Construction
73	Exhaust emissions	Machinery would be turned off when not in use.	Construction contractor	Construction
74	Climate change	Design would consider the potential effects of climate change on the proposal, including drainage and stormwater management requirements.	Principal Consultant	Detailed design
75	Climate change	The selection process for vehicle and plant would consider energy efficiency and related carbon emissions.	Construction contractor	Pre-construction and construction
76	Energy efficiency	Equipment would be serviced frequently to ensure it is operating efficiently.	Construction contractor	Construction
77	Energy efficiency	Machinery would be operated efficiently to ensure optimal performance, minimise downtime and improve fuel efficiency.	Construction contractor	Construction
78	Visual impact of structures	The use of shotcrete would need be to be managed in accordance with the Roads and Maritime Services Shotcrete Design Guidelines 2005.	Principal consultant	Detailed design
79	Visual impact of structures	Landscaping would need to be managed in accordance with the Roads and Maritime Services Landscape guideline, 2008.	Principal consultant	Detailed design
80	Visual impact of structures	Bridge work would need to be managed in accordance with the Roads and Maritime Services Bridge Aesthetics guidelines, 2012.	Principal consultant	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
81	Visual impact of structures	Work to be carried out in accordance with EIA-N04 Guideline for Landscape Character and visual impact assessment.	Principal consultant	Detailed design
82	Visual impact of structures	The bridge structure is to be well integrated into surrounding landforms	Principal consultant	Detailed design
83	Visual impact of structures	Concrete formwork is to be of a high standard with accurate tapers and clean edges.	Construction contractor	Construction
84	Visual impact of structures	The impact can be minimised through design that integrates with the existing landform. Using precast units for retaining walls where possible to minimise construction footprint and vegetation clearing.	Principal consultant	Detailed design
85	Visual impacts of earthworks design (cuttings, fill embankments, and retaining walls	Provide screen planting below walls where practicable and use visually recessive materials to minimise visual impact.	Principal consultant	Detailed design
86	Vegetation removal	Design to avoid impact to prominent trees and vegetation communities where possible. Retaining walls and batters steepened to grades suitable for the proposed surface treatment.	Principal consultant	Detailed design
87	Vegetation removal	Work areas to be clearly defined and managed minimising vegetation removal.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
88	Road furniture visual impact	Coordinate signage location with other roadside elements including structures, fencing and landscape treatments.	Principal consultant	Detailed design
89	Road furniture visual impact	Look for opportunities to minimise design signage particularly where changes to the alignment have occurred.	Principal consultant	Detailed Design
90	Road furniture visual impact	Use soft engineering and well integrated drainage facilities. If concrete lining is required coloured or heavily roughened concreted should be used.	Principal consultant	Detailed Design
91	Impact on road users and the community	A comprehensive community consultation strategy would be prepared and implemented to fully inform the community of work during the construction process.	Roads and Maritime	Pre-construction and construction
92	Impact on road users and the community	Community consultation would need to be undertaken in accordance with the Community Involvement Practice Notes and Resource Manual.	Roads and Maritime	Pre-construction and construction
93	Impact on road users and the community	Complaints received are to be recorded and attended to promptly in accordance with the Community Involvement Practice Notes and Resource Manual.	Roads and Maritime	Pre-construction and construction
94	Impact on road users and the community	A complaints handling register would be included in the construction environmental management plan (CEMP).	Construction contractor	Pre-construction
95	Impact on landowners and the community	Access will be maintained. Prior to any temporary unavoidable disruption to access, the affected landowner would be consulted. (Refer Section 2.3.2)	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
96	Impact on businesses and the community	Community consultation would be carried out in accordance with Roads and Maritime's Community Involvement Practice Notes and Resource Manual (2012).	Roads and Maritime	Detailed design, pre-construction and construction
97	Impact on property owners due to land acquisition	Property acquisition would be managed in accordance with the provisions of Roads and Maritime's Land Acquisition Policy and the *Land Acquisition (Just Terms Compensation) Act 1991.* (Refer Section 2.8.1 and 2.8.2)	Roads and Maritime	Pre-construction
98	Waste Management	Resource management hierarchy principles in accordance with the Waste Avoidance & Resource Recovery Act 2001 would need to be followed and include: • Avoiding unnecessary resource consumption as a priority • Resource recovery, including reuse of materials, reprocessing, recycling and energy recovery • Disposal being undertaken as a last resort. (in accordance with the Waste Avoidance & Resource Recovery Act 2001).	Construction contractor	Pre-construction and construction
99	Waste Management	Bulk project waste (eg. fill) sent to a site not owned by the Roads and Maritime (excluding Office and Environment and Heritage licensed landfills) for land disposal would need 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.	Construction contractor	During construction
100	Waste Management	If coal tar asphalt is identified and would need to be removed, it is to be disposed of to landfill in accordance with Roads and Maritime Services Environmental Direction No.21 – Coal Tar Asphalt Handling and Disposal.	Construction contractor	During construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
101	Waste Management	There is to be no disposal or re-use of construction waste on to other land.	Construction contractor	During construction
102	Waste Management	Waste is not to be burnt on site.	Construction contractor	During construction
103	Waste Management	Waste material, other than vegetation and tree mulch, is not to be left on site once the work has been completed.	Construction contractor	During construction
104	Waste Management	Working areas would need to be maintained, kept free of rubbish and cleaned up at the end of each working day.	Construction contractor	During construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
105	Waste Management	A resource and waste management plan (RWMP) would be developed as a component of the CEMP. The RWMP would include: • The type and volume of all materials • Destinations for each resource/waste type either for on-site reuse or recycling, off-site reuse or recycling, or disposal at a licensed waste facility • Quantity and classification of excavated material generated as a result of the proposal • Management measures for each type of material in accordance with the *Protection of the Environment Operations Act 1997* • Details of how waste would be stored and treated on site • Identification of suitable waste disposal locations to dispose of litter and other wastes on-site • Identification of all non-recyclable waste • Identification of strategies to 'avoid', 'reduce', 're-use' and 'recycle' in accordance with the waste hierarchy established under the WARR Act • Identification of available recycling facilities on-site and off-site • Identification of suitable methods and routes to transport waste • Procedures and disposal arrangements for unsuitable excavated material or contaminated material.	Construction contractor	Pre-construction and construction
106	Waste Management	Training in waste management principles would be included in site inductions for the workforce.	Construction contractor	Pre-construction and construction
107	Increases in production of waste materials	Types of waste collected, amounts, date/time and details of disposal would be recorded in a waste register.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
108	Sourcing of recycled materials	Roads and Maritime contractors would be required to propose recycled-content materials where they are cost- and performance-competitive.	Construction contractor	Construction
~~109~~	~~Sourcing of recycled materials~~	~~Workspaces would be maintained, kept free of rubbish and cleaned up at the end of each working day.~~	~~Construction contractor~~	~~Construction~~
110	Reuse and recycling of materials	Material identified for recycling would be stockpiled in an adequately bunded area (in accordance with the *Roads and Maritime Stockpile Site Management Guidelines*, 2011).	Construction contractor	Construction
111	Resource/ material storage	Fuel and chemical storage areas would be appropriately sized and imperviously bunded.	Construction contractor	Construction
112	Resource/ material storage	All fuels, chemicals and liquids would need to be stored in an impervious bunded area a minimum of 50 m away from: • Rivers, creeks or any areas of concentrated water flow • Flooded or poorly drained areas • Slopes above 10%.	Construction contractor	Construction
113	Resource/ material storage	Refuelling of plant and equipment would need to occur in impervious bunded areas located a minimum of 50 m from drainage lines or waterways.	Construction contractor	Construction
114	Waste disposal	Cleaning of spray bars (or equivalent equipment) would need to occur in suitable areas (e.g. not table drains) and not cause water pollution	Construction contractor	Construction
115	Waste disposal	Vehicle wash down and/or cement truck washout would need to occur in a designated bunded area.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
116	Hazardous spill management	An emergency spill kit is to be kept on site at all times. All staff would need to be made aware of the location of the spill kit and trained in its use.	Construction contractor	Construction
117	Hazardous spill management	If an incident (eg spill) occurs, the Roads and Maritime Services Environmental Incident Classification and Reporting Procedure would need to be followed and the Roads and Maritime Services Contract Manager notified as soon as practicable.	Construction contractor	Construction
118	Waste disposal	Solid and liquid wastes, as well as fuels, lubricants and chemical containers would be disposed of in accordance with OEH requirements.	Construction contractor	Construction
119	Waste disposal	Suitable containers would be provided for waste collection.	Construction contractor	Construction
120	Waste disposal	A dedicated concrete washout facility would be provided during construction so that runoff from the washing of concrete machinery and equipment could be collected and disposed of at an appropriate waste facility.	Construction contractor	Construction
121	**Hazard and risk management**	**A Bushfire Management Plan would be prepared as part of the Project Health and Safety Plan. The Bushfire Management Plan would include (as a minimum):** • **Bushfire management planning** • **Site activities and processes to minimise fire risk** • **The management of the site in the event of bushfire** • **A process for altering management measures as required.**	**Construction contractor**	**Pre-construction and construction**

No.	Impact	Environmental safeguards	Responsibility	Timing
New or revised measures shown in bold				
122	Biodiversity	A Biodiversity Offset Strategy would be developed in accordance with Roads and Maritime Biodiversity Offset Guideline (2011). In preparing the strategy, Roads and Maritime would: • consult with relevant government departments, including OEH and Local Land Services • consider acquisition of offset properties under an appropriate legal instrument, • consider purchasing and retiring biobanking credits • incorporate the proposed rehabilitation areas as part of the offset strategey • consider seed collection for the Bolivia Wattle and other affected threatened species (Refer Sections 2.6.1 and 2.6.4)	Roads and Maritime	Detailed design
123	Non-Aboriginal heritage	A Heritage Interpretation Plan will be prepared, with consideration of the location, safety of access, and style of interpretation appropriate to the project.	Roads and Maritime	Detailed Design

5.3 Licensing and approvals

The following licenses, permits, notifications and/or approvals would be needed to construct/operate the proposal.

Table 5.2: Summary of licensing and approval required

Requirement	Timing
~~Section 220 of the *Fisheries Management Act* 1994 requires written notice to be provided to the Minister for blocking of fish passage. As noted in Section 4.3.2 of this REF, the proposal would be carried out so that fish passage would be maintained throughout construction. This would be verified during detailed design. If required, notification would be given to the Minister and any matters raised by the Minister would be considered within 28 days after giving of the notice.~~	~~At least 28 days before the start of work (if required).~~
Applying for a Surface Water Licence under the Water Act 1912 for water required during construction that would be taken from a local water course. Applications for temporary transfers of surface or groundwater should be lodged with State Water. An assessment would be undertaken to check if there were any supply constraints which would prohibit the transfer such as if the transfer, would impact on other water users or the environment.	At least 28 days before the start of work (if required).
Applying for an Environmental Protection Licence (EPL) for Extractive Activities (land-based extractive activity involves the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials) under the POEO Act. The detailed design should check volumes of material in order to assess the need for an Extractive Activities EPL.	At least 60 days before the start of works

6 References

Cardno 2013, Bolivia Hill Upgrade Assessment of Route Selection Biodiversity Impact Assessment

Cardno(b) 2013, Bolivia Hill Upgrade Assessment of Route Aquatic Flora and Fauna Biodiversity Assessment

Douglas Partners 2014, Geotechnical Investigation – Proposed Bolivia Hill Upgrade

Hewlett Hunter Pty Ltd 2012, Survey of Vegetation and Flora Constraints – Bolivia Hill Re-alignment

Hyder Consulting 2015, Bolivia Hill Upgrade – Bridge Options Report

Hyder Consulting 2015, Bolivia Hill Upgrade – Preliminary Hydrology/Hydraulics Report of the Assessment of Route Options

Landcom 2014 Managing Urban Stormwater, Soils and Construction

Roads and Maritime Services 2011, Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects, Transport NSW.

Roads and Maritime Services 2011, EIA Guidelines – Environmental assessment procedure, Project review of environmental factors, EIA-P05-2, Transport NSW.

Roads and Maritime Services 2011, EIA Guidelines – Environmental assessment procedure, Addressing ecologically sustainable development practice note, EIA-N02, Transport NSW.

Roads and Maritime Services, 2010. Code of Practice for Water Management.

Roads and Traffic Authority, 2010. Traffic Control at Work Sites.

Roads and Traffic Authority, 2008. Roads and Maritime Erosion and Sedimentation Procedure.

Roads and Traffic Authority, 2001. Environmental Noise Management Manual 2001, Practice Note vii – Roadworks Outside of Normal Working Hours.

Roads and Maritime Services, 2011, Community Engagement and Communications Resources Manual

Roads and Maritime Services, 2011. Standard Management Procedure – Aboriginal cultural heritage consultation and investigation (PACHCI), Transport NSW.

Roads and Maritime Services, 2011. Roads and Maritime Technical Guidelines – Temporary Stormwater Drainage for Road Construction.

Office of Environment and Heritage 2012, *Erosion and sediment control on unsealed roads*: A field guide for erosion and sediment control maintenance practices.

Roads and Maritime Services, 2011, Standard Management Procedure – Unexpected Threatened Species Finds, Transport NSW.

Roads and Maritime Services, 2011, Stockpile Site Management Guidelines, Transport NSW.

Roads and Maritime Services 2011, EIA Guidelines – Environmental assessment procedure, Project review of environmental factors, EIA-P05-2, Transport NSW.

Roads and Maritime Services 2011, EIA Guidelines – Environmental assessment procedure, Addressing ecologically sustainable development practice note, EIA-N02, Transport NSW.

Roads and Traffic Authority, 2010. Traffic Control at Work Sites.

Roads and Traffic Authority, 2008. Roads and Maritime Erosion and Sedimentation Procedure.

Sinclair Knight Merz 2014 New England Highway Upgrade Bolivia Hill Biodiversity Assessment Review

Transport for NSW, 2012. NSW Long Term Transport Master Plan

Appendix A – Stakeholder List

Organisation	Contact	Method	Address
Office of Environment and Heritage	Dimitri Young	Post / email	Federation House, 24 Moonee Street, Coffs Harbour NSW 2450
Department of Primary Industries	David Ward	Post / email	Tamworth Agricultural Institute 4 Marsden Park Road Calala NSW 2340
Crown Lands Office	Ross Fuller	Post / email	2 Evans Street Inverell NSW
Crown Lands Office	Rodney O'Brien	Post	P.O Box 199A Armidale NSW 2350
Tenterfield Shire Council	David Stewart Manager Property & Environmental Services Lotta Jackson General Manager	Post / email	PO Box 214, Tenterfield NSW 2372
Glen Innes Severn Council	Graham Price Planning Director Keith Appleby Director of Infrastructure Services	Post / email	PO Box 61 Glen Innes NSW 2370
NSW Environment Protection Authority	Lindsay Fulloon A/Manager Armidale and Far West Regions	email	

Appendix B – Bolivia Hill Road Upgrade Aboriginal Heritage Letter of Advice (Artefact)

[Not to be included in Public Document]

Appendix C – Noise and vibration impact assessment

ACOUSTICS AND AIR

NEW ENGLAND HIGHWAY
BOLIVIA HILL UPGRADE
NOISE AND VIBRATION IMPACT ASSESSMENT

REPORT NO. 00667
VERSION A

OCTOBER 2015

PREPARED FOR

ARCADIS DESIGN & CONSULTANCY
LEVEL 7 PREMION PLACE
CNR OF QUEEN AND HIGH STREETS
SOUTHPORT QLD 4215

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Draft	2 October 2015	Adam Bioletti	Rob Bullen

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

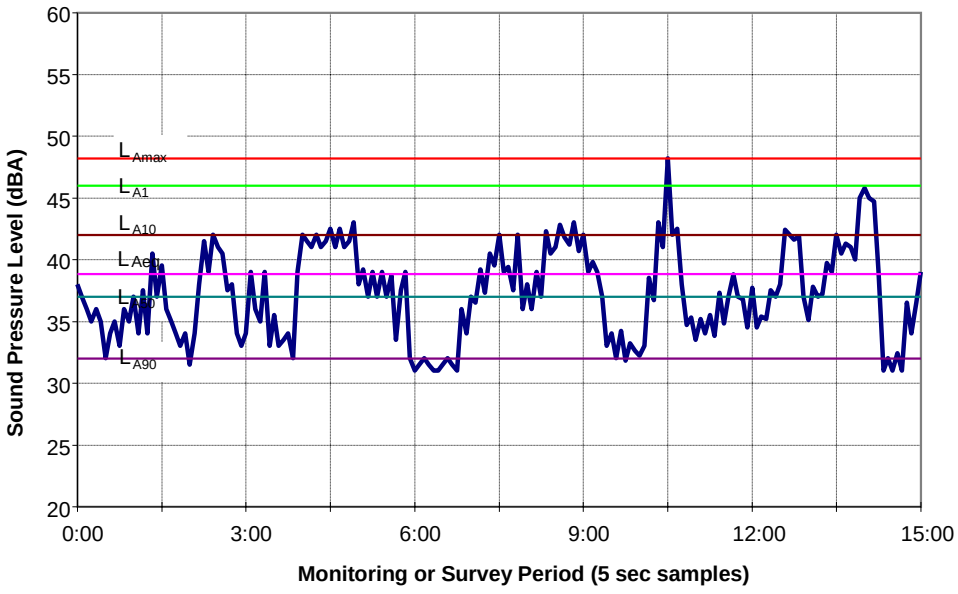
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

NSW Roads and Maritime Services is proposing to undertake a safety upgrade of the New England Highway at Bolivia Hill (the proposal).

Wilkinson Murray has been commissioned to undertake a noise and vibration impact assessment for the proposed works. This assessment includes potential noise impacts from operations, construction, and blasting; and potential vibration impacts from construction and blasting.

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

- *Noise Criteria Guideline* (RMS, 2015);
- *NSW Road Noise Policy* (DECCW, 2011);
- *Interim Construction Noise Guideline* (DECC, 2009); and,
- *Assessing Vibration: a technical guideline* (DEC, 2006)

2 THE PROPOSAL

2.1 Project Description

Roads and Maritime Services (RMS) propose to undertake works for the purposes of road safety improvement on the New England Highway near Bolivia Hill. The key objectives of the proposal are to:

- Improve road safety
- Improve road transport productivity, efficiency and reliability of travel
- Minimise the impact on the natural, cultural and built environment
- Provide value for money.

Key features of the proposal include:

- Upgrade of about 2.1 km of the New England Highway.
- Widening of the existing two-lane highway to provide a minimum shoulder width of 2m.
- Building a bridge about 320 m long to realign the highway between chainage 57705 and 58025.
- Realignment (horizontally and vertically) of the highway between chainage 58150 and 58600 using imported fill.
- Removal of the existing rest area at chainage 57675, which would be used for the southern end approach for the proposed bridge on the new alignment
- A compound site accessible from Pyes Creek Road, which would allow for a concrete batching plant, site office, laydown and stockpile areas during construction

- Access tracks 5 m wide connecting the compound site and the highway to the bridge pier locations via the valley floor
- Retention of the existing road between chainages 57650 to 58100 for ongoing maintenance purposes

The proposal is shown in Figure 2-1.

Figure 2-1 Proposal

2.2 Construction Activities

This section provides a summary of the likely construction methodology, staging, work hours, plant and equipment that would be used for construction of the proposal and associated activities. For the purpose of this assessment, an indicative construction plan and methodology are provided.

The detailed construction staging plans and methods would be determined by the construction contractor(s) after completion of the detailed design. The actual construction methods may vary from the description in this chapter due to:

- The identification and location of underground utilities and services
- On-site conditions identified during pre-construction activities
- Ongoing refinement of the detailed design
- Community consultation, including consideration of submissions received

Construction activities would be guided by a Construction Environmental Management Plan (CEMP) to ensure works are located within the specified works areas and are completed to incorporate all safeguards as described in this report and any subsequent measures included as a result of submissions. The final construction environmental management plan (CEMP) and methods used for construction would be consistent with statutory requirements (including any work, health and safety regulations) and all conditions of approval issued following determination of the proposal.

2.2.1 Work Methodology

The construction would be undertaken in various stages, with different noise emissions for each. Due to the large setback distances to receivers however, this assessment considers only high noise and/or vibration emitting activities in detail. These sources are limited to blasting, rock breaking and impact piling. A fourth scenario, representing generic bulk earthwork activities has also been assessed.

2.2.2 Construction hours and duration

Construction is anticipated to be completed in 2019 with the construction program taking approximately two years.

Construction would generally be carried out during standard construction working hours in accordance with the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) as follows:

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

It is anticipated that some work may be required outside standard working hours to avoid major delays to traffic and to maintain the safety of the workforce. In particular, night work (between 8pm and 7am) may be required for traffic control switches and road surfacing, and may include high noise-generating activities.

When work is required outside standard working hours, the procedure contained in Roads and Maritime's Environmental Noise Management Manual 2001, Practice Note vii – Roadworks Outside of Normal Working Hours (RTA 2001) would be followed, as well as the Interim Construction Noise Guidelines (DECC 2009) and any safeguards contained in this REF. This would include notifying the local community of any work planned to be carried out outside standard working hours, in accordance with the project's community consultation strategy.

2.2.3 Plant and equipment

An indicative list of plant and equipment that would typically be required is provided below. (Additional equipment requirements would be determined during detailed design by the construction contractor.)

- Asphalt pavers
- Asphalt profiling machines
- Back hoes
- Bobcats
- Cherry pickers
- Chipping machines
- Compactors
- Compressors
- Compressed air machinery
- Concrete pavers
- Concrete saws
- Concrete trucks
- Concrete pumps
- Concrete mixers
- Cranes
- Dewatering pumps
- Dump trucks
- Bulldozers
- Excavators
- Elevated work platforms
- Front-end loaders
- Generators
- Graders
- Hand tools
- Hydraulic hammers
- Hydraulic jacks
- Lighting units
- Line markers
- Mobile cranes
- Piling plant
- Road rollers
- Road sweepers
- Scrapers
- Vibratory rollers
- Water carts
- Rock breakers
- Drill / boring rigs

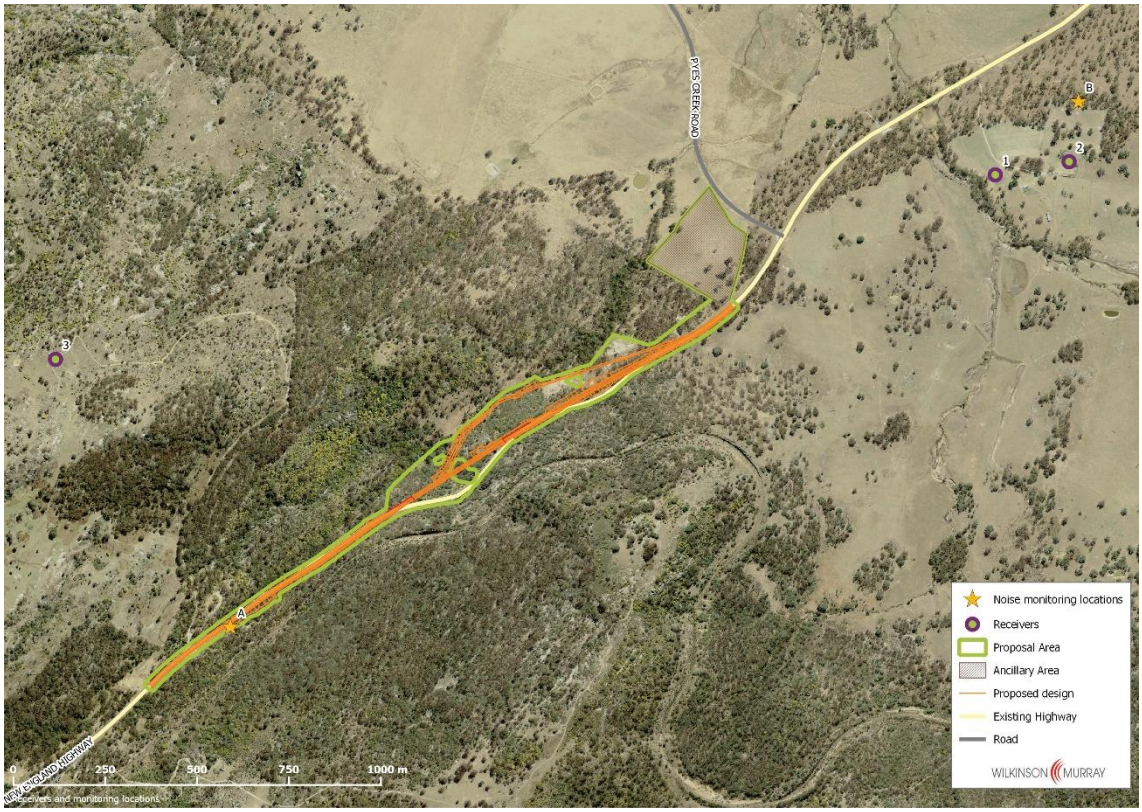
3 SITE DESCRIPTION

The works extend approximately 2.1 km of the New England Highway.

The area is rural. Isolated residences are located between 800-900m from the works. It is noteworthy that no noise-sensitive receivers are located within 600m of the works. This distance is significant because it is informally prescribed as defining the study area for operational road traffic noise assessment by the *NSW Road Noise Policy*.

Sensitive receiver locations are illustrated in Figure 3-1.

Figure 3-1 Study Area and Sensitive Receivers



4 EXISTING NOISE ENVIRONMENT

Long term noise monitoring surveys were conducted at two locations adjacent to the proposal. The purpose of the monitoring was to measure the existing levels of traffic noise, and to identify the Rating Background Levels (RBL) in support of the construction noise assessment.

4.1 Noise Monitoring Locations and Methodology

The noise monitoring was undertaken, with contemporaneous traffic counting, at four locations between 3 June and 15 June 2015. The monitoring locations are described in Table 4-1 and illustrated in Figure 3-1.

Table 4-1 Noise Monitoring Locations

Monitoring Location	Description	Distance to Highway
Location A	In the forested area, adjacent to the highway.	20m
Location B	Near receivers 1 and 2 on grazing land.	230m

The unattended noise monitoring equipment used for these measurements consisted of ARL NGARA environmental noise loggers set to fast response. This equipment is capable of remotely monitoring and storing both A-weighted and C-weighted noise levels every one-tenth of a second. Additionally the noise monitors are capable of storing wav files for aural analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

Post processing of the one-tenth second noise levels permits the derivation of noise descriptors. L_{A1}, L_{A10}, L_{A90}, L_{Amax} and L_{Aeq} levels of the ambient noise were analysed in 15-minute sampling periods. L_{A1}, L_{A10} and L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively. The L_{Aeq} level is the Equivalent Continuous Sound Level and has the same sound energy over the sampling period as the actual noise environment with its fluctuating sound levels. The L_{A1} is indicative of regular maximum noise levels due to individual noise events such as occasional aircraft noise. The L_{A90} level is normally taken as the background noise level during the relevant period.

Periods of rain and high winds have been excluded from the logging results, using data from the Bureau of Meteorology monitoring station at Tenterfield and reviewing the measured noise levels.

4.2 Noise Monitoring Results

Table 4-2 presents the Rating Background Levels for each monitoring location, which have been calculated in accordance with the *NSW Industrial Noise Policy* (INP) (EPA, 2000). Many of the measured RBLs were less than 30 dBA. The INP recommends a minimum RBL of 30 dBA, and therefore, in cases where the measured RBL is less than 30 dBA, the minimum RBL of 30 dBA is adopted.

Table 4-2 Existing Ambient and Background Noise Levels

Location	Ambient – L_{Aeq} dBA			Background – RBL dBA		
	Daytime*	Evening*	Night*	Daytime*	Evening*	Night*
A	60	59	56	30 (28)	30 (24)	30 (21)
B	50	50	49	31	30 (25)	30 (22)

* Daytime = 7.00am – 6.00pm, Evening = 6.00pm – 10.00pm, Night = 10.00pm – 7.00am

Additionally the road traffic noise descriptors $L_{Aeq,15hr(day)}$ and $L_{Aeq,9hr(night)}$ were derived for location B. (Road traffic noise levels from Location A are not relevant to this assessment.)

Table 4-3 Road Traffic Noise Levels

Location	Daytime* - $L_{Aeq,15hr}$ dBA	Night* - $L_{Aeq,9hr}$ dBA
B	50	49

* Daytime = 7.00am – 10.00pm, Night = 10.00pm – 7.00am

5 ASSESSMENT OF OPERATIONAL NOISE IMPACTS

5.1 Road Noise Criteria

The *NSW Road Noise Policy* (RNP) (DECCW, 2009) provides detailed information on operational noise criteria for road, and traffic generating developments. In April 2015, RMS released the *Noise Criteria Guideline* (NCG) (RMS, 2015). The purpose of the NCG is to ensure a consistent approach to assessing potential operational noise impacts from RMS road projects.

The NCG distinguishes between, and provides a framework for the assessment of noise from, three road project categories:

- New
- Redeveloped
- Minor Works.

In accordance with Section 5 of the NCG, the proposal is classified as Minor Works since it is not predicted to result in a notable increase in overall traffic-carrying capacity or heavy vehicle numbers and the road alignment will not be substantially changed.

The NCG recommends that in the case where Minor Works increase existing noise levels at the most affected receiver by more than 2.0 dBA, the existing road criteria, as prescribed by the RNP should be applied. That is, if it can be demonstrated that road noise levels will not increase by more than 2.0 dBA due to a Minor Works Project, no further assessment or mitigation of road noise is warranted.

The applicable criteria from the RNP are those for a redeveloped arterial road, namely $L_{Aeq,15hr}$ 60 dBA and $L_{Aeq,9hr}$ 55 dBA for the day and night periods respectively.

5.2 Assessment Methodology

The RNP promotes a study area of up to 600m from the road for the assessment of operational road traffic noise. In this instance there are no noise-sensitive receivers within the region defined by a 600m buffer.

At the closest residences, which are represented by measurement location B above, given that the road alignment and traffic volumes are not significantly changed due to the project, the noise level is very unlikely to increase by more than 2.0 dBA. Furthermore the measured road traffic noise levels are well within the base noise level criteria prescribed by the RNP ($L_{Aeq,15hr}$ 60 dBA and $L_{Aeq,9hr}$ 55 dBA).

Considering these items, further assessment of operational road traffic noise is not considered warranted.

6 ASSESSMENT OF CONSTRUCTION NOISE IMPACTS

6.1 Construction Noise Management Levels

The *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) recommends noise management levels (NMLs) to reduce the likelihood of noise impacts arising from construction activities. The ICNG NMLs for residential receivers are shown in Table 6-1.

Table 6-1 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.

Time of Day	Management Level $L_{Aeq,15min}$	How to Apply
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.

With reference to the RBLs presented in Table 4-2, the project specific construction NMLs for residential receivers are presented in Table 6-2.

Table 6-2 Construction NML – Residential Receivers

Receivers	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	
All	41	36	35	35	75

6.2 Construction Plant Sound Power Levels

Sound levels of typical equipment are listed in Table 6-3. 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 6-3, source noise levels from a number of sample construction phases have been calculated, and are presented in Table 6-4.

Table 6-3 Typical Construction Plant Sound Levels

Plant	Sound Power Level (dBA)	Sound Pressure Level at 7m (dBA)
Front End Loader	111	86
Grader	107	82
Smooth Drum Roller	107	82
Spoil, Materials or Concrete Truck	109	84
Tower Crane or Mobile Crane	105	80
Truck-mounted Shotcrete Pump	106	81
Excavator or Bobcat	107	82
Concrete Pump	105	80
Concrete Vibrator	103	78
Concrete Cutter	109	84
Large Bored Drilling Rig	112	87
Small Bored Drilling Rig	108	83
Powered Hand Tools	109	84
30t Excavator operating with Hydraulic hammer	122	97
Rock Saw	116	91
Water Cart	110	85
Kerbing Machine	99	74
Chainsaw	106	81
Forklift	106	81
Mulcher	106	81
Articulated Dump Truck	113	88
Handheld Jackhammer	113	88
Air Compressor (Power Tools)	98	73
Asphalt Paving Plant	114	89
Vibratory Roller	114	89
Backhoe	105	80
Compressor	100	75
Scraper	110	85
Impact Piling Rig	126	101

Table 6-4 Construction Source Sound Power Levels

Activity	Typical Equipment Used	Total $L_{Aeq,15min}$ Sound Power Level (SWL) used for Calculations
Rock Breaking	30t Excavator operating with Hydraulic hammer, Excavators, Trucks	125
Impact Piling	Impact Piling Rig, Excavators or Front End Loaders	126
Bulk Earthworks	Excavators, Road and Off-road Trucks, Compactor, Grader, Multi Tyred and Vibratory Rollers	114

6.3 Construction Noise Prediction Methodology

Construction noise levels were predicted using CadnaA computer noise modelling software implementing ISO9613-2:1996 prediction algorithms. The model accounts for attenuation due to topographic shielding, ground attenuation, atmospheric absorption and spherical spreading.

The following data was utilised in the noise modelling.

- 5m interval terrain data supplied by Arcadis
- The proposed design including cuttings and bridge pier locations, supplied by Arcadis
- Receiver locations determined from aerial photography and confirmed during a site survey

A ground attenuation coefficient of 1.0 was used. Foliage was not accounted for, though it is noted that foliage can significantly attenuate noise propagation and therefore the assessment is conservative in this regard. Specific meteorological conditions were not included, though it is noted that ISO9613-2:1996 includes an allowance to account for a moderate downwind condition (i.e. source to receiver direction). These assumptions are considered appropriate for the prediction of construction noise in the current assessment.

6.4 Predicted Construction Noise Levels

Table 6-5 presents the typical worst-case construction noise levels at each of the receivers for the construction scenarios discussed in the preceding sections.

Table 6-5 Predicted Construction Noise Levels - $L_{Aeq,15min}$ dBA

Receiver	Rock Breaking *	Impact Piling *	Bulk Earthworks
1	45	46	34
2	46	47	35
3	40	41	29

* Rock breaking and impact piling predictions include a 5dB penalty for impulsiveness, as required by the *ICNG*.

Construction noise levels due to bulk earthworks are predicted to be within relevant NMLs, both

during and outside standard construction hours. For noisier activities the NML for standard construction hours is predicted to be exceeded by up to 6 dB, and NMLs for work outside standard hours are predicted to be exceeded by up to 11 dB. This is primarily due to the low background noise levels, and consequently NMLs. It is worthwhile noting that construction noise levels are predicted to be less than existing traffic noise levels at receivers with exposure to the highway.

Noise levels from typical construction activities, described by the bulk earthworks scenario, are predicted to be within the NML.

No exceedances of the "highly noise affected" level are predicted.

7 CONSTRUCTION NOISE MITIGATION

Best practice mitigation and management measures should be used to minimise construction noise and vibration at noise sensitive receivers, and should be described in a Construction Noise and Vibration Management Plan (CNVMP).

The CNVMP should be developed in accordance with the *ENMM* and *ICNG*, and should include:

- Development of notification and negotiation procedure for receivers where noise impact cannot be mitigated to meet the criteria;
- A procedure assessing audibility at any sensitive receiver outside normal construction hours;
- A procedure for dealing with and responding to complaints; and,
- Development of noise monitoring and auditing procedures to verify compliance with the predicted noise impacts.

In general, management of noise and vibration requires attention to the following:

- Construction hours;
- Noise and vibration monitoring on site and at sensitive receivers;
- Training and awareness;
- Communication;
- Incident and emergency response; and,
- Non-conformance, preventative and corrective action.

Where appropriate, the specific noise mitigation measures could include the following.

- Respite periods for noise from driven piling and rock breaking activities;
- Construction timetabling, in particular for works outside standard hours, to minimise noise impacts. This may include time and duration restrictions and respite periods;
- Avoiding using noisy plant simultaneously;
- Using dampened tips on rock breakers;
- Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks;
- Selecting plant and equipment based on noise emission levels;

- Using alternative construction methods;
- Providing alternative arrangements with affected residents such as respite activities;
- Using spotters, closed circuit television monitors, "smart" reversing alarms, or "squawker" type reversing alarms in place of traditional reversing alarms; and,
- Education and training of site staff is necessary for satisfactory implementation of noise mitigation measures. Education and training strategies should focus on:
  - Site awareness training / environmental inductions that include a section on noise mitigation techniques / measures to be implemented throughout the proposal;
  - Ensuring work occurs within approved hours;
  - Ensuring plant and equipment is well maintained and not making excessive noise; and,
  - Turning off machinery when not in use.

The potential noise reduction that can be achieved by noise mitigation measures are shown in Table 7-1.

Table 7-1 Noise Mitigation Measures

Management Measure	Anticipated Noise Reduction, dBA
Administrative Controls	
Operate during approved hours	N/A
Undertake regular noise monitoring to determine the impact of operating plant on sensitive receivers	N/A
Appropriate training of onsite staff	N/A
Undertake community consultation and respond to complaints in accordance with established project procedures	N/A
Turning off machinery when not in use	0-5
Respite periods for pile drivers and rock breakers	N/A
Engineering Controls	
Avoiding using noisy plant simultaneously and/or close together, adjacent to sensitive receivers.	2-3
Using dampened tips on rock breakers.	3-6
Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks	5-10
Using spotters, closed circuit television monitors, "smart" reversing alarms, or "squawker" type reversing alarms in place of traditional reversing alarms	2-5

8 ASSESSMENT OF CONSTRUCTION VIBRATION IMPACTS

8.1 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 will be achieved with the building damage objectives.

8.1.1 Human Comfort

The EPA's *Assessing Vibration: A Technical Guideline* (DEC, 2006) provides acceptable values for continuous and impulsive vibration in the range 1-80Hz. Both preferred and maximum vibration limits are defined for various locations and are shown in Table 8-1.

Table 8-1 Preferred & 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 8-2.

Table 8-2 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.

8.1.2 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 8-3.

Table 8-3 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 and 50 mm/s for commercial and industrial buildings.

8.2 Source Levels of Vibration

Table 8-4 provides some estimated vibration levels at a range of distances from the various construction activities.

Table 8-4 Typical Vibration Emission Levels from Construction Plant

Activity	PPV Vibration Level (mm/s) at Distance		
	10m	20m	30m
4-Tonne Vibratory Roller (High)	2.0-2.4	0.4-1.2	0.2-0.8
Hydraulic Hammer (30t)	3	1.5	1.0
Impact Piling	5	2	1.5

8.3 Potential Vibration Impacts

Vibration is unlikely to be perceptible at the nearest receivers.

Vibration-sensitive structures outside of 5-10m are unlikely to be at risk of damage due to excessive vibration.

9 ASSESSMENT OF BLASTING IMPACTS

There is a potential for blasting to be employed during the construction phase, in areas of the proposal that are located well away from sensitive receivers. It is anticipated that if blasting were employed, it would be undertaken in the cuttings and/or bridge pier locations.

9.1 Construction Blasting Criteria

Construction blasting should be assessed for its potential to impact human comfort and building structures.

9.1.1 Criteria for Human Comfort

(DEC, 2006) defers to the *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990). The fundamental criteria are that at any privately-owned residence or other sensitive location:

- the maximum overpressure due to blasting should not exceed 115 decibels (dB) for more than 5% of blasts in any year, and should not exceed 120 dB for any blast; and
- the maximum peak particle ground velocity should not exceed 5 millimetres per second (mm/s) for more than 5% of blasts in any year, and should not exceed 10 mm/s for any blast.

9.1.2 Criteria for the Prevention of Structural Damage to Buildings

At sufficiently high levels, blast overpressure may in itself cause structural damage to some building elements such as windows.

Australian Standard (AS) AS2187.2-2006 *Explosives - Storage and Use. Part 2 Use of explosives* indicates

> "*From Australian and overseas research, damage (even of a cosmetic nature) has not been found to occur at airblast levels below 133dB*."

For assessment of damage due to ground vibration, *AS2187.2 2006* recommends frequency-dependent criteria for vibration damage, derived from British Standard 7385-2 and United States Bureau of Mines Standard RI 8507. For the frequencies typical of blast vibration, a value of 10 mm/s peak particle velocity represents a conservatively low estimate of the level above which structural damage may possibly occur in residential dwellings or light commercial buildings. This limit is appropriate for the surrounding sensitive receivers, though ultimately the human comfort limit dictates the allowable magnitude of vibration at these locations.

9.1.3 Recommended Times and Frequency of Blasting

The ANZECC blasting guideline (ANZECC, 1990) recommend the following times and frequency for blasting activities:

- Blasting should generally only be permitted during the hours of 9.00am to 5.00pm Monday to Saturday;

- Blasting should not take place on Sundays or Public Holidays; and,
- Blasting should generally take place no more than once per day.

The above restrictions do not apply to locations where the effects of blasting are not perceptible at sensitive receivers.

9.2 Prediction of Blasting Overpressure and Vibration Levels

Overpressure and ground vibration levels from blasting are related to the "scaled distance" from the blast. The scaled distance (SD) is defined as:

- $SD = D/W^{1/3}$ for airblast overpressure; and
- $SD = D/W^{1/2}$ for ground vibration,

Where D is the distance from the blast in metres and W is the MIC of explosive, in kg Ammonium Nitrate Fuel Oil (ANFO) equivalent.

For this assessment, Wilkinson Murray has used data from over 7,600 records of blasts undertaken in the Hunter Valley, NSW to derive relationships between scaled distance and overpressure or vibration. These relationships are designed to predict the 95th percentile values of overpressure and vibration, representing levels that would be exceeded by only 5% of blasts.

For overpressure, the following curvilinear relationship was derived to adequately explain the measurement data:

$$\text{Overpressure (dB)} = 201.1 - 62.313 \log_{10}(SD) + 10.79 (\log_{10}(SD))^2$$

For vibration, a linear relationship was derived:

$$\text{Log}_{10}(\text{Peak Particle Velocity}) = 3.015 - 1.4359 \log_{10}(SD)$$

9.3 Maximum Allowable MIC for Blasting

The minimum foreseeable distance between receivers and blasting events is approximately 950 metres. To meet the overpressure criteria set out in Section 9.1 (115dB), blasting should not be carried out with MICs of greater than 115 kg. This is ample MIC for typical blasting and thus exceedances are unlikely with any typical blast design.

We note that airblast overpressure can be somewhat mitigated by careful blast design and therefore reiterate that this MIC is intended only to provide a starting point in the detailed blast design.

Vibration levels at receivers due to blasting with a MIC of 115 kg are predicted to be 1.7 mm/s and are well below the established criteria.

10 POTENTIAL IMPACTS ON FAUNA

The majority of the construction will occur in a forested area and excessive noise and vibration has the potential to impact fauna.

Impacts on fauna are typically related to sensitive times during the day and/or year. The fauna assessment undertaken for the REF concluded that no species in the immediately surrounding environment are sensitive to elevated noise, including any sensitive time periods.

A review of the ambient noise environment against the predicted construction noise levels reveals that the bulk of the construction activities would produce similar noise levels to those currently produced by traffic, in particular heavy vehicles.

Considering the above, it is unlikely that the works would have any significant impact on fauna in the surrounding environment. Any impacts that do occur from the occasional emissions from the noisier activities are likely to be temporary, with no lasting effect.

11 CONCLUSION

Wilkinson Murray has been undertaken an assessment of noise and vibration impacts anticipated from the upgrade of the New England Highway near Bolivia Hill. The assessment has considered potential noise impacts from operations, construction, and blasting; and potential vibration impacts from construction and blasting.

Operational noise is not anticipated to increase as a result of the project, which would be considered minor works. The noise level is also expected to remain well below the base noise criteria for prescribed by the *NSW Road Noise Policy*.

Construction noise was assessed in accordance with the *NSW Interim Construction noise Guideline*. Minor exceedances of the noise management level are expected from the greatest noise generating activities such as impact piling and rock breaking. These exceedances are due primarily to the low criteria, which are in turn due to the low-background-noise environment surrounding the proposal. With the application of noise management measures detailed in this report, minimal impacts would be expected to result from construction noise.

We note that construction noise is predicted to be well below the highly affected level and in fact the highest levels are predicted to be similar to existing traffic noise levels at the most-affected receivers.

Vibration from construction is predicted to be well within relevant criteria at surrounding receivers and vibration-sensitive structures.

The large distances between any potential blasting sites and the nearest receivers means that any practical blast designs would be expected to yield airblast overpressure and ground vibration levels within appropriate criteria. Nonetheless, the maximum instantaneous charge detailed in this report serves as a starting point for detailed blast design, which would be undertaken at a later stage.

APPENDIX A

NOISE MEASUREMENT RESULTS

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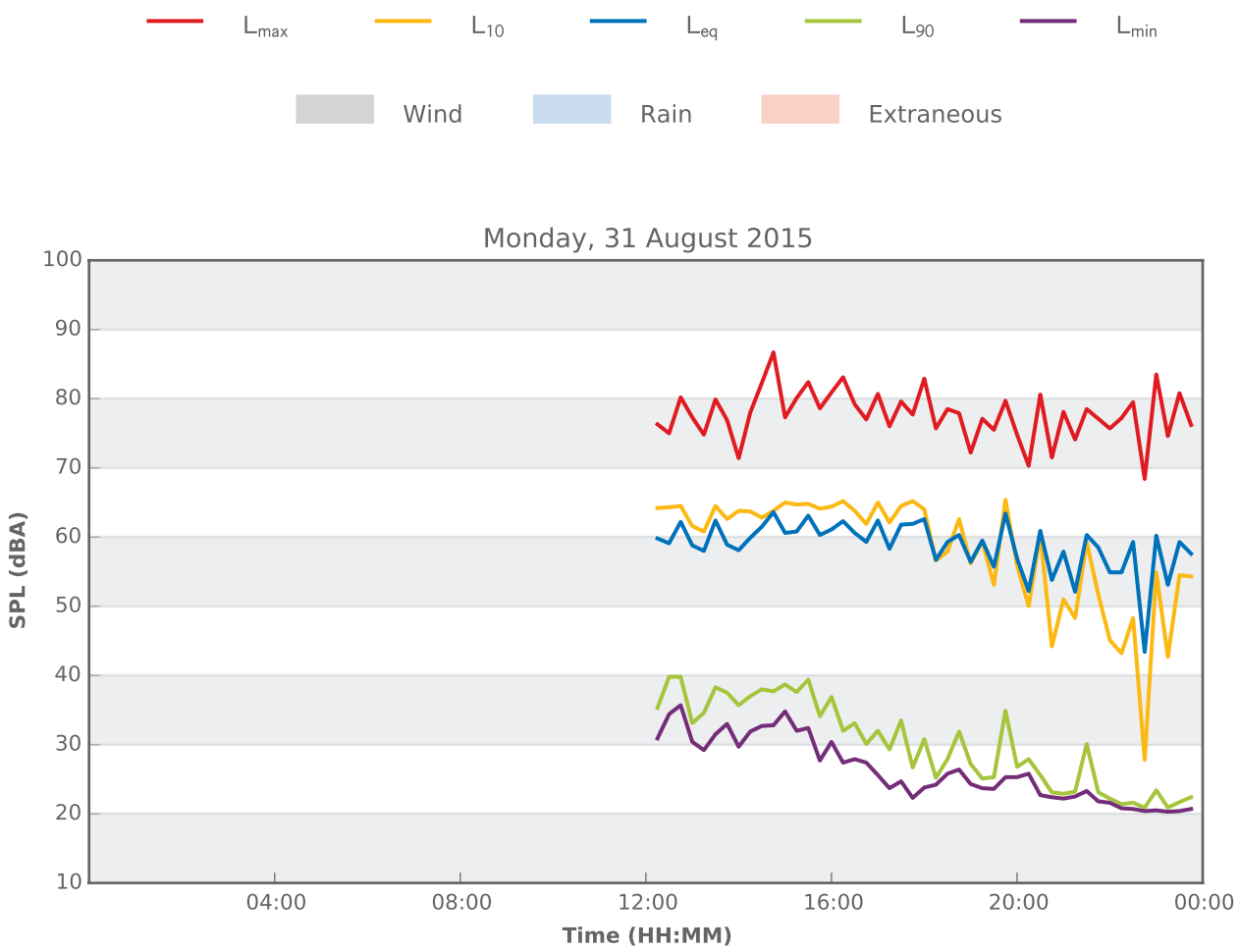
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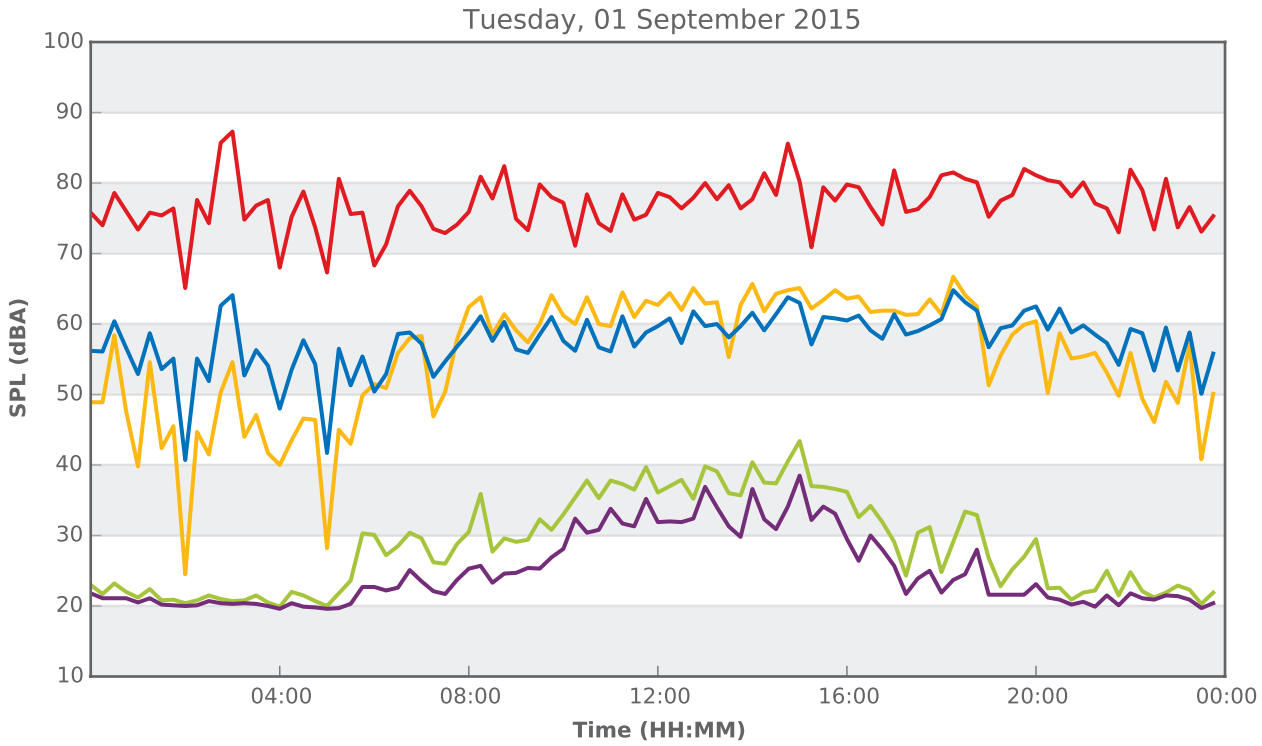
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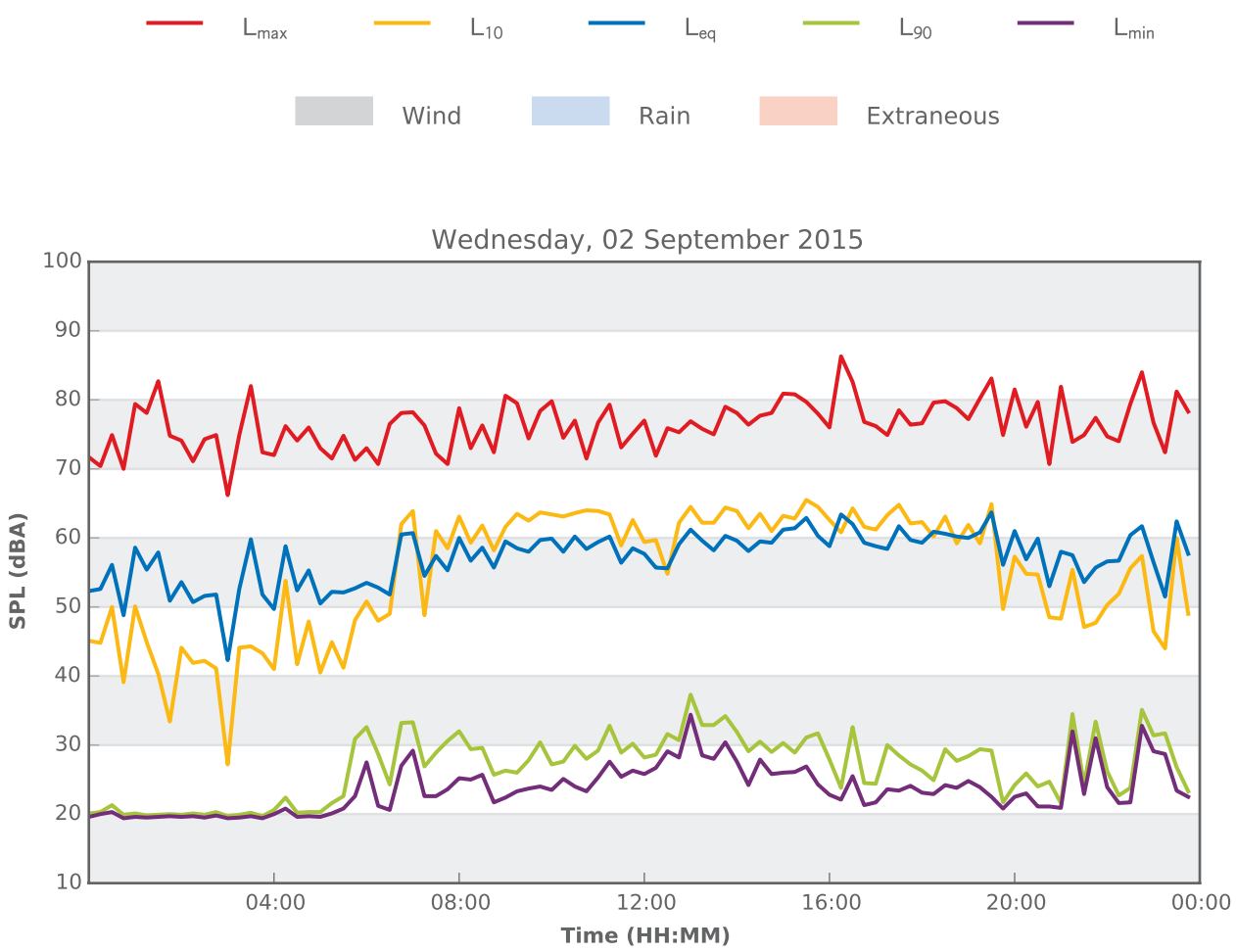
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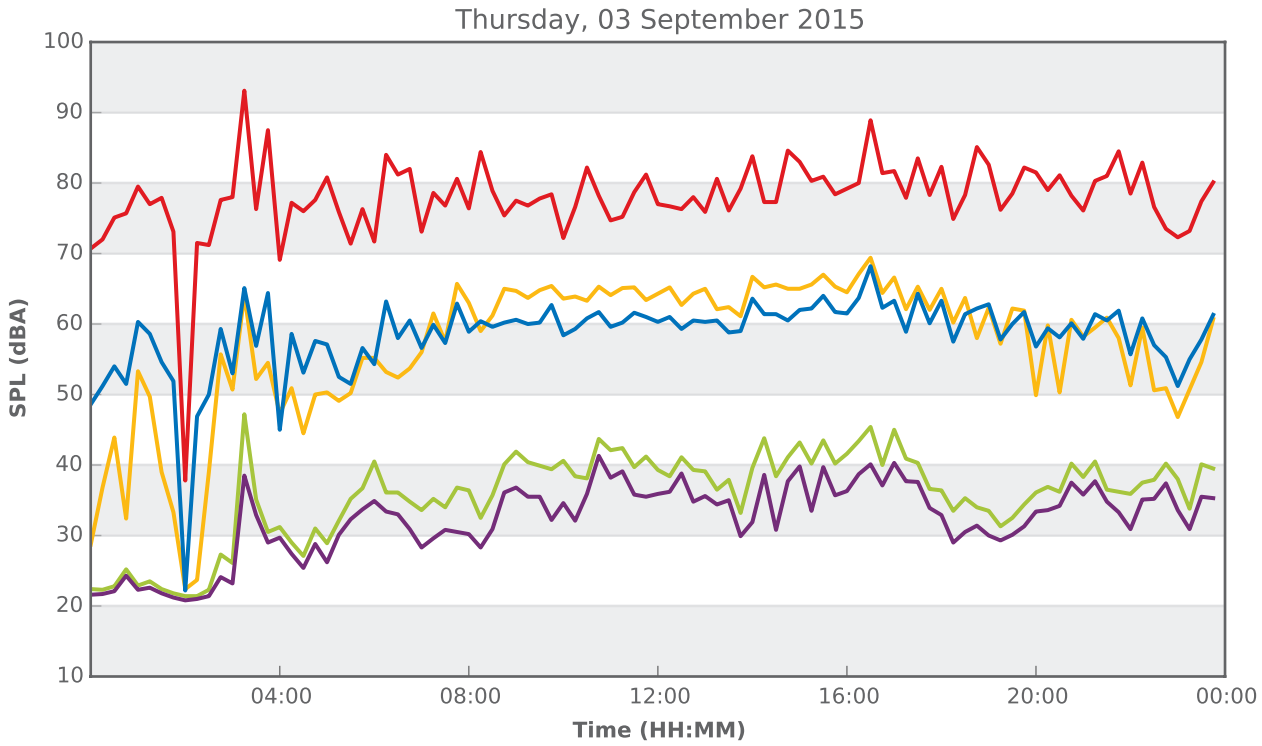
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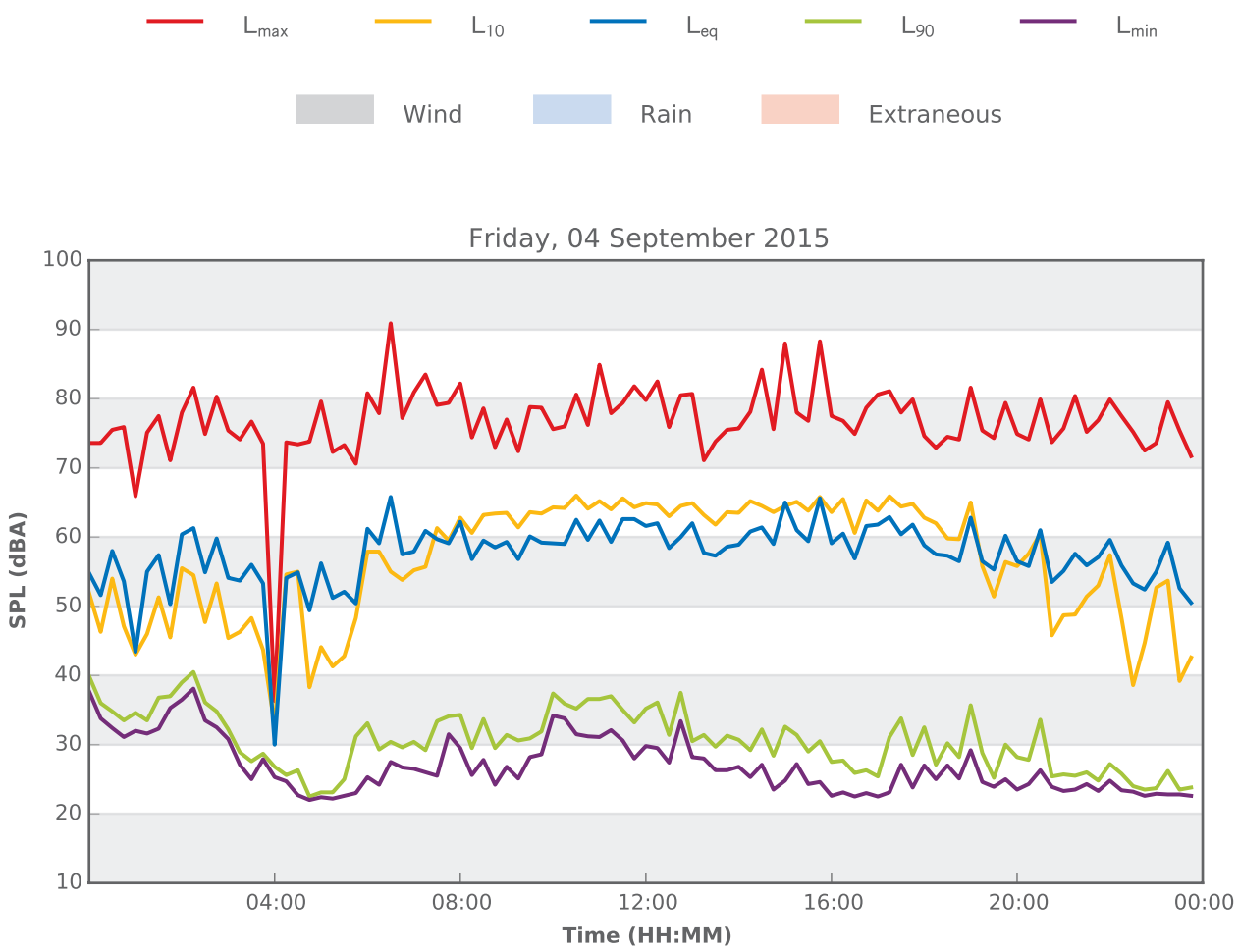
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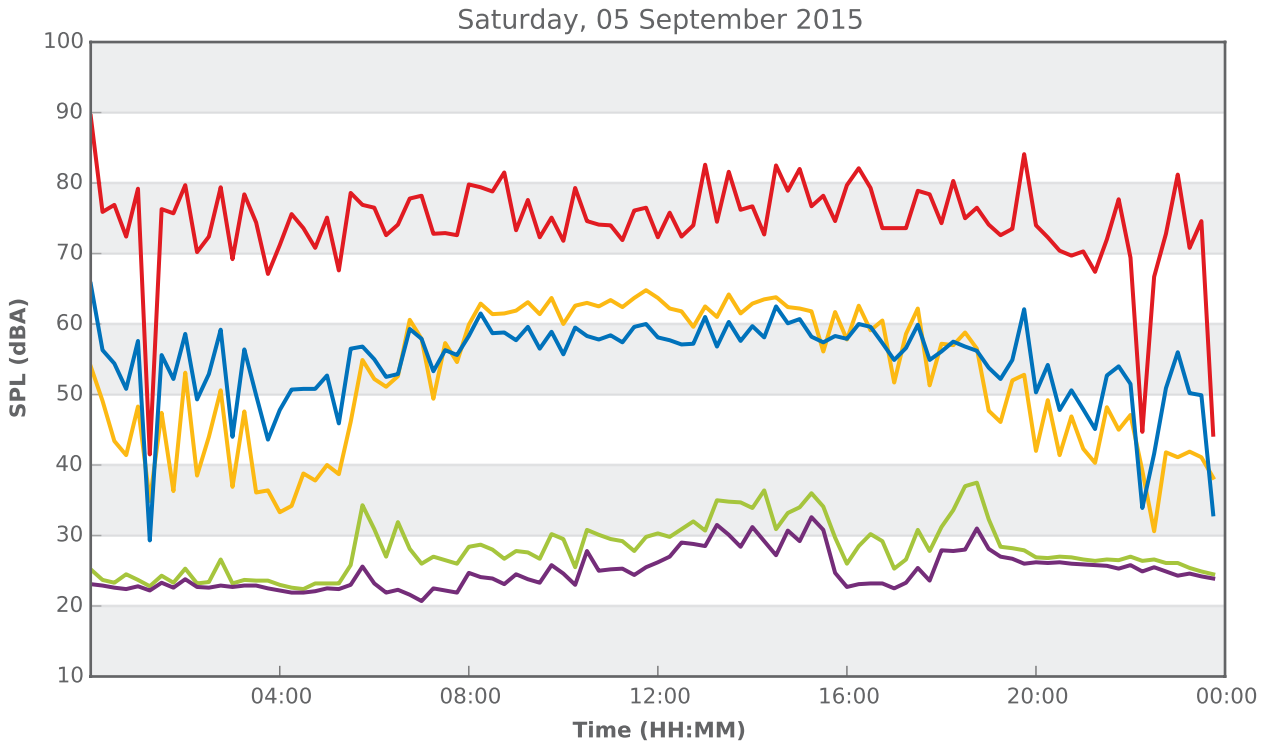
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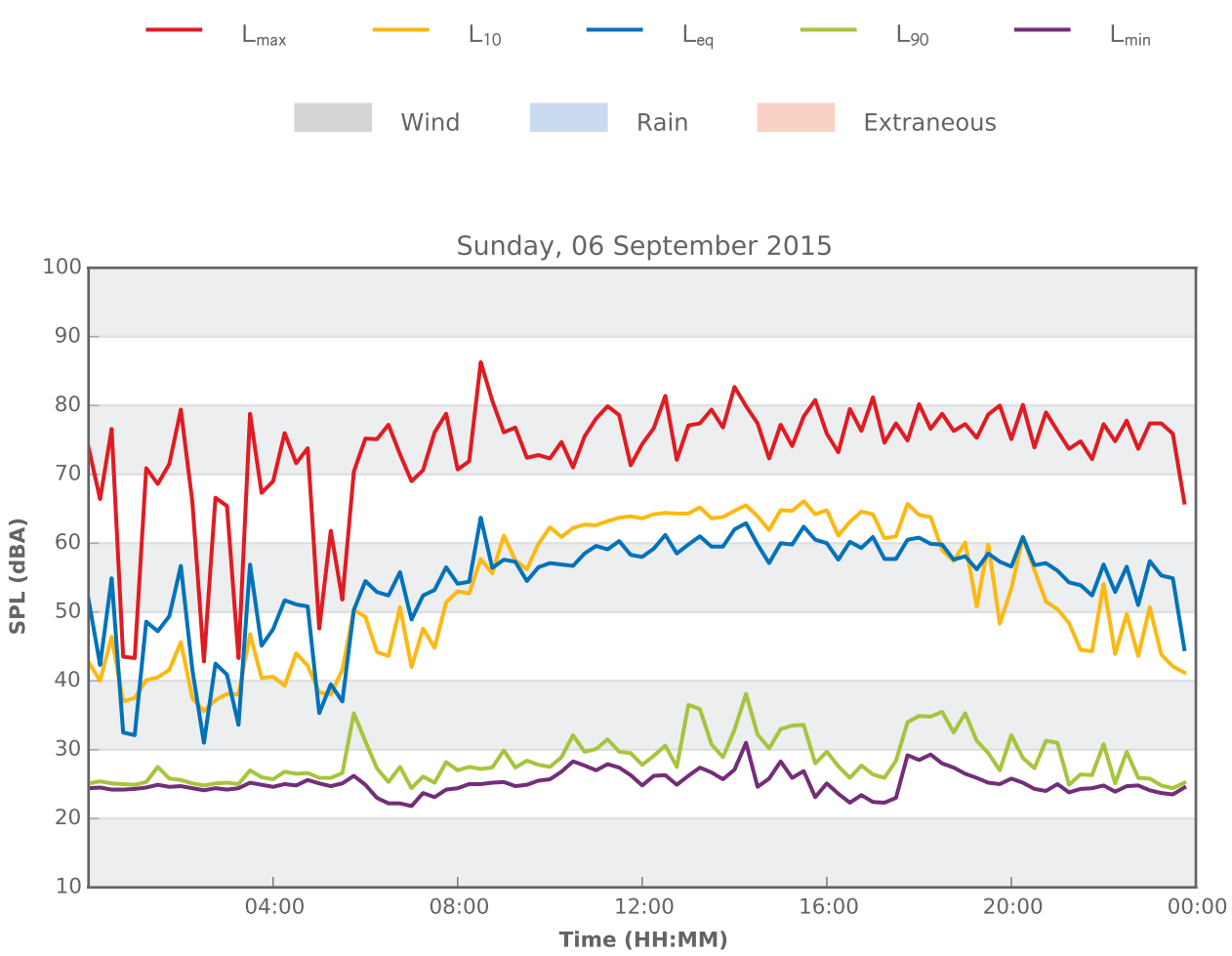
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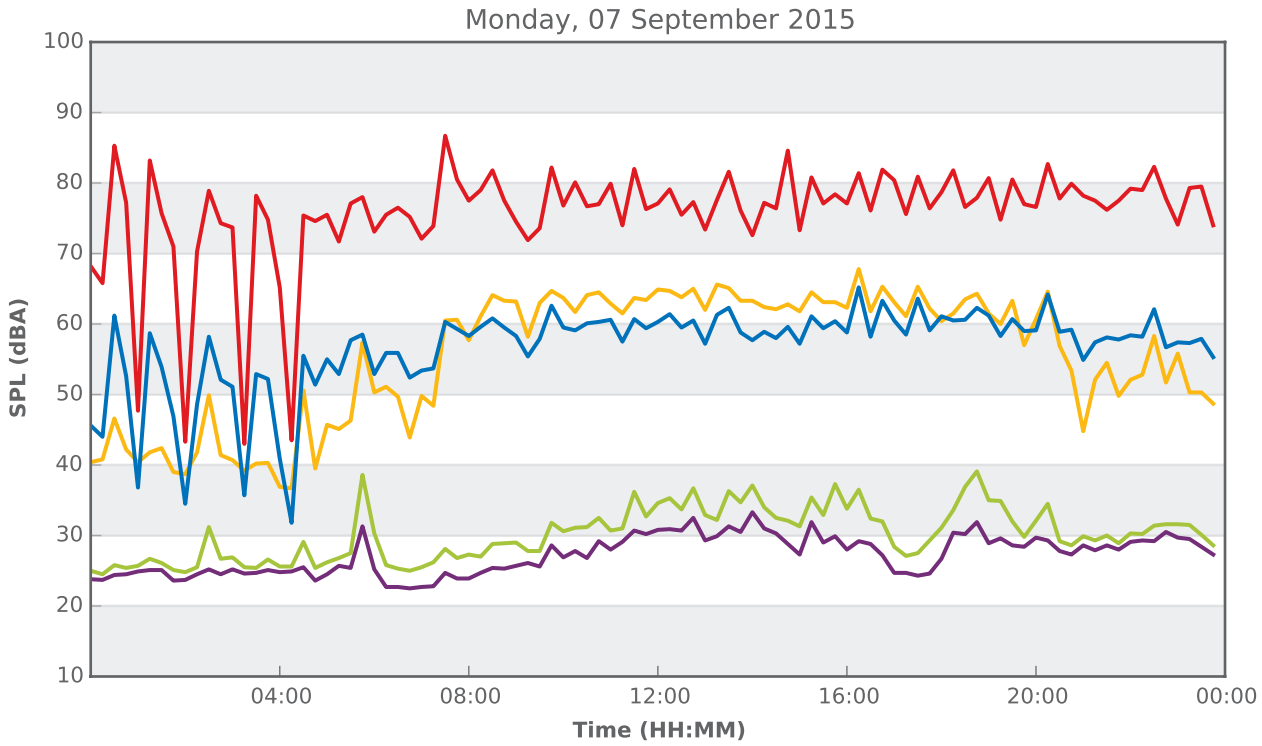
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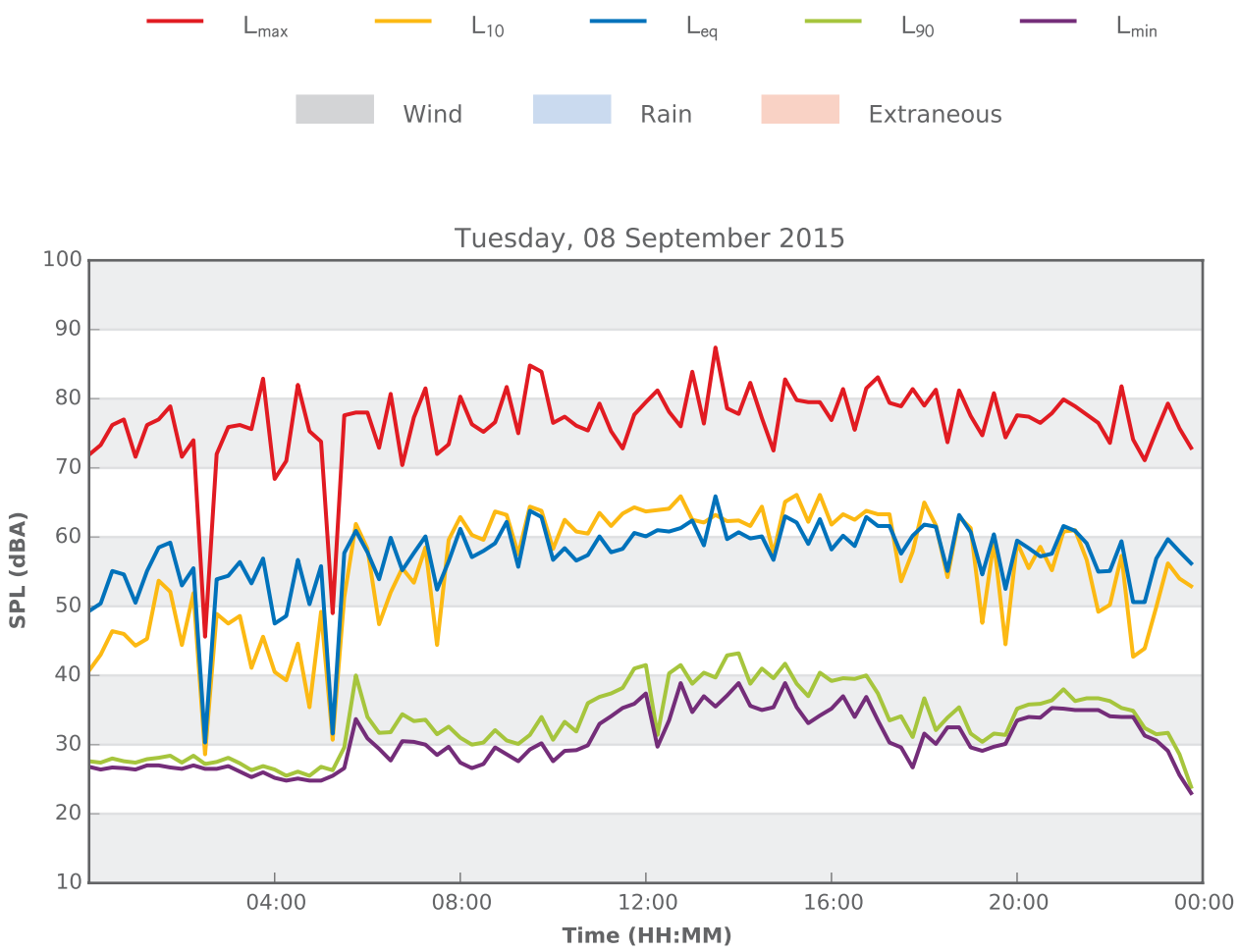
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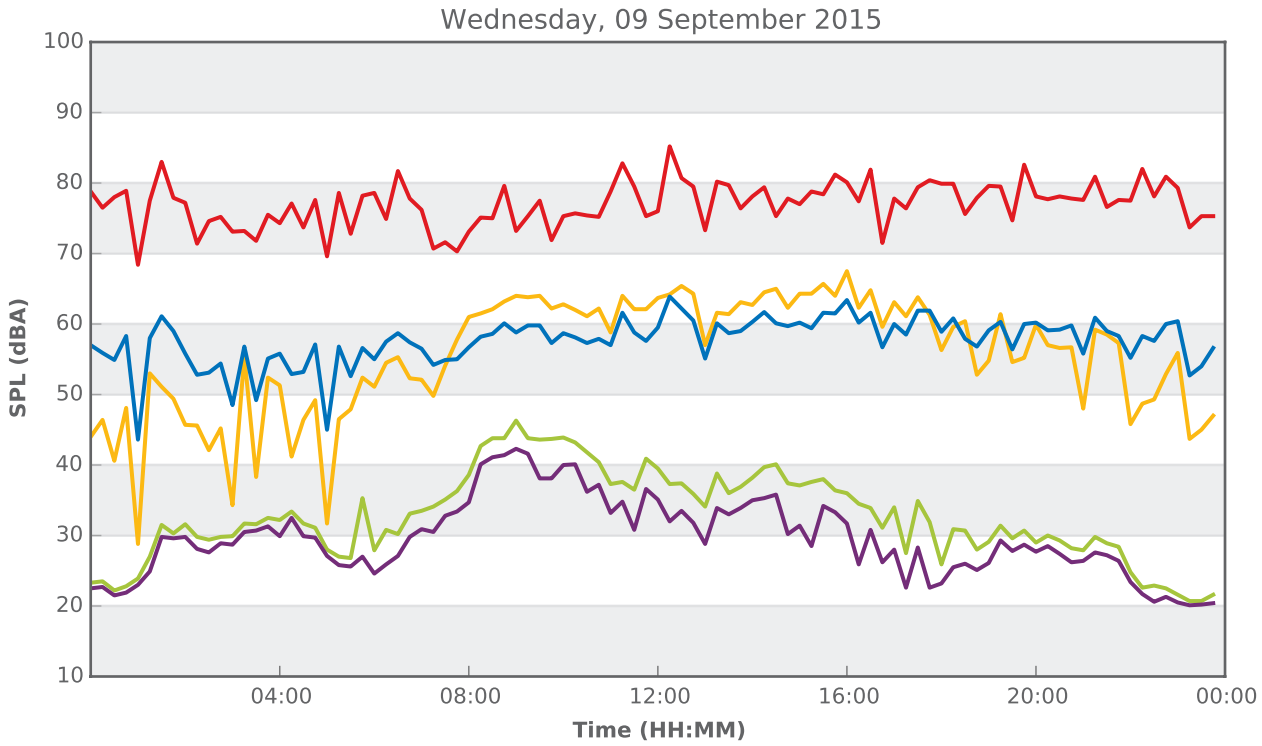
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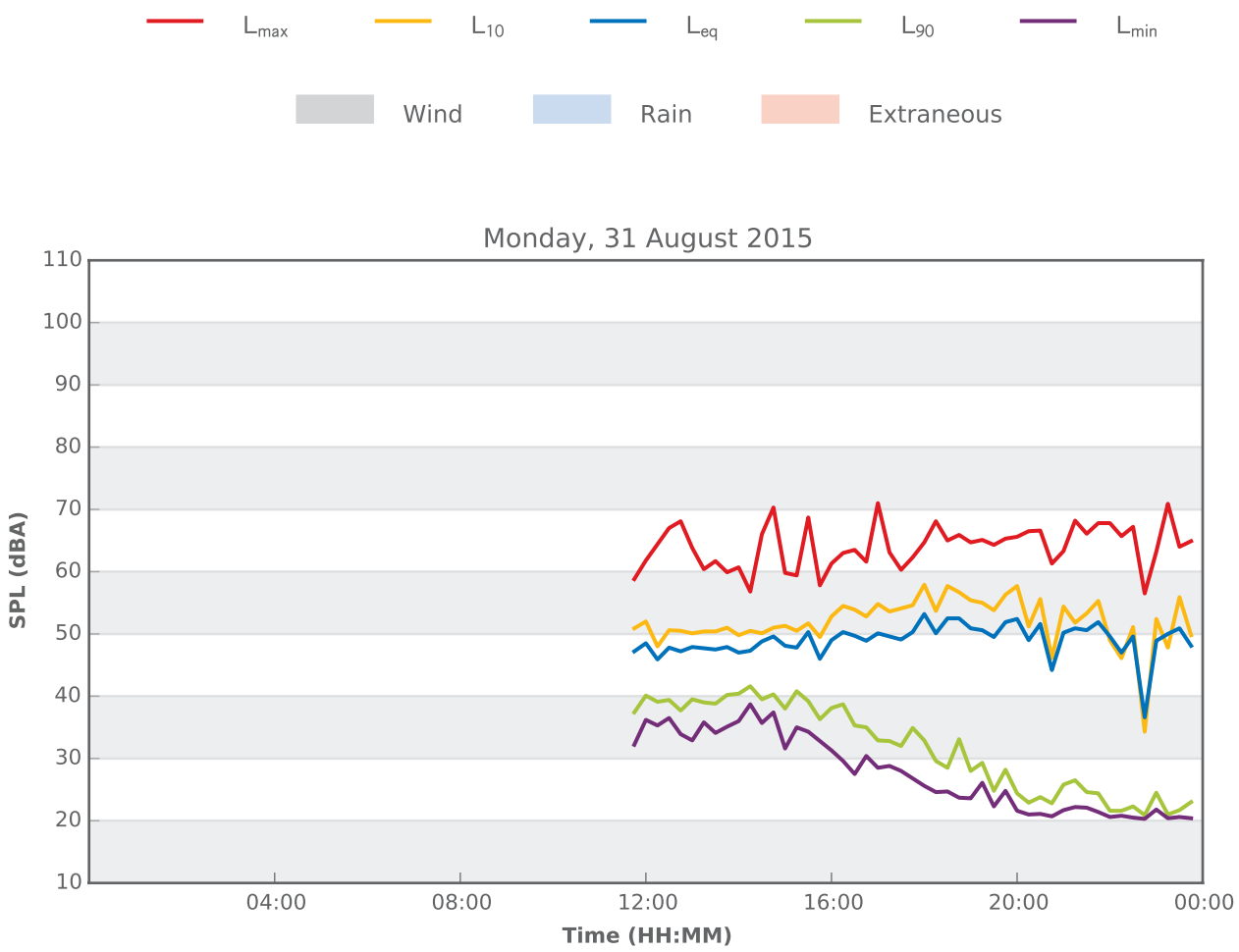
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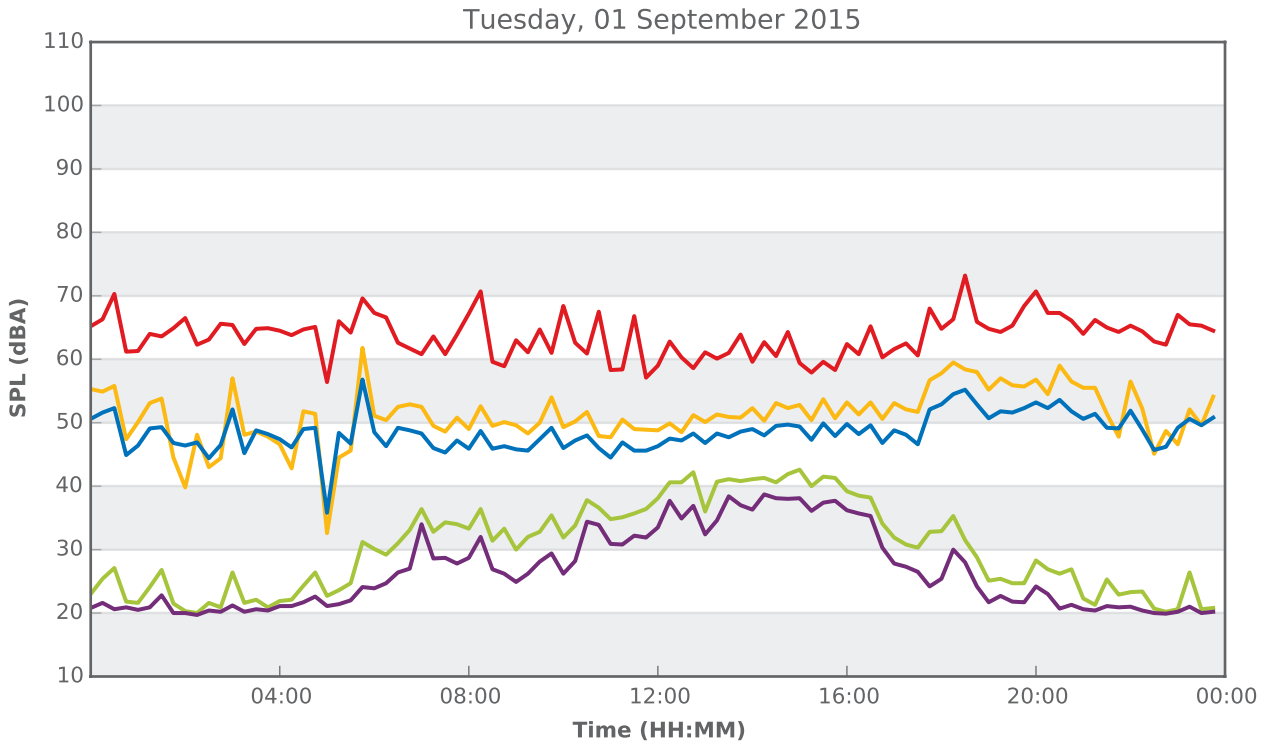
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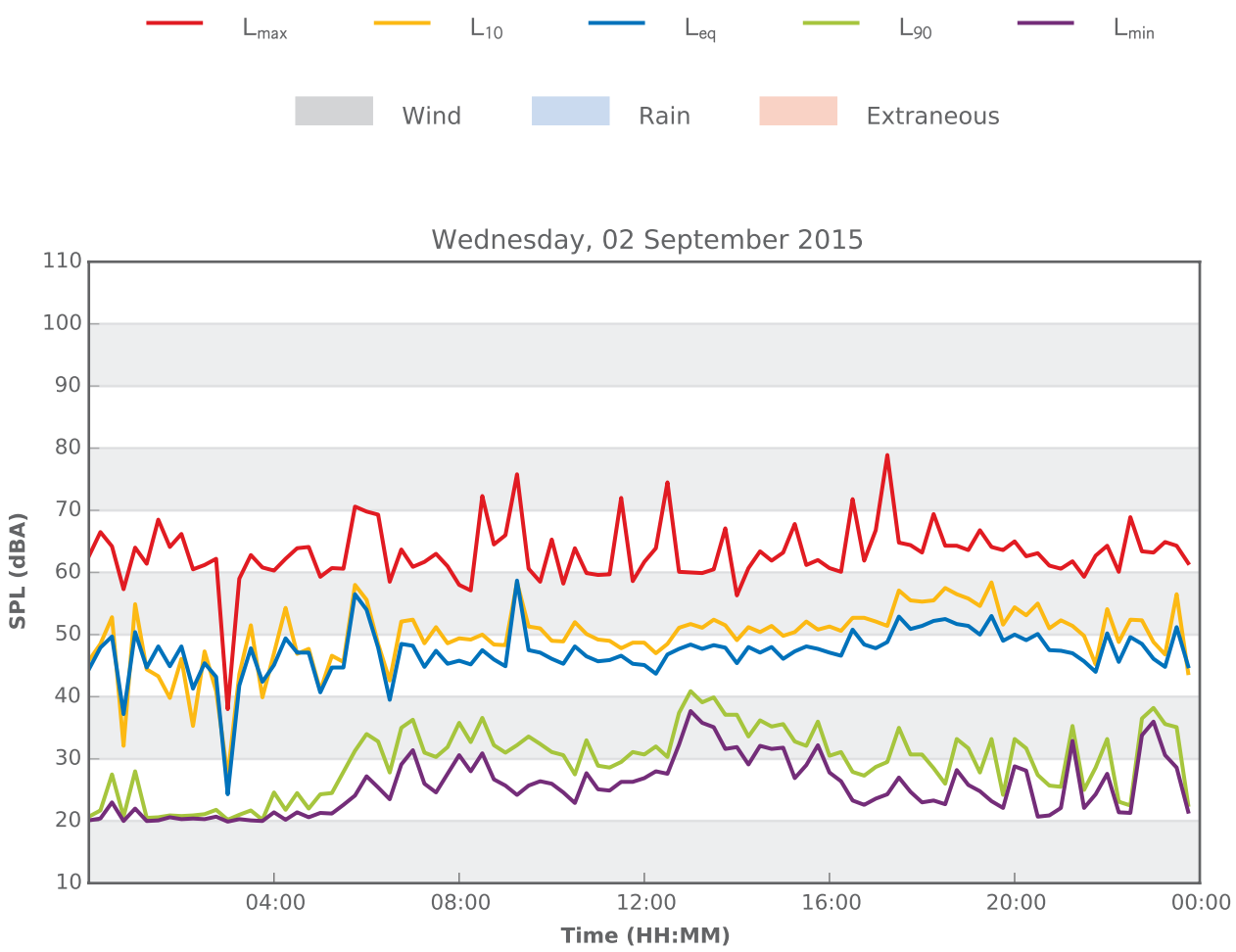
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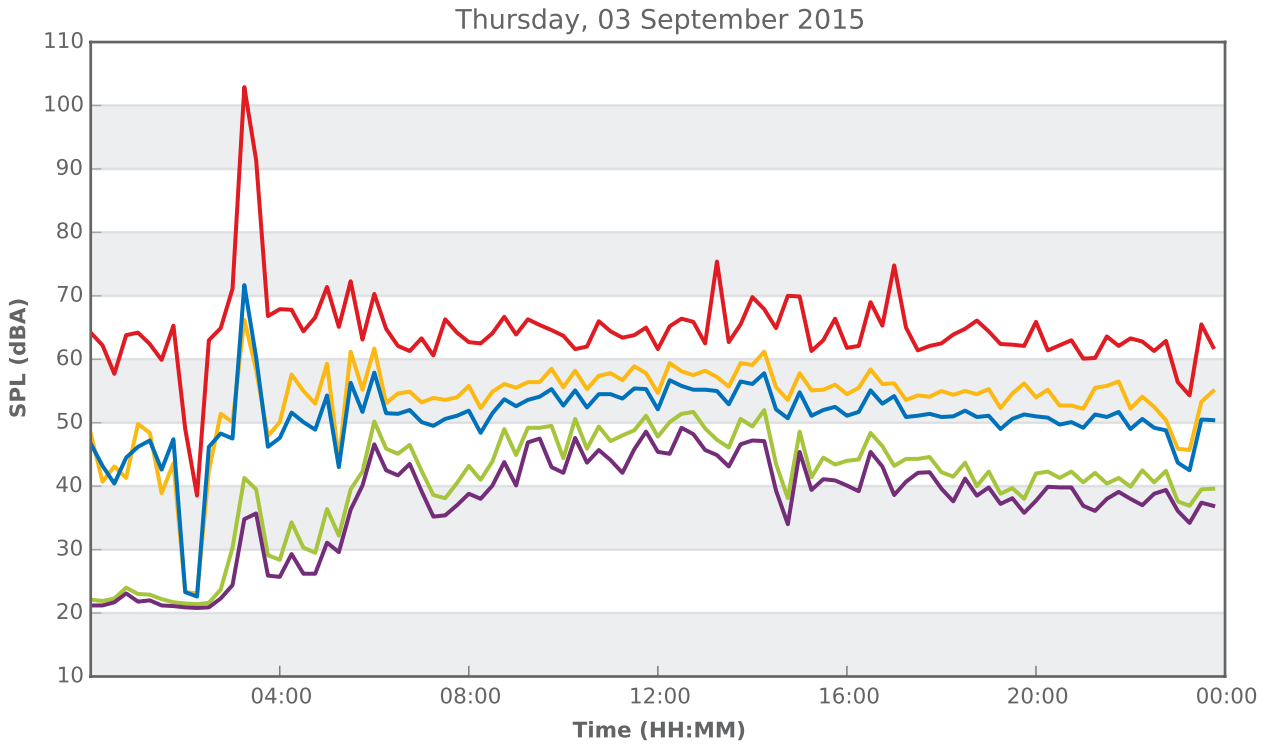
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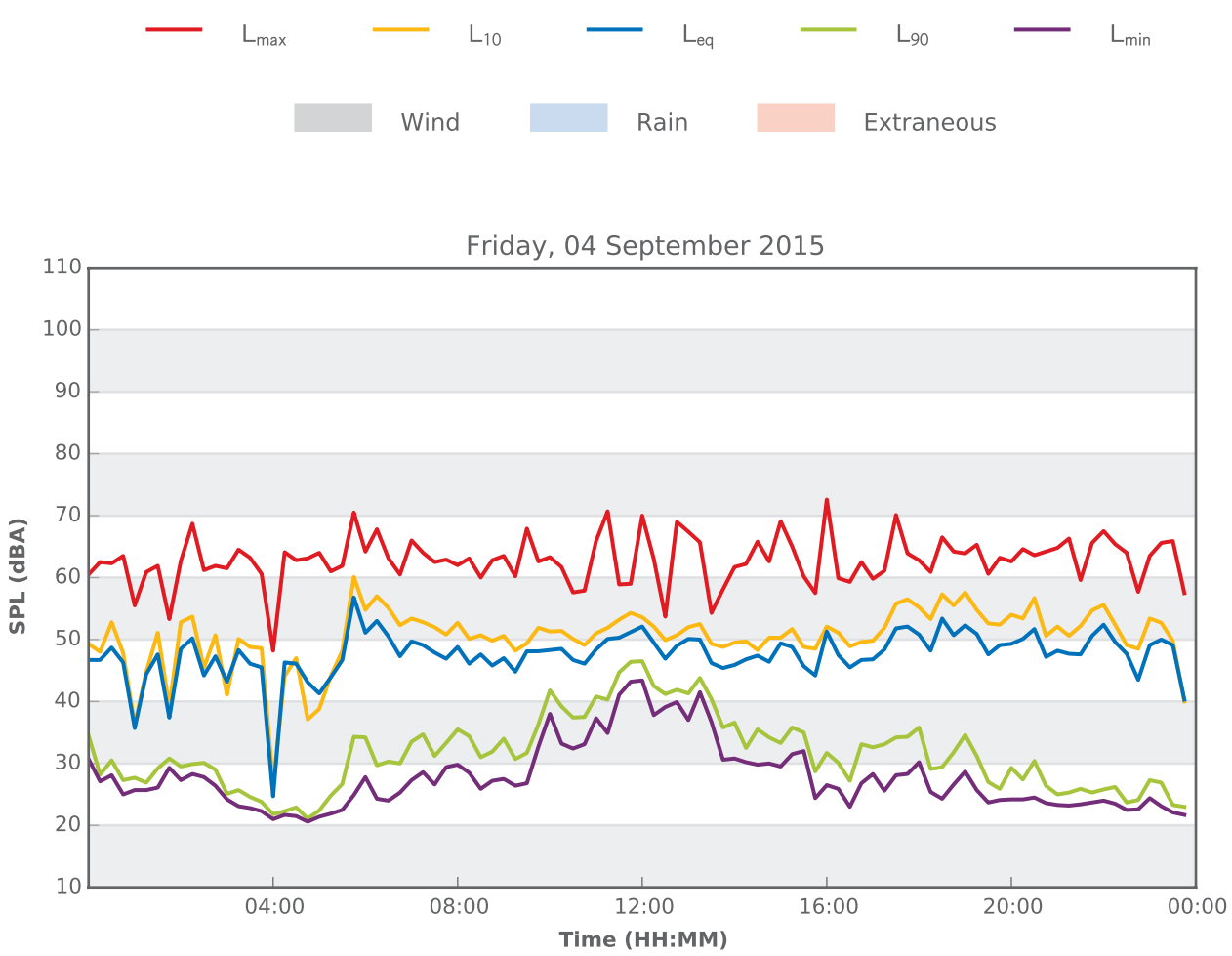
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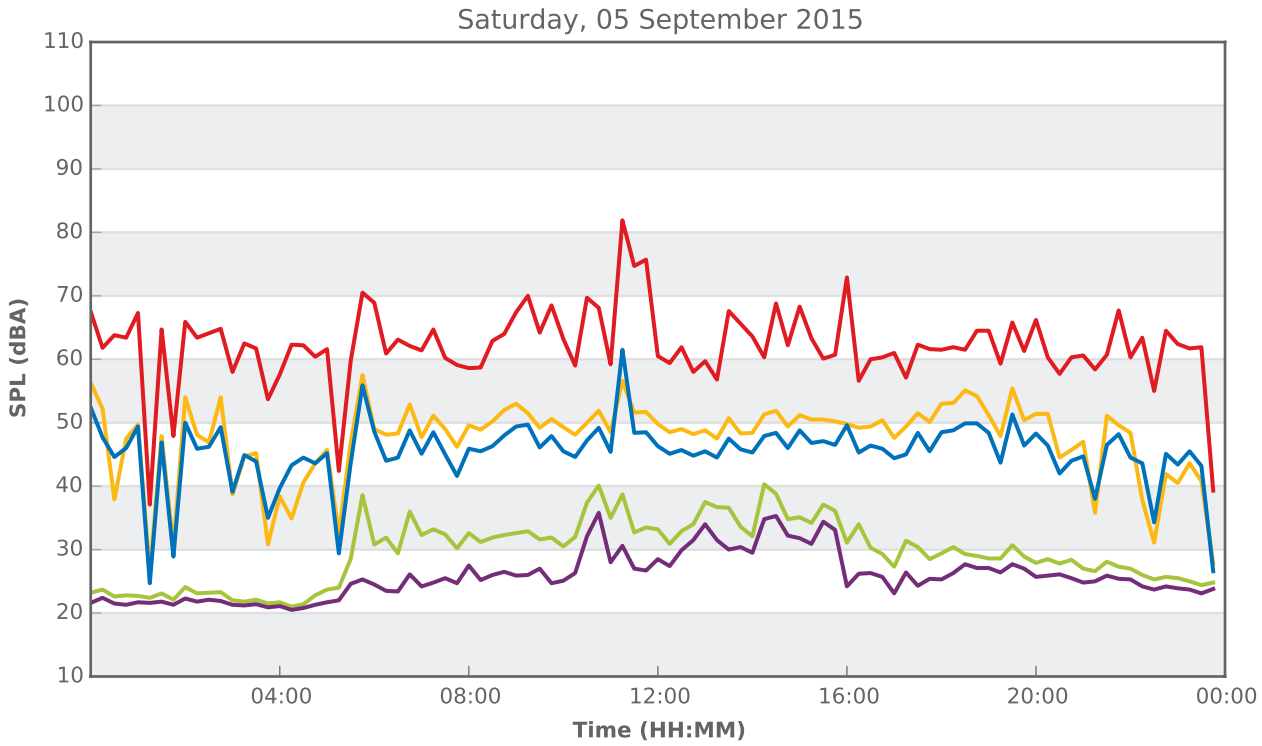
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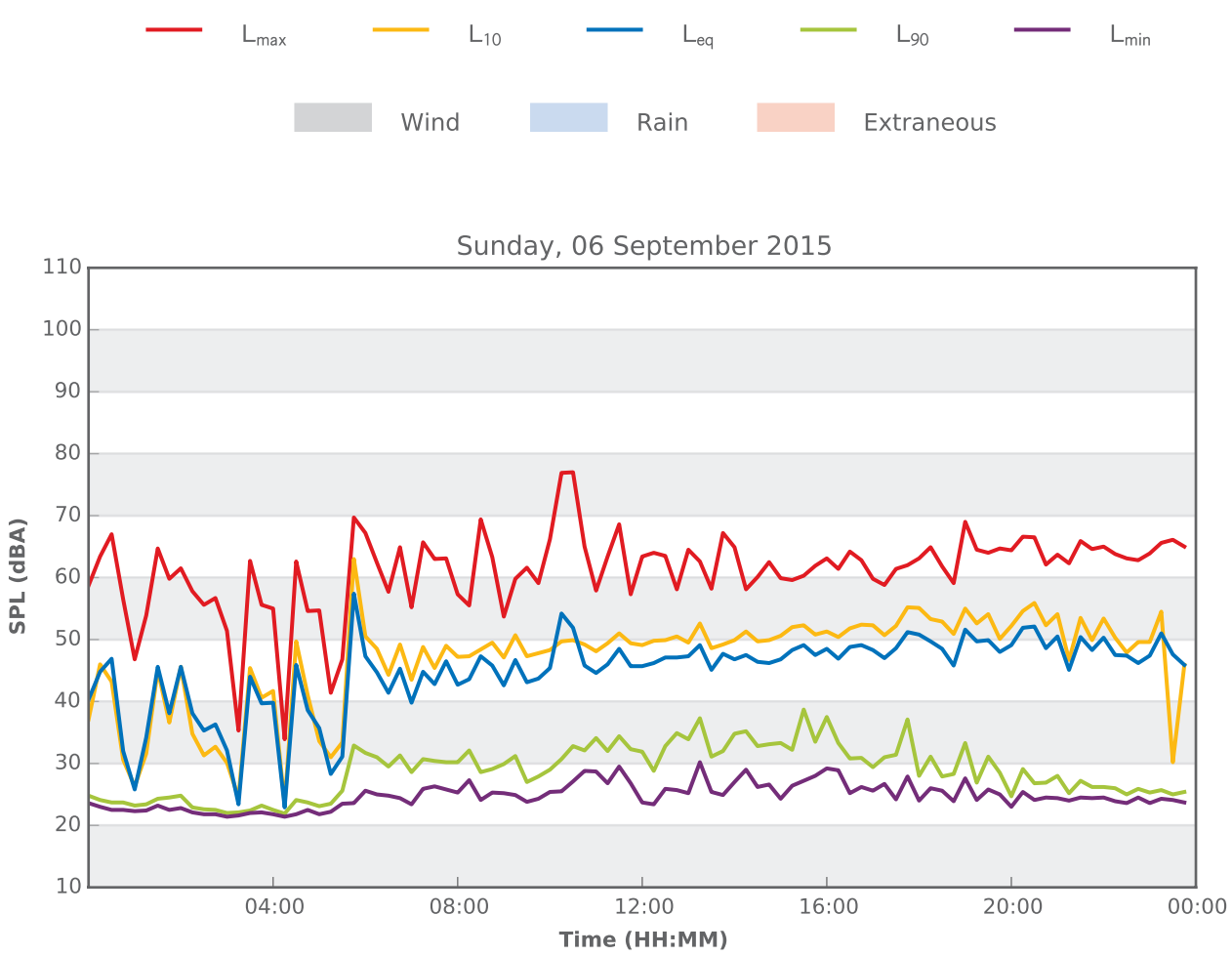
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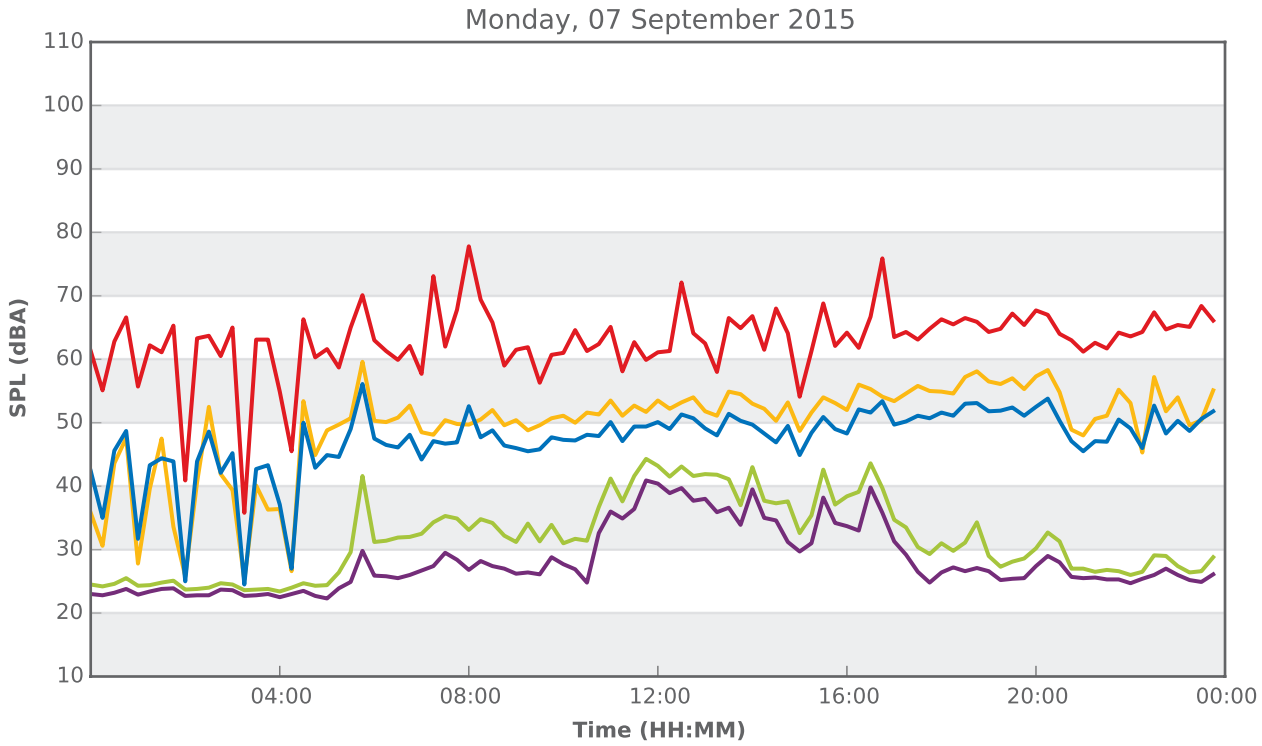
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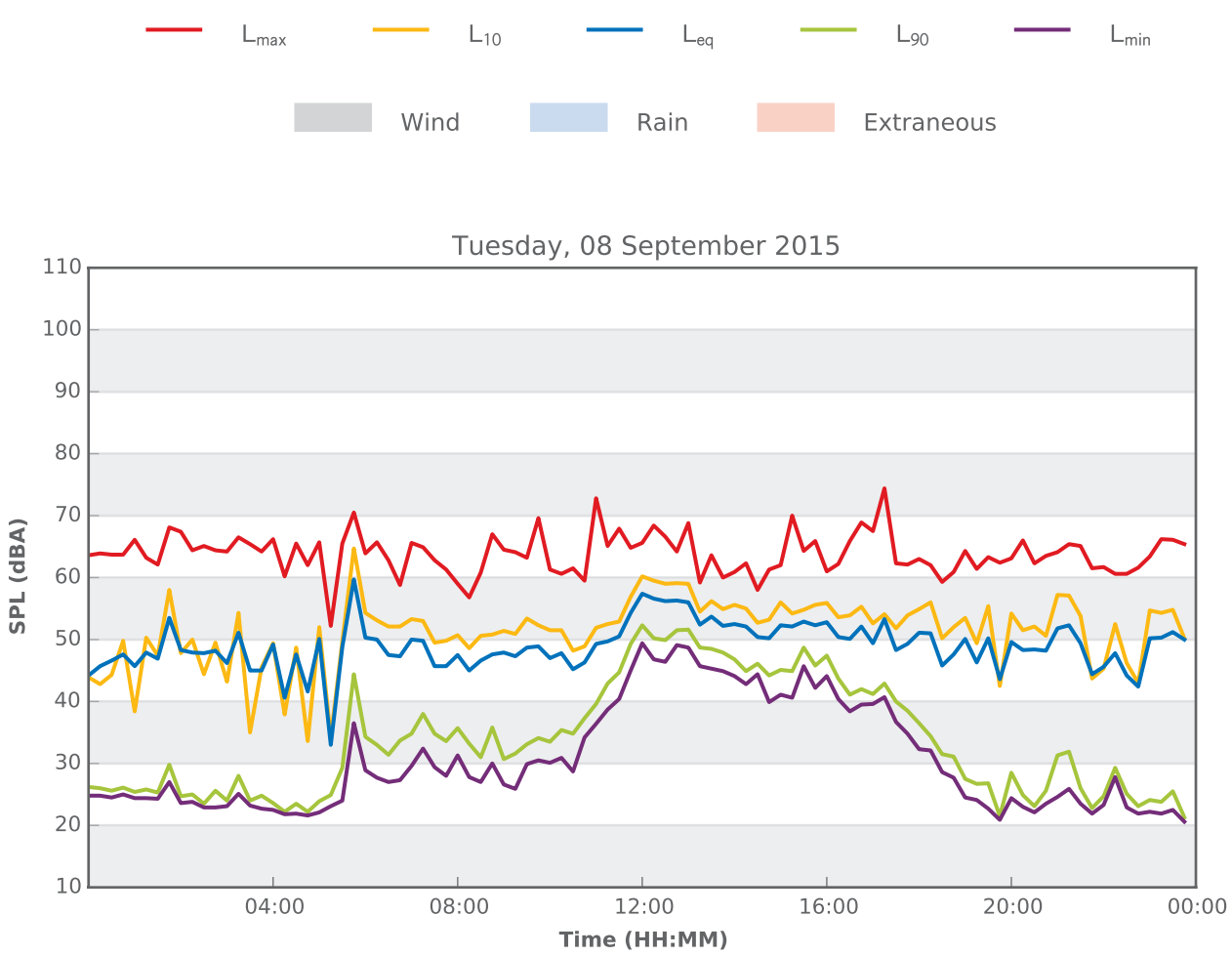
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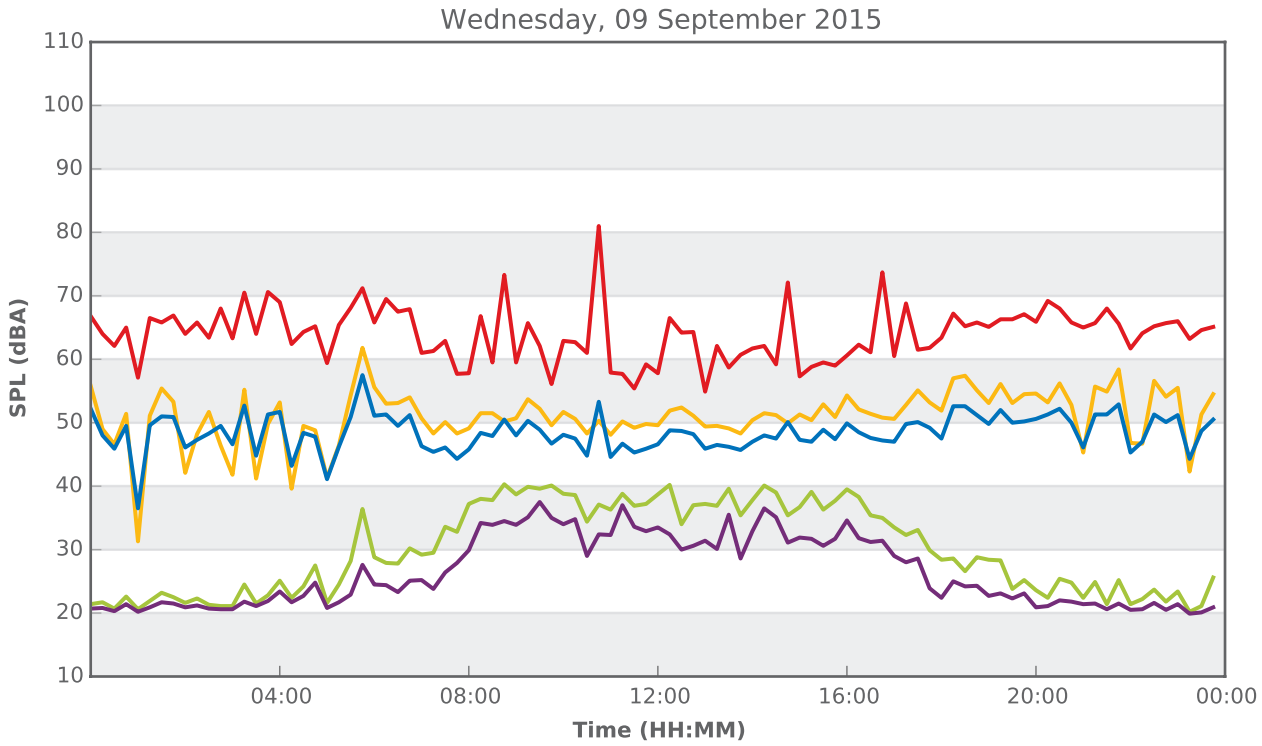
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Appendix D – Submissions

Submission Number	Respondent	Issues Raised	Response Reference
1	Individual	The project is not required and people should drive according to the conditions. Huge cost. Other roads require upgrading first, ie between Tenterfield and Drake. Collusion – trucking companies and government? Thank you for the community consultation at Tenterfield today. I was invited to submit this feedback in addition to my hand written form given to the team earlier. I do not support the Bolivia Hill upgrade and indicated this by email to Tony Windsor (then Federal MP) and Tenterfield Shire Council after the proposal was first announced. In short – Drive according to conditions. The installation of warning signs, flashing lights, rumble strips etc are quite sufficient for this short section as demonstrated in other parts of NSW. Accident rates have declined dramatically in recent years. I understand the earlier emotional campaign by those sadly affected by accidents on this stretch of road, however this is no longer justification for this project when circumstances have changed. In addition I question the influence on the Federal and NSW Governments of large transport interests in seeking to cut travel times. Will this huge expenditure detract from the more important heavy traffic bypass proposed for Tenterfield? Tenterfield Shire and adjoining areas have extensive road systems that need upgrading/maintenance now. The road to Drake is far more challenging. The continual struggle by local government for funding for these essential services beggars belief when this proposed highway upgrade costs so much and, to me, is less justified.	2.2 2.5
2	Tenterfield Shire Council	New development (tourist cabins) occurring at the southern end of the alignment, and access for new development to be maintained.	2.3.2 2.3.4
3	Individual	Pyes Creek Road – improve intersection and right turn. Passing lane should be extended from southern end as trucks will be hitting the slope at 100km, and will be almost at the end of the bridge before dropping to 70-80km/h – meaning it will be at the end of the bridge where the passing lane would be required.	2.3.1 2.3.3 2.3.4
4	Individual	Road should be two lanes up and one lane down –	2.3.1

		more head on collisions than previously between chainage 57613 and 56800.	
5	Glen Innes Severn Council	1. How much traffic will divert to Pacific Motorway during construction, thereby taking business away from smaller towns? 2. Query on whether there would be an overtaking lane. 3. Perception the project is more expensive than it is. Traffic safety – quoted rates are per 100 million km's travelled and the focus is severity not volume. 4. A wind farm will be constructed west of Glen Innes at White Rock. Over 200 people during construction of 70 turbines. Proponent (Gold Wind Australia) is currently investigating delivery routes. 2 additional wind farms proposed – facing same traffic issues.	2.3.1 2.3.4 2.3.5 2.5
6	Individual	Stakeholder notes there is a burnt off area adjacent the road which appears to be slipping. Identified additional contact living in Deepwater who has extensive local knowledge.	2.4
7	Individual	Concern the construction delays will cause visitors to take a detour and get lost.	2.3.4 2.3.5
8	Glen Innes Severn Council	Interested to know if there was a certain species (Homoranthus Croftianus) in the area.	2.6.1
9	Individual	Questioned whether the lighted speed sign was working properly as the stakeholder had observed it working every 7th or 9th vehicle on separate visits to the site. Queried whether a temporary memorial could be placed roadside until December. The stakeholder is a relative of a person who was killed in a road traffic accident on Bolivia Hill, and is in contact with families of other accident victims.	2.7.1
10	Department of Primary Industries – Lands	Refer to Appendix E	2.6.2 2.6.42.8.1 2.8.2 2.10.1 2.10.2
11	Tenterfield Shire Council	To whom it may concern Subject: Bolivia Hill Upgrade – Feedback on Review of Environmental Factors (REF) Thank you for the opportunity to provide feedback on the REF for the Bolivia Hill upgrade. Please accept Council's apologies for the delay in responding to your email of 25 September 2015. Council overwhelmingly supports the realignment, widening and construction of the subject section of New England Highway at Bolivia Hill. It is understood that Option 7B has been selected as	2.3.4 2.3.5 2.6.4

		the preferred alignment, with the objectives being to: • Improve road safety; • Improve road transport productivity, efficiency and reliability of travel; • Minimise the impact on the natural, cultural and built environment; • Provide value for money. Roads and Maritime Services engaged Hyder Consulting to develop the concept design and manage the environmental assessment process of the REF. From Council's perspective the REF would appear to cover all of the issues associated with the project. Provided all of the necessary control measures are put in place by ROADS AND MARITIME/the Contractor during the construction and post construction phase of the project, Council is confident that the upgrade at Bolivia Hill will be successful. Of particular note is the need to: • Protect the Bolivia Wattle, which is identified as being a vulnerable species, when undertaking the construction and post construction phases of the project; • Appropriately manage traffic when realigning and widening the highway due to the identified risks associated with falling rocks/boulders and 'working under traffic'. Council strongly objects to any closure of the New England Highway for long periods of time given such a closure(s) will impact upon the through movement of traffic generally, and in particular, the heavy transport industry. Further, closure of the New England Highway at Bolivia Hill has the potential to impact upon the local economy of Tenterfield. Any planned detour of traffic will be a significant impost on the travelling public due to the increased travel distances and time. Council's road network will also be expected to convey traffic away from Bolivia Hill during any planned closure of the New England Highway. Council would expect that if closures are planned to control traffic, roads such as Pyes Creek Road etc would be periodically maintained and graded by Roads and Maritime/the Contractor to cater for the increased traffic and transport demand. Finally, Council is eager to see the Bolivia Hill upgrade commence. By improving the subject section of New England Highway, this will greatly improve road safety and transport efficiency, hence the need for the works to commence as soon as possible. Council trusts that the above comments, albeit	

		brief, will be of benefit to the project team.	
12	Office of Environment and Heritage	Refer to Appendix E	2.6.2 2.6.4 2.9
13	Department of Primary Industries – Fisheries	Refer to Appendix E	2.6.3
14	Department of Primary Industries – Local Land Services	Bolivia Wattle Preservation – suggest investigate seed collection for future regeneration of Bolivia Wattle. Stakeholder manages seed bank, which is happy to store seed if project team collects. View to aid species connectivity.	2.6.4
15	Office of Environment and Heritage – Heritage Division	Refer to Appendix E	2.7.2 2.7.3 2.7.4 2.7.5

Appendix E – Government stakeholder responses

Information Session Glen Innes: 16 Oct 2015

Event Type	Information Session Glen Innes
Event Date	16 Oct 2015 11:00 AM (GMT +11)
Event End Date	16 Oct 2015 11:00 AM (GMT +11)
Location	Bolivia Hill Upgrade REF
Summary	Ecological interest
Stakeholder Comments	Interested to know if there was a certain species in the area.
Issues	Environment

Stakeholders:

Full Name	Organisation	Address	BH Phone	Mobile	Email
Koch, Mahri	Glen Innes Severn Council	"Platypus Run" 1620 Morven Road Glen Elgin GLEN INNES NSW 2370 AUSTRALIA	02 6734 4257		kochmahri@gmail.com

Team Members:

Full Name	Organisation	Phone	Mobile	Email
Spencer, Julie	Hyder Consulting		0416 338 263	julie.spencer@hyderconsulting.com

Information Session Glen Innes: 16 Oct 2015

Event Type	Information Session Glen Innes
Event Date	16 Oct 2015 11:00 AM (GMT +11)
Event End Date	16 Oct 2015 1:00 PM (GMT +11)
Location	Bolivia Hill Upgrade REF
Summary	Traffic; Overtaking Lane; Project Justification; Wind Farm
Stakeholder Comments	1. How much traffic will diver to Pacific Motorway during construction, thereby taking business away from smaller towns? 2. Query on whether there would be an overtaking lane. 3. Perception the project is more expensive than it is. Traffic safety - quoted rates are per 100 million km's travelled and the focus is severity not volume. 4. A wind farm will be constructed west of Glen Innes at White Rock. Over 200 people during construction of 70 turbines. Proponent (Gold Wind Australia) is currently investigating delivery route. 2 additional wind farms proposed - facing same traffic issues.
Issues	Overtaking Lane, Construction: Delays

Stakeholders:

Full Name	Organisation	Address	BH Phone	Mobile	Email
Appleby, Keith	Glen Innes Severn Council	AUSTRALIA	0408 144 251		kappleby@gisc.nsw.gov.au

Team Members:

Full Name	Organisation	Phone	Mobile	Email
Spencer, Julie	Hyder Consulting		0416 338 263	julie.spencer@hyderconsulting.com

Information Session Tenterfield: 15 Oct 2015

Event Type	Information Session Tenterfield
Event Date	15 Oct 2015 3:33 PM (GMT +11)
Event End Date	15 Oct 2015 3:33 PM (GMT +11)
Location	Bolivia Hill Upgrade REF
Summary	Access to new development (one tourist cabin)
Stakeholder Comments	New development occurring at the southern end of the alignment, and access for new development to be maintained.
Team Response	Information to be passed to project team.
Issues	Construction: Safety, Construction: Delays

Stakeholders:

Full Name	Organisation	Address	BH Phone	Mobile	Email
Davidson, Tamai	Tenterfield Shire Council	PO Box 61 GLEN INNES NSW 2370 AUSTRALIA	0267366015		t.davidson@tenterfield.nsw.gov.au

Team Members:

Full Name	Organisation	Phone	Mobile	Email
Spencer, Julie	Hyder Consulting		0416 338 263	julie.spencer@hyderconsulting.com

Department of Primary Industries
Lands

Roads and Maritime Services NSW
Via: Jeff Dane
Associate Technical Director - Acadis

Email: boliviahillupgrade@hyderconsulting.com and jeff.dane@arcadis.com

30 October 2015

Re: Bolivia Hill Highway Upgrade – Review of Environmental Factors

Dear Sir,

Thank you for the invitation to provide comment on the Review of Environmental Factors (REF) for the Bolivia Hill upgrade to the New England Highway. The Department makes the following submission to be considered by the Roads and Maritime Services.

Affected Crown Reserves
There are several Crown reserves impacted by the proposed upgrade to the New England Highway at Bolivia Hill. These reserves have several reservations and management authorities, summarised in Table 1.

Reserve Number	Purpose	Management
22242	Travelling Stock	Local Lands Services
1300	Railway	DPI-Lands
751498	Future Public Requirements	DPI-Lands
22252	Travelling Stock	Local Lands Services

Table 1 Crown Reserves impacted by proposal

Aboriginal Land Claims
The following Aboriginal Land Claims (ALCs) exist on Crown land affected by the proposed development. ALC status can change at any time.

These Land Claims would need to be dealt with by the Roads and Maritime Service prior to commencement of works, or as part of the acquisition process.

Aboriginal Land Claim	Status
ALC 9779	Incomplete
ALC 32083	Incomplete
ALC 31721	Incomplete

Table 2 Aboriginal Lands Claims relevant to the proposal

Native Title
No Native Title claim is currently lodged over the proposal area.

Department of Primary Industries - Lands
25-27 Fitzroy Street TAMWORTH NSW 2340
P O Box 2185 DANGAR NSW 2309
T:1300 886 235 F:02 4925 3517 E: tamworthcrownlands@crownland.nsw.gov.au
W: www.crownland.nsw.gov.au
ABN: 72 189 919 072

Acquisition of Crown Land
The Department is aware that acquisition of Crown Land will be a necessary part of the progress of the project. The Department will need to be furnished with a copy of the draft acquisition plan for comment before impacts of this acquisition on the residual area of affected reserves can be determined.

Environmental Concerns – impact on Crown Land
Long term impacts of the proposal primarily relate to increased fragmentation of the natural landscape. This area, including land managed by the Department and the adjacent Bolivia Hill Reserve has a range of important environmental values. The Department considers that the impact of disturbance and clearing would be in some part offset by the decommissioning of the disused road surface at the completion of the works phase. This area could be rehabilitated and revegetated to minimise overall habitat loss.

Cleared vegetation – environmental benefit would be obtained from the retention and relocation of all large logs or felled trees with hollows to adjacent vegetated or rehabilitated land to provide fauna habitat.

Exclusion fencing around Bolivia wattle, should be removed at the completion of the works phase.

Removal of non-permanent fencing, barricade and erosion control materials at the completion of their use should take place. This will avoid degrading materials entering waterways in the future.

Topsoil used to rehabilitate exposed soil upon completion of works should be sourced only from the site, not transported from other areas. This will retain the integrity of the seedbank for vegetation reestablishment, and limit opportunities for weed and pathogen introduction.

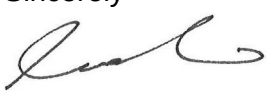
Spray grass should not set viable seed if incorporating seed of exotic grass species.

Bushfire risk
No mention was found in the REF of bushfire management planning, or activities to reduce the likelihood of construction works igniting a bushfire in the project area. Given the level of disturbance to be caused by this project, consideration should me made of practices to reduce the possibility of any part of project work starting a fire, and management of the site in the event of a bushfire.

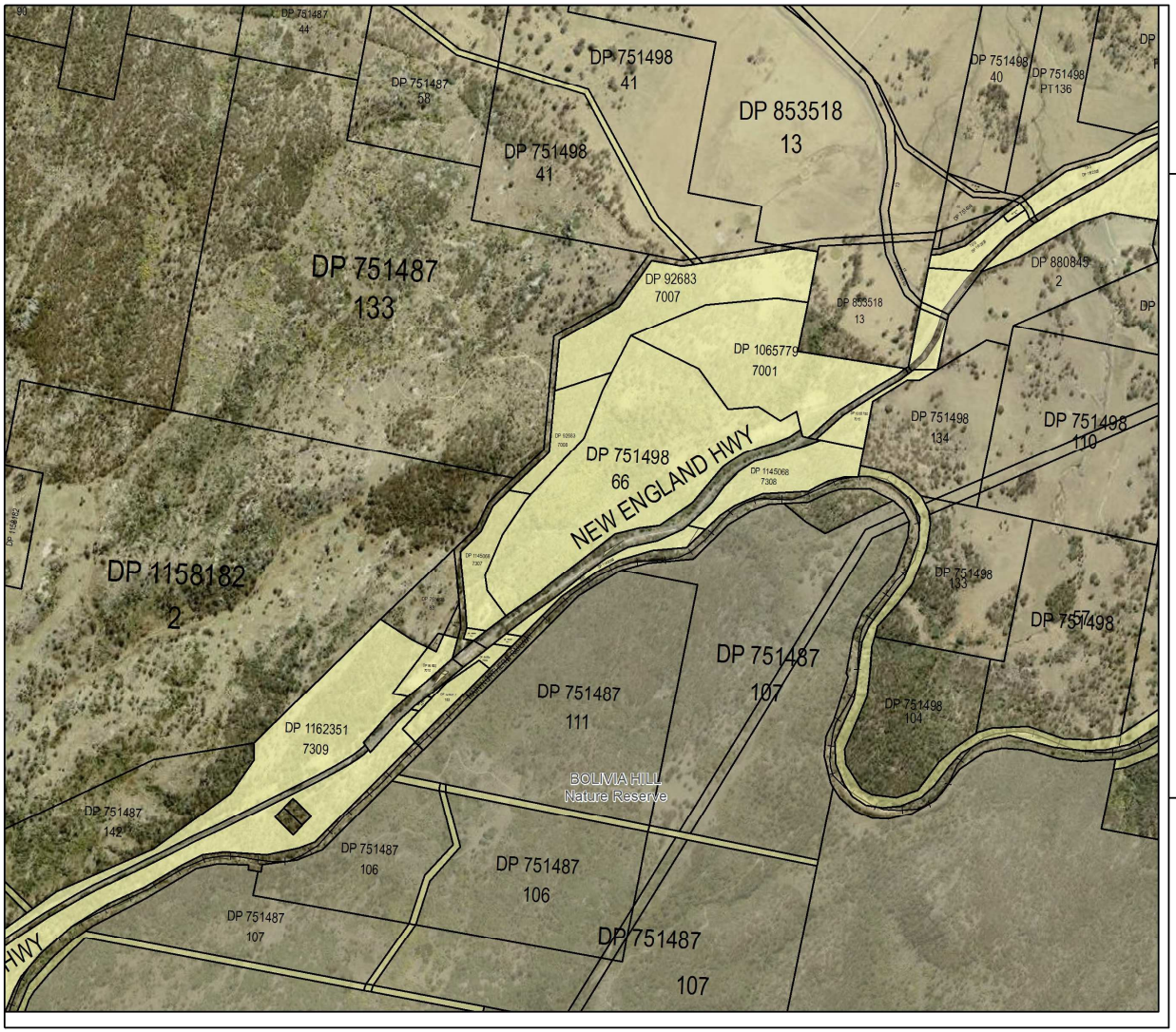
Biodiversity Offsets
Given the high environmental values in the vicinity of the proposed project, the Department requests liaison regarding the development of the planned biodiversity offset strategy, and the incorporation of nearby or adjacent land.

I welcome the opportunity to discuss these matters with the RMS or its representative,

Sincerely



Anna Cronin
Natural Resource Management Projects
Anna.Cronin@crownland.nsw.gov.au
02 6763 3027



Bolivia Hill Highway Upgrade Crown Land Impacts

N

Legend

Crown Land

Author: A Cronin
Map Created: 28/10/2015

Coordinate System: GDA 1994 NSW Lamberts CC
Projection: Lambert Conformal Conic
Imagery: PLEASE UPDATE OR REMOVE
<Refer to sixmaps/sixmaps/BestImageryDates layer for information> DD/MM/YYYY

Disclaimer:
The information contained in this map has been provided in good faith. Whilst all effort has been made to ensure the accuracy and completeness of this information the data providers take no responsibility for errors or omissions nor any loss or damage that may result from the use of this information.

0 390 780 Meters

NSW GOVERNMENT | Department of Primary Industries Lands

From: Stephen Bell [mailto:s.bell@tenterfield.nsw.gov.au]
Sent: 3 November 2015 4:07 PM
To: AUS Bolivia Hill Upgrade; Jeff Dane

Cc: Lotta Jackson
Subject: IWS20151094 - CAS-07506-WBCL - Bolivia Hill upgrade project - New England Highway

To whom it may concern

Subject: Bolivia Hill Upgrade – Feedback on Review of Environmental Factors (REF)

Thank you for the opportunity to provide feedback on the REF for the Bolivia Hill upgrade. Please accept Council's apologies for the delay in responding to your email of 25 September 2015.

Council overwhelmingly supports the realignment, widening and construction of the subject section of New England Highway at Bolivia Hill. It is understood that Option 7B has been selected as the preferred alignment, with the objectives being to:

- Improve road safety;
- Improve road transport productivity, efficiency and reliability of travel;
- Minimise the impact on the natural, cultural and built environment;
- Provide value for money.

Roads and Maritime Services engaged Hyder Consulting to develop the concept design and manage the environmental assessment process of the REF. From Council's perspective the REF would appear to cover all of the issues associated with the project. Provided all of the necessary control measures are put in place by RMS/the Contractor during the construction and post construction phase of the project, Council is confident that the upgrade at Bolivia Hill will be successful. Of particular note is the need to:

- protect the Bolivia Wattle, which is identified as being a vulnerable species, when undertaking the construction and post construction phases of the project;
- appropriately manage traffic when realigning and widening the highway due to the identified risks associated with falling rocks/boulders and 'working under traffic'. Council strongly objects to any closure of the New England Highway for long periods of time given such a closure(s) will impact upon the through movement of traffic generally, and in particular, the heavy transport industry. Further, closure of the New England Highway at Bolivia Hill has the potential to impact upon the local economy of Tenterfield.
- any planned detour of traffic will be a significant impost on the travelling public due to the increased travel distances and time. Council's road network will also be expected to convey traffic away from Bolivia Hill during any planned closure of the New England Highway. Council would expect that if closures are planned to control traffic, roads such as Pyes Creek Road etc would be periodically maintained and graded by RMS/the Contractor to cater for the increased traffic and transport demand.

Finally, Council is eager to see the Bolivia Hill upgrade commence. By improving the subject section of New England Highway, this will greatly improve road safety and transport efficiency, hence the need for the works to commence as soon as possible.

Council trusts that the above comments, albeit brief, will be of benefit to the project team.

Regards

Stephen Bell
Director Engineering Services

Stephen Bell
Director of Engineering Services
Tenterfield Shire Council
PO Box 214, Tenterfield NSW 2372

Phone:	(02) 6736 6000
Direct Phone:	-
Mobile:	-
Fax:	(02) 6736 6005
Email:	s.bell@tenterfield.nsw.gov.au
Website:	www.tenterfield.nsw.gov.au

From: AUS Bolivia Hill Upgrade [mailto:BoliviaHillUpgrade@hyderconsulting.com]
Sent: Friday, 25 September 2015 4:57 PM
To: AUS Bolivia Hill Upgrade <BoliviaHillUpgrade@hyderconsulting.com>
Subject: IWS20151094 - CAS-07506-WBCL - Bolivia Hill upgrade project - New England Highway

Thank you for your previous interest in the Bolivia Hill upgrade project. Roads and Maritime Services has completed a review of environmental factors (REF) for building the upgrade. The community is invited to provide feedback on the REF until **26 October 2015**. This feedback will be considered as decisions regarding the project are made into the future. You can provide your feedback on the REF via email or Reply Paid post using the details below, or in person at the Community drop-in sessions.

Further information about the REF is detailed in the community update available from the project website. Please click here to obtain a copy of the community update. If you would like us to post you a hard copy of the community update, please contact the project team using the details below.

Community drop-in sessions

The project team will be available at community drop-in sessions to answer your questions and receive feedback. Copies of the REF will be available to view at these sessions.

When: Thursday 15 October 2015, 3pm to 7pm

Where: Sir Henry Parkes School of Arts, corner of Rouse and Manners streets, Tenterfield

When: Friday 16 October, 11am to 1pm

Where: Glen Innes Severn Library, 71 Grey Street, Glen Innes

Static displays

The REF will also be on display at the following locations (copies of the community update will be available at these locations):

TENTERFIELD

- Tenterfield Motor Registry, 94 Molesworth Street
- Tenterfield Council, 247 Rouse Street
- Tenterfield Visitor Centre, 157 Rouse Street
- Shell Service Station, 69 Rouse Street

GLEN INNES

- Glen Innes Motor Registry, Cnr of Grey and Ferguson streets
- Glen Innes Severn Shire Council, 136 Church Street
- Glen Innes Visitor Centre, 152 Church Street

ONLINE

www.rms.nsw.gov.au

Subject to determination of the REF, the next steps are to complete detailed design and start construction.

You are welcome to forward this message to friends and neighbours and invite them to contact us to join the project's email list. Alternatively, if you wish to be removed from this email list, please reply with UNSUBSCRIBE in the subject line.

Kind regards,

The Bolivia Hill upgrade project team

Phone: 131 782

Email: boliviahillupgrade@hyderconsulting.com

Post: RMS

Bolivia Hill upgrade

Reply Paid 546

Grafton NSW 2460

NSW GOVERNMENT | Office of Environment & Heritage

Our Ref: DOC15/395733
Your Ref: Bolivia Hill Upgrade

Mr David Andrews
Roads and Maritime Services
Reply Paid 546
Grafton NSW 2460

Dear Mr Andrews

Re: Bolivia Hill Upgrade – Review of Environmental Factors

Thank you for your email dated 30 September 2015 regarding the Bolivia Hill Review of Environmental Factors (REF) requesting comments from the Office of Environment and Heritage (OEH). I appreciate the opportunity to provide input and apologise for the delay in responding.

The OEH has statutory responsibilities relating to biodiversity (including threatened species, populations, ecological communities, or their habitats), Aboriginal and historic heritage, National Parks and Wildlife Service estate, flooding and estuary management. Matters relating to noise, air and water quality and any licensing requirements under the *Protection of the Environment Operations Act 1997* should be addressed separately to the Environment Protection Authority because that authority is now independent of us.

I understand that you have been provided with a contact email within the Heritage Division of the OEH and you are advised to seek comments on historic heritage from that division regarding this proposal. With respect of other OEH statutory responsibilities, we have reviewed the documents supplied and advise that, although we have no concerns about NPWS estate or flood management, a number of issues are apparent with respect to the assessments for biodiversity, and Aboriginal cultural heritage. These issues are discussed in detail in **Attachment 1** to this letter.

In summary, the OEH recommends that prior to determining the REF:

1. The total impacts of the project, including the direct and indirect impacts, should be quantified to ensure that a suitable offset package can be developed in a repeatable and transparent way.

2. The Roads and Maritime Services should ensure that all mitigation measures have been addressed in the REF and included in the Construction Environmental Management Plan to reduce biodiversity impacts during construction and operational phases.

3. A biodiversity offset strategy should be developed and finalised.

Locked Bag 914 Coffs Harbour NSW 2450
Federation House, Level 8, 24 Moonee Street
Coffs Harbour NSW 2450
Tel: (02) 6659 8200 Fax: (02) 6651 5356
ABN 30 841 387 271
www.environment.nsw.gov.au

4. A detailed rehabilitation plan should be developed to ensure that at least part of the offset package relates to the subject area where the rehabilitation can benefit the ecological values that are proposed to be impacted.

5. The current proposed route should be subject to further assessment in the form of an archaeological survey and a final consolidated report, correcting the errors and anomalies within the current documents, should be submitted to the OEH for review.

If you have any further questions about this issue, Mr Krister Waern, Senior Operations Officer, Regional Operations, OEH, can be contacted on 6640 2503 or at krister.waern@environment.nsw.gov.au.

Yours sincerely

Dimitri Young 6 November 2015

DIMITRI YOUNG
Senior Team Leader Planning, North East Region
Regional Operations

Contact officer: KRISTER WAERN
6640 2503

Enclosure: Attachment 1 – Detailed OEH Comments – Bolivia Hill REF

Attachment 1: Detailed OEH Comments – Bolivia Hill REF

Biodiversity matters

The OEH has reviewed the Bolivia Hill Upgrade REF dated September 2015 and provides the following comments:

- The level of ecological assessment appears to be adequate as detailed in the Fauna Ecological Report and the Flora and Aquatic Assessment.

- The proposal will impact on 11.05ha of native vegetation, of which 2.54ha is considered to be part of an endangered ecological community. This impact appears to have been calculated on the direct impact of the proposal only and further impacts associated with the indirect impacts should also be quantified. Particularly as section 5.2.3 of the Flora and Aquatic Assessment states that a 30m indirect impact area is likely to occur around the construction footprint on the existing biodiversity values.

- The area supports a large population of *Acacia pycnostachya* which is listed as vulnerable under both state and commonwealth biodiversity legislation. The OEH notes that eight individuals may be impacted by the proposal. It is noted that some of these plants occur close to the construction footprint and the indirect impact of 30m should be used to determine how many individuals will be impacted by the proposal.

- Both the flora and fauna reports detail mitigation measures for biodiversity, i.e. Table 7-28 Safeguards to be implemented and Table 6-9: Proposed safeguards and management measures. The RMS should ensure that all the mitigation measures in the detailed ecological reports are incorporated into the Construction Environmental Management Plan (CEMP) for the proposal.

- Page 101 of the REF states that biodiversity offsets are required for the project and that the Biobanking calculator may be used to determine the size and quantum of the offset. The REF recommends that a biodiversity offset strategy is prepared in accordance with the RMS Guideline for Biodiversity Offsets (2011). The OEH agrees with the recommendation that biodiversity offsets should be provided and is willing to assist the RMS in determining a suitable offset for the proposed impacts of the project.

- The REF indicates that rehabilitation works will be undertaken as part of the project. There is very little detail about where the rehabilitation will occur and what timeframe is involved in ensuring that the rehabilitation is successful in the long term. A more detailed rehabilitation strategy should be developed which can also form part of the offset requirements of the project.

Recommendations

1. The total impacts of the project, including the direct and indirect impacts should be quantified to ensure that a suitable offset package can be developed in a repeatable and transparent way.

2. The RMS should ensure that all mitigation measures have been addressed in the REF and included in the CEMP to reduce biodiversity impacts during construction and operational phases.

3. A biodiversity offset strategy should be developed and finalised prior to commencement of works on site.

4. A detailed rehabilitation plan should be developed to ensure that at least part of the offset package relates to the subject area where the rehabilitation can benefit the ecological values that are proposed to be impacted.

Aboriginal Cultural Heritage

The OEH has reviewed the REF and associated documents from an Aboriginal cultural heritage perspective and has the following comments to make.

We note the conclusions and recommendations in the REF based on supporting documentation, however we further note that anomalies in, and inconsistencies between, the various documents need to be rectified in order to provide sufficient evidence to support the recommendations and management protocols. The supporting documentation does not contain sufficient information to support those conclusions.

The OEH notes that the survey conducted by Niche in 2013 was carried out according to landform units. One of the 'landform units' identified for the survey was 'Access Tracks'. The OEH does not consider that 'Access Tracks' constitute a landform unit for the purposes of scientific survey. The OEH also identified the fact that no maps or figures are included in the Niche 2013 report to indicate survey area and transect locations. Figure 9 of the Niche 2013 report is labelled "Figure 9: Survey Transects" does not show survey transects, rather it shows some of the landform unit designations used in the assessment.

The OEH further notes that the area of land covered by the 'Access Tracks' landform unit was less than 2000 square metres whereas the smallest other landform unit identified in the project area was over 150000 square metres. Review of the 'Effective Coverage' data in Table 6 (Niche 2013) reveals that the information provided therein is incorrect and should have been calculated to provide indication of percentage of land relative to the overall project area. The final figure of 42.25% coverage is false and misleading as this figure actually calculates to 0.12% survey coverage (0.06% if 'Access Tracks' are excluded from the calculations). The OEH notes that a survey covering approximately one tenth of one percent of the project area located a number of sites all of which are considered of high significance (post contact artefacts, scar trees, rock art and grinding grooves). The OEH considers the likelihood for other sites to be present within the project area to be very high based on this analysis.

The REF proper notes the proximity of PAD areas recorded by Niche as being in the vicinity of works however no accurate spatial information regarding these PAD areas is included in any of the documents, including the Niche 2013 ACHAR. OEH does not consider that enough spatial data has been provided to determine where the PAD areas in question are actually located.
In the Niche 2013 ACHAR, the location of the two areas identified as 'Site 5: Bolivia Hill PAD 1' and 'Site 6: Bolivia Hill PAD 2' are both recorded as having the same coordinates. The OEH fails to understand how the review process carried out in 2015 (Artefact 2015) was able to verify these PAD locations as no correct coordinates exist in the Niche 2013 report. The OEH requires that updated, accurate and ground-truthed evidence of the location of these areas is provided prior to making final comment on the recommended management protocols.

Furthermore the OEH notes that the survey conducted by Artefact to inform the Niche 2013 report, identified a site (Site 1: Bolivia Hill AS 1) which was recorded in 2013 as containing Aboriginal stone objects, including Aboriginal objects produced from ceramic materials. The presence of ceramic knapped objects is evidence of a post-contact site of high significance. The Niche archaeologist also identified an area of PAD, associated with those objects, considered highly likely to contain further evidence of Aboriginal occupation. The OEH notes that the subsequent (Artefact 2015) assessment recommends declassification of this area as PAD and also failed to relocate the most significant objects present. The OEH notes that the rationale provided by the archaeologist to support his recommendations is based entirely on the fact that the immediate location had been subject to historical disturbance and is partially flood prone. The OEH does not concur that the possible disturbance to the site warrants its declassification particularly when the archaeologist failed to

relocate a highly significant proportion of the site and could not, therefore, have been aware of the site parameters when making this recommendation. The OEH considers that site AS1 should retain its status as PAD and that further inspection should be carried out to relocated the ceramic artefacts and determine the extent of the PAD and associated visible surface expression. The OEH does not concur with the significance assessment presented as Table 2 in the Artefact 2015 report, particularly with regard to site AS1.

Review of section 1.4 of the Artefact 2015 report notes that the recommendations are based upon a disputed understanding of the nature, extent and significance of site AS1 and its associated PAD area. The OEH recommends that, given this site is within the current proposed corridor further assessment of this site should be undertaken to confirm the extent of the surface expression and also to test the PAD area for subsurface deposits.

Furthermore the OEH notes that the REF document provided states that consultation in accordance with the RMS PACHI and OEH Consultation Requirements was carried out for the project (P 68). This is directly contradictory to the Niche 2013 report which categorically states at a large number of locations that no consultation was undertaken as it was not part of the contract between Niche and the proponent.

The OEH also notes that key figures are missing from the REF (Figures 6-8 and 6-9). Section 6.3.4 refers to the location of PAD 2 however, as noted above, the location of PAD 2 is unconfirmed as there are errors in the site recording for PAD 1 and PAD 2. The OEH also notes that Section 6.3.4 of the REF refers to the potential to impact previously unrecorded Aboriginal sites. Given the statistically low proportion of the project area effectively surveyed (less than one half of one percent) and the number and nature of sites located during the survey, the OEH considers the likelihood for previously unrecorded Aboriginal sites to be high and that a number of these sites may be of moderate to high significance. The recommendations for the management of site AS1 and associated PAD are inappropriate as they rely on an understanding of the site and PAD extent which is currently unknown.

Recommendation

1. Given the large number of errors within each of the three documents reviewed (REF, Niche 2013 and Artefact 2015) and the large number of discrepancies between the three documents, as well as the low proportion of effective survey coverage, the OEH recommends that the current proposed route be subject to further assessment in the form of an archaeological survey and that a final consolidated report, correcting the errors and anomalies within the current documents, be submitted to the OEH for review prior to any further determination of this issue.

	Jeff Dane 30 September 2015 1:46 PM
To	AUS Bolivia Hill Upgrade
Subject:	FW: Bolivia Hill Upgrade - New England Highway review of environmental factors - Fisheries Response

Jeff Dane | Associate Technical Director | BEng (Hons) CEng MICE RPEQ | jeff.dane@arcadis.com
Arcadis | Level 7/199 Grey Street | South Brisbane QLD 4101 | Australia
T.+61 7 3337 0095 | M. 0407 262 997
www.arcadis.com

From: David Ward [mailto:david.ward@dpi.nsw.gov.au]
Sent: 30 September 2015 1:31 PM
To: Jeff Dane
Cc: ANDREWS David K
Subject: Re: Bolivia Hill Upgrade - New England Highway review of environmental factors

Hi Jeff,

Thank you for providing me with a link to the REF. The tributary of Brickyard Creek is a first order stream (Strahler Stream Ordering) and is therefore not considered Key Fish Habitat (3rd Order & above). Therefore there will be no approvals or concurrence required from our department should the detailed design works involve any works within or adjacent to the creek.

Cheers
David

On 30 September 2015 at 12:10, Jeff Dane <Jeff.Dane@arcadis.com> wrote:

> Dear Stakeholder
>
> The Australian and NSW governments have committed funding for planning and building the proposed Bolivia Hill upgrade situated on the New England highway between Glen Innes and Tenterfield. The preferred route option for the upgrade was confirmed in February 2014.
>
> Roads and Maritime Services has completed a review of environmental factors (REF) which is on display from 28th September to 26th October The REF assesses the potential environmental and

social impacts of the preferred alignment and found that the proposal would not significantly affect the environment or the community.

The REF can be accessed at the following link:

http://www.rms.nsw.gov.au/projects/northern-nsw/bolivia-hill-new-england-highway/project-documents.html

For your convenience a USB stick containing a digital copy of the document will also be posted to you.

Roads and Maritime invites your organisation to provide comment and advise of any interests, concerns or statutory requirements relating to the proposal.

We welcome the opportunity to meet with you to discuss any of your concerns and to answer any queries directly. Please do not hesitate to contact us to arrange such a meeting.

The project team will also be in attendance at two community drop-in sessions in the following locations:

Tenterfield
When: Thursday 15 October 2015, 3pm to 7pm
Where: Sir Henry Parkes School of Arts, corner of Rouse and Manners streets, Tenterfield

Glen Innes
When: Friday 16 October, 11am to 1pm
Where: Glen Innes Severn Library, 71 Grey Street, Glen Innes

We would be pleased to answer any questions in person at either session, or can meet privately immediately before or after if you prefer.

To enable consideration of your comments on the REF, a written response would be appreciated by the **19th October 2015**. This will enable the team to address any enquiries within the existing timeframes.

Roads and Maritime Services would be pleased to provide further information if required. David Andrews (Project Development Manager) may be contacted on (02) 6640 1073 or by email David.Andrews@rms.nsw.gov.au.

Kind Regards

Jeff Dane | Associate Technical Director | BEng (Hons) CEng MICE RPEQ | jeff.dane@arcadis.com

Arcadis | Level 7/199 Grey Street | South Brisbane QLD 4101 | Australia

T.+61 7 3337 0095 | M. 0407 262 997

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David Ward | Regional Assessment Officer (Tamworth) |

Aquaculture & Aquatic Environment| Department of Primary Industries|

4 Marsden Park Road | Calala NSW 2340 |

T: 02 6763 1255 | F: 02 6763 1265| M: 0429 908 856| E: david.ward@dpi.nsw.gov.au

PERMIT APPLICATION FORMS & FISH HABITAT POLICIES AVAILABLE AT:
www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/toolkit

Submit permit applications via email to: ahp.central@dpi.nsw.gov.au

NB from date of receipt of application please allow:
- 28 days for Permits, Consultations and Land Owner's Consent responses
- 40 days for Integrated Development Applications

Information Session Tenterfield: 15 Oct 2015

Event Type	Information Session Tenterfield
Event Date	15 Oct 2015 3:27 PM (GMT +11)
Event End Date	15 Oct 2015 3:27 PM (GMT +11)
Location	Bolivia Hill Upgrade REF
Summary	Bolivia Wattle preservation.
Stakeholder Comments	Investigate collection of seed for future re-generation of Bolivia Wattle. Manages seed bank which is happy to store seed if project team collects. View to aid in species connectivity.
Team Response	Environmental team to look into suggestion.
Issues	Environment

Stakeholders:

Full Name	Organisation	Address	BH Phone	Mobile	Email
Davidson, Andrew		AUSTRALIA	0267361355		andrew.davidson@lls.nsw.gov.au

Team Members:

Full Name	Organisation	Phone	Mobile	Email
Spencer, Julie	Hyder Consulting		0416 338 263	julie.spencer@hyderconsulting.com

Heritage Council of New South Wales

3 Marist Place
Parramatta NSW 2150

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Parramatta NSW 2124
DX 8225 PARRAMATTA

Telephone: 61 2 9873 8500
Facsimile: 61 2 9873 8599

heritage@heritage.nsw.gov.au
www.heritage.nsw.gov.au

File No. EF15/20542
Job ID: DOC15/482046
Your ref: RMS15.374

Mr Jeff Dane
Technical Director - Arcadis
Level 7/199 Grey Street
South Brisbane QLD 4101

Dear Mr Dane

RE: Bolivia Hill Upgrade – Review of Environmental Factors (REF).

I refer to your email received on 25 November seeking comments from the Heritage Council of NSW for the above study and proposal. As delegate of the Heritage Council of NSW I have reviewed the documents listed below and provide the following comments regarding the REF:

- Letter Report titled "Bolivia Hill Upgrade Non-Aboriginal Assessment Update" Prepared by Artefact Heritage Pty Ltd dated 20 July 2015; and
- Report titled "Proposed Route Options for the New England Highway Upgrade, Bolivia Hill – Historical Heritage Assessment" prepared by Niche Environment and Heritage dated July 2013.

The REF states there are no items listed on the State Heritage Register within the proposed study area. However it is noted there are twelve heritage items/sites within the Study Area and four heritage items are likely to be impacted by the preferred route option. These four sites include a travelling stock route (TSR); the former Bolivia Hill Township; roadside Angel Memorial and the roadside Harry and Lenny Memorial. The Historical Archaeological Assessment supporting the REF has identified the potential for the nearby Bolivia Hill Township (archaeological site) to retain a state level of heritage significance.

The REF proposes the relocation of the two road side memorials close to their original location as mitigation measures from the impact of the upgrade works. The impacts proposed to the former Bolivia Hill Township (archaeological site) have been reduced to the removal and replacement of the existing road pavement only. Consequently at this stage no further mitigation is proposed by this project. The REF also recommends no further work is required to mitigation the impact on the TSR.

It is considered that the supporting heritage documentation has not adequately addressed several matters regarding the level of significance of the TSR and mitigation measures appropriate for proposed impact by this project. Consequently the following advice is recommended to ensure appropriate management of this item by the proposal:

i. The Travelling Stock Route (TSR) was identified as likely to retain local heritage significance in the initial heritage study (Niche 2013) however the Letter Report prepared by Artefact Heritage did not undertake an adequate level of historical research to assess its significance including whether there is potential for historical archaeological relics to be present associated

with its use. The REF should clarify the significance and impact of the proposal on this item. Appropriate mitigation measures should be identified for the project and adopted by the REF for this project.

ii. It is further noted that while impact to the former township of Bolivia Hill have been reduced because this item is likely to retain a level of state heritage significance based on its archaeological record, any change to the proposed works which may cause a greater level of harm to this site, would require additional historical assessment including research, survey and consideration of impacts to any former township remains. Should the archaeological remains of this town be impacted an approval may be required under the *Heritage Act 1977*.

iii. The Heritage Division supports the investigation of opportunities to install heritage interpretation during and following completion of the project, where appropriate.

iv. If the scope of the project changes and further Heritage Impacts are identified, the REF should be amended with additional consideration of the above heritage matters.

If you have any questions regarding the above matter please contact Chris Lewczak, Acting Archaeologist, at the Heritage Division, Office of Environment and Heritage, on telephone (02) 9873 8500 or by email at Chris.Lewczak@environment.nsw.gov.au.

Yours sincerely

Katrina Stankowski
Acting Manager, Conservation
Heritage Division, Office of Environment & Heritage
As Delegate of the Heritage Council of NSW

9 December 2015

rms.nsw.gov.au

contactus@rms.nsw.gov.au

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

NSW GOVERNMENT Transport Roads & Maritime Services