



**Transport**  
Roads & Maritime  
Services

# **APPENDIX B3**

## **Noise and Vibration Management Sub Plan**

### **Warrell Creek to Nambucca Heads**

**DECEMBER 2014**



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- Appendix A Plant and equipment sound power levels**
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- Appendix C Out of hours works procedure**
- Appendix D Sensitive Receiver Locations (Figure 4-1)**



## Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DECC	Department of Environment and Climate Change (now EPA)
EA	Environmental Assessment
EMS	Environmental management system
Environmental aspect	Defined by AS/NZS ISO 14001:2004 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2004 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.
Environmental objective	Defined by AS/NZS ISO 14001:2004 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental target	Defined by AS/NZS ISO 14001:2004 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
ER	Environmental Representative
ERG	Environmental Review Group
EWMS	Environmental Work Method Statements
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements..
L <sub>Aeq</sub> (15min)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community.
L <sub>A</sub> (max)	The A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
OEH	Office of Environment and Heritage
OOHW	Out of hours work
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days

	measured. There is therefore an RBL value for each period (day, evening and night)
Roads and Maritime	Roads and Maritime Services
SoC	Revised Statement of Commitments included in the Submissions Report
SWP	Sound Power Level
SPL	Sound Pressure Level

# 1 Introduction

## 1.1 Context

This Construction Noise and Vibration Management Sub Plan (CNVMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the upgrade of the Pacific Highway between Warrell Creek and Urunga, specifically between Warrell Creek and Nambucca Heads (the Project).

The WC2NH section of the WC2U Project involves the upgrade of approximately 19km of the Pacific Highway from the northern end of the Allgomeria deviation south of Warrell Creek to Old Coast Road, west of Nambucca Heads. The WC2NH Project is being constructed by ACCIONA Ferrovial Joint Venture (AFJV).

This CNVMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the Roads and Maritime Statement of Commitments (SoC), the mitigation measures listed in the Warrell Creek to Urunga Environmental Assessment (EA) and all applicable legislation.

## 1.2 Background

The *Warrell Creek to Urunga – Upgrading the Pacific Highway - Environmental Assessment* (RTA 2010) assessed noise and vibration impacts on sensitive receivers and structures from construction of the Project.

As part of EA development, a detailed construction and operational noise and vibration assessment was prepared to address the Environmental Assessment Requirements issued by the then Department of Planning. The noise and vibration assessment was included in the EA as Working Paper 3 – Noise and Vibration.

The EA concluded that there will be some noise and vibration impacts during construction and the extent will vary depending on the type of activity in progress and the proximity to sensitive receivers.

## 1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The CNVMP is part of the Acciona Ferrovial Joint Venture (AFJV) environmental management framework for the Project, as described in Section 4.1 of the CEMP. In accordance with CoA B.31(c), this Plan has been developed in consultation with the NSW Environment Protection Authority (EPA).

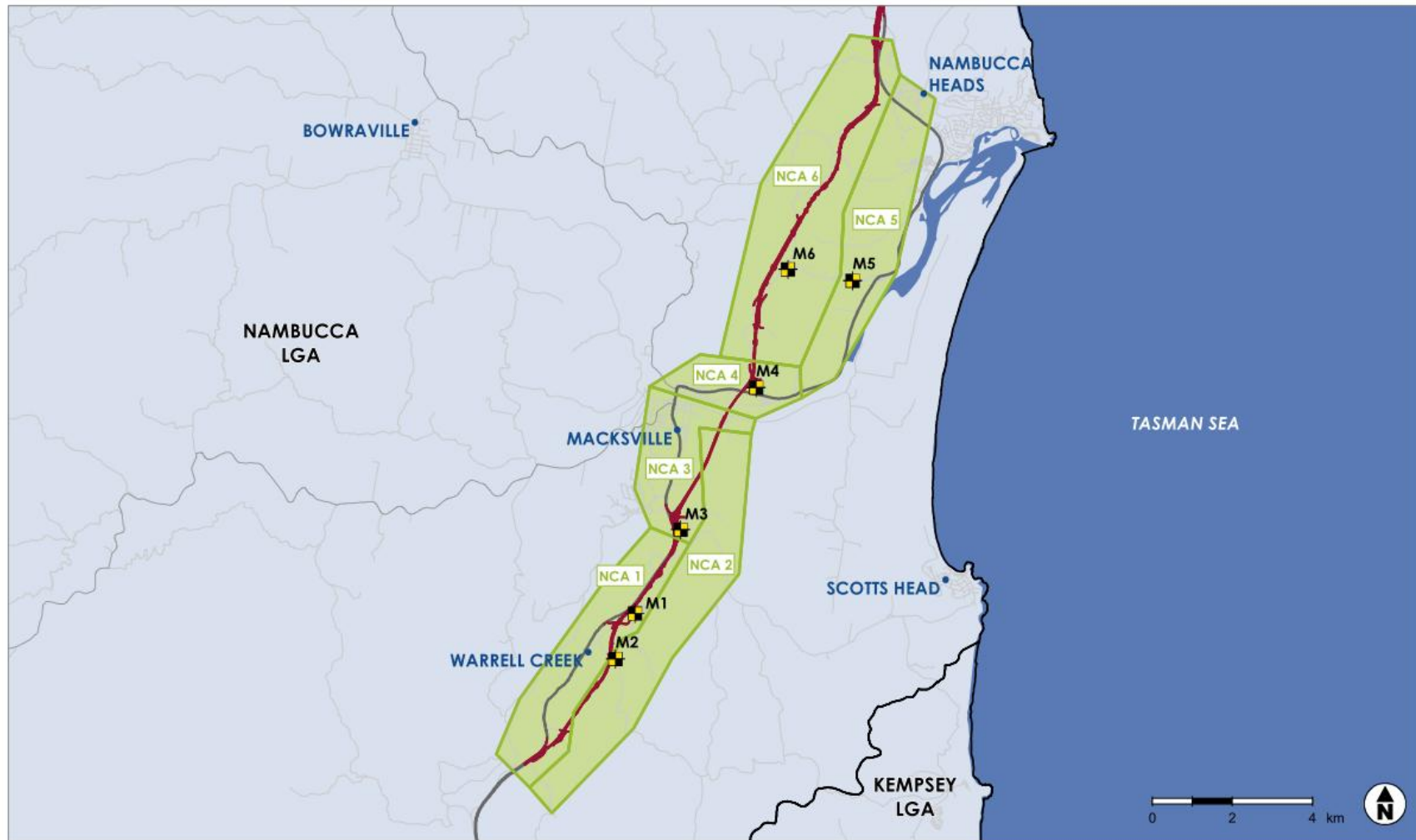
Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS).

EWMS will be developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified requirements and associated mitigation measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by AFJV personnel and contractors.

The review and document control processes for this Plan are described in Section 1.6 and Chapter 10 of the CEMP.

Figure 1-1 Project layout, Noise Catchment Areas and noise monitoring locations



NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F003\_r1v1\_overview

- Alignment
- Monitoring location
- Noise catchment area

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this Plan is to describe how the AFJV proposes to manage potential noise and vibration impacts during construction of the Project.

The management of noise and vibration impacts in this Plan is based on the assessment undertaken as part of the EA.

### 2.2 Objectives

The key objective of the CNVMP is to ensure that impacts to the local community and the built environment from noise and vibration are minimised. Specific objectives include:

- Identifying sensitive receivers and ensuring appropriate environmental controls and procedures are implemented during construction activities.
- Minimising potential adverse noise and vibration impacts to the environment and community.
- Managing impacts if they occur through a systematic analysis of mitigation strategies.
- Ensure appropriate measures are implemented to address the relevant CoA and SoC outlined in Table 3.1 and Table 3.2, and the mitigation measures detailed in the EA.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 and Section 3.4 of this Plan.

### 2.3 Targets

Targets have been established for the management of noise and vibration impacts during the Project to ensure:

- Full compliance with the relevant legislative requirements, CoA and SoC.
- Implement feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the *Interim Construction Noise Guidelines* (ICNG) (DECC, 2009).
- That blasting activities are only undertaken at designated times and remain within established/agreed criteria.
- Complaints from the community and stakeholders are minimised.

## 3 Environmental requirements

### 3.1 Relevant legislation and guidelines

#### 3.1.1 Legislation

Legislation relevant to noise and vibration management includes:

- *Protection of the Environment Operations Act 1997* (POEO Act).
- *Protection of the Environment Operations (Noise Control) Regulation 2008*.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

#### 3.1.2 Guidelines

The main guidelines, specifications and policy documents relevant to this Plan include:

- *RMS QA Specification G36 – Environmental Protection* (Management System).
- *Environmental Criteria for Road Traffic Noise* (ECRTN) (EPA 1999).
- *NSW Industrial Noise Policy* (EPA 2000).
- *RTA Environmental Noise Management Manual* (ENMM) (RTA 2001a).
- *Interim Construction Noise Guideline* (ICNG) (DECCW 2009).
- *Assessing Vibration: A Technical Guideline* (DEC 2006).
- *British Standard 7385: Part 2 Evaluation and measurement of vibration in buildings*.
- *German DIN 4150: Part 3 – 1999 Effects of Vibration on Structure* (DIN 1999).
- *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (1990) Australian and New Zealand Environment and Conservation Council (ANZECC).
- Australian Standard AS2187.2-2006: *Explosives – Storage, Transport and Use*.

### 3.2 Minister’s Conditions of Approval

The CoA relevant to this Plan are listed Table 3-1. A cross reference is also included to indicate where the condition is addressed in this Plan or other project management documents.

**Table 3-1 Conditions of Approval relevant to noise and vibration**

CoA No.	Condition Requirements	Document Reference
CoA B31 c)	As part of the Construction Environment Management Plan for the project required under condition B30 of this approval, the Proponent shall prepare and implement the following:  A Construction Noise and Vibration Management Plan to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall be developed in consultation with the EPA and include, but not necessarily be limited to:	This plan
	i. identification of nearest sensitive receptors and relevant construction noise and vibration goals applicable;	Chapter 4, Chapter 5
	ii. identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to impact on surrounding	Chapter 7, Appendix A

CoA No.	Condition Requirements	Document Reference
	sensitive receivers including expected noise/ vibration levels;	
	iii. identification of all feasible and reasonable measures proposed to be implemented to minimise construction noise and vibration impacts (including construction traffic noise impacts);	Chapter 8
	iv. procedure for dealing with out-of-hour works in accordance with condition C4, including procedures for notifying the Director General concerning complaints received in relation to the extended hours approved under condition C4(d);	Appendix C
	v. procedures and mitigation measures to ensure relevant vibration and blasting criteria are achieved, including a suitable blast program supported by test blast results, applicable buffer distances for vibration intensive works, use of low vibration generating equipment vibration dampeners or alternative construction methodology, and pre- and post-construction dilapidation surveys of sensitive structures where blasting and/ or vibration is likely to result in building damage;	Chapter 8, Section 9.3, Appendix B
	vi. procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints; and	Chapter 8, Community Communications Strategy
	vii. a program for construction noise and vibration monitoring clearly indicating monitoring frequency, location, how the results of this monitoring would be recorded and, procedures to be followed where significant exceedances of relevant noise and vibration goals are detected.	Section 9.3, Section of 8.3 of the CEMP
C3	The Proponent shall only undertake construction activities associated with the project during the following standard construction hours: <ul style="list-style-type: none"> <li>a. 7:00am to 6:00pm Mondays to Fridays, inclusive; and</li> <li>b. 8:00am to 1:00pm Saturdays; and</li> <li>c. at no time on Sundays or public holidays.</li> </ul>	Chapter 8
C4	Works outside of the construction hours identified in conditions C3 may be undertaken in the following circumstances: <ul style="list-style-type: none"> <li>a. works that generate noise that is not audible at any sensitive receptor;</li> <li>b. for delivery of materials required outside these hours by the Police or other authorities for safety reasons; or</li> <li>c. where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or</li> <li>d. construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the project boundary. In this case construction is permissible during the following hours: 6.00am to 6.00pm Monday to Friday and 7.00am to 4.00pm Saturdays and at no time on Sundays or public holidays. These works hours may be reviewed and/ or revoked by the Director General in consultation with the EPA in the case of excessive or unresolved noise complaints; or</li> <li>e. where an EPL applies to the construction of the project, construction hours which are approved in accordance with the conditions of an EPL for the project; or</li> <li>f. where an EPL does not apply to the construction of the project, Out of Hours Works as agreed to by the Director general in accordance with condition C5.</li> </ul>	Chapter 8 and Appendix C

CoA No.	Condition Requirements	Document Reference
C5	<p>For the purposes of condition C4 (f), certain construction activities (Out of Hours Works) may be allowed to occur outside the construction hours specified in conditions C3 with the prior written approval of the Director General. Requests for out of hours approval will be considered for construction activities which cannot be undertaken during the construction hours specified in conditions C3 for technical or other justifiable reasons and will be considered on a case by case or activity-specific basis. Any request for Out of Hours Works must be accompanied by:</p> <ol style="list-style-type: none"> <li>details of the nature and need for activities to be conducted during the varied construction hours;</li> <li>written evidence to the EPA and the Director General that activities undertaken during the varied construction hours are justified, appropriate consultation with potentially affected receivers and notification of Council has been undertaken, issues raised have been addressed, and all feasible and reasonable mitigation measures have been put in place; and</li> <li>evidence of consultation with the EPA on the proposed variation in standard construction hours. Despite the above, Out of Hours Works may also occur in accordance with an approved Construction Environment Management Plan or Construction Noise and Vibration Management Plan for this project, where that plan provides a process for considering the above on a case by case or activity specific basis by the Proponent, including factors a) to c) above.</li> </ol>	Chapters 7 and 8 Appendix C
C6	<p>Blasting associated with the project shall only be undertaken during the following hours</p> <ol style="list-style-type: none"> <li>9:00 am to 5:00 pm, Mondays to Fridays, inclusive;</li> <li>9:00 am to 1:00 pm on Saturdays; and</li> <li>at no time on Sundays or public holidays.</li> </ol> <p>This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.</p>	Chapter 8 and Appendix B
C7	<p>The Proponent shall implement all feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009) during construction activities. Any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the Construction Noise and Vibration Management Plan required under condition B31(c) of this approval.</p>	Chapter 8, Section 9.3, Section 9.4
C8	<p>The Proponent shall implement all feasible and reasonable mitigation measures with the aim of achieving the following construction vibration goals and ground-borne noise levels:</p> <ol style="list-style-type: none"> <li>for structural damage vibration, the vibration limits set out in the German Standard D/N 4150 Part 3-1999 Structural Vibration in Buildings - Effects on Structures;</li> <li>for works in the vicinity of the heritage structures, the vibration limits set out in the German Standard DIN 4150-3: 1999 Structural Vibration - part 3: Effects of vibration on structures; and</li> <li>for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC 2006); and</li> <li>the ground-borne noise levels set out in the Interim</li> </ol>	Chapter 8, Appendix B



CoA No.	Condition Requirements	Document Reference						
	Construction Noise Guidelines (DECC, 2009).							
C9	<p>The Proponent shall ensure that airblast overpressure generated by blasting associated with the project does not exceed the criteria specified in Table 1 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the commencement of the project blasting program, with results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 1.</p> <p>Table 1 Airblast overpressure criteria</p> <table border="1"> <thead> <tr> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td>115</td> <td>5% of total number of blasts over a 12 month period</td> </tr> <tr> <td>120</td> <td>0%</td> </tr> </tbody> </table>	Airblast overpressure (dB(Lin Peak))	Allowable exceedance	115	5% of total number of blasts over a 12 month period	120	0%	Chapter 8, Appendix B
Airblast overpressure (dB(Lin Peak))	Allowable exceedance							
115	5% of total number of blasts over a 12 month period							
120	0%							
C10	<p>The Proponent shall ensure that ground vibration generated by blasting associated with the project does not exceed the criteria specified in Table 2 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the commencement of the project blasting program, with results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 2.</p> <p>Table 2 Peak particle velocity criteria</p> <table border="1"> <thead> <tr> <th>Peak particle velocity (mms-1)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>5% of total number of blasts over a 12 month period</td> </tr> <tr> <td>10</td> <td>0%</td> </tr> </tbody> </table>	Peak particle velocity (mms-1)	Allowable exceedance	5	5% of total number of blasts over a 12 month period	10	0%	Chapter 8, Appendix B
Peak particle velocity (mms-1)	Allowable exceedance							
5	5% of total number of blasts over a 12 month period							
10	0%							
C11	<p>The blasting criteria identified in condition C9 and/ or C10 do not apply where the Proponent has a written agreement with the relevant landowner to exceed the criteria identified in condition C9 and/ or C10 and the Director General has approved the terms of the written agreement. In obtaining the Director General approval for any such agreement, the Proponent shall submit to the Director General:</p> <ol style="list-style-type: none"> <li>details of the proposed blasting program and justification for the proposed increase to blasting criteria including alternatives considered (where relevant);</li> <li>an assessment of the environmental impacts of the increased blast limits on the surrounding environment and most affected residences or other sensitive receivers including, but not limited to noise, vibration and air quality and any risk to surrounding utilities, services or other structures;</li> <li>details of the blast management, mitigation and monitoring procedures to be implemented; and</li> <li>details of consultation undertaken and agreement reached with the relevant landowners (including a copy of the</li> </ol>	Chapter 8, Appendix B						

CoA No.	Condition Requirements	Document Reference
	<p>agreement in relation to increased blasting limits).</p> <p>The following exclusions apply to the application of this condition:</p> <ol style="list-style-type: none"> <li>any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved;</li> <li>the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 25 mm/s or maximum Airblast Overpressure level of 125 dBL; and</li> <li>the provisions under condition C'11 (to increase applicable blast criteria in agreement with the relevant landowners) do not apply where the property is a heritage property.</li> </ol>	

### 3.3 Statement of commitments

Relevant SoC are listed Table 3-2. This includes reference to required outcomes, the timing of when the commitment applies, relevant documents or sections of the environmental assessment influencing the outcome and implementation.

**Table 3-2 Statements of commitment relevant to this NVMP**

Outcome	Ref #	Commitment	Timing	NVMP Reference
Minimise construction noise and vibration impacts.	N1	<p>Further investigation of all feasible and reasonable mitigation and management measures to minimise construction noise at sensitive receivers will occur as part of detailed design (including consideration of early implementation of operational noise mitigation measures).</p> <p>Noise and vibration monitoring will measure against predicted levels and assess effectiveness. Implementation of further feasible and reasonable mitigation measures will occur where necessary.</p>	Pre-construction and construction	Chapter 8, Section 9.3
	N2	<p>Consultation with affected education institutions during construction works in their vicinity will attempt to limit audible construction works during important events, such as examination periods.</p>	Pre-construction / Construction	Chapter 8, Community Communications Strategy
	N3	<p>Best practice mitigation and management measures will be used to minimise construction noise and vibration at sensitive receivers.</p>	Construction	Chapter 8
	N4	<p>Construction would normally be limited to the following hours:</p> <ul style="list-style-type: none"> <li>Between 6am and 6pm Monday to Friday.</li> <li>Between 7am and 4pm Saturday.</li> </ul> <p>There would be no works outside these hours or on Sundays or public holidays except:</p> <ol style="list-style-type: none"> <li>Works that do not cause construction noise to be audible at any sensitive receivers.</li> <li>For the delivery of materials required outside these hours by the Police or other</li> </ol>	Construction	<p><b>Note: The Project's normal working hours are contained in CoA C3 and C4 which prevail over those nominated in SoC N4.</b></p> <p><b>Hours of construction are addressed in Chapter 8 and</b></p>

Outcome	Ref #	Commitment	Timing	NVMP Reference
		<p>authorities for safety reasons.</p> <p>c) Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.</p> <p>d) Any other work as agreed through negotiations between the RTA and potentially affected sensitive receivers. Any such agreement must be recorded in writing and a copy kept on site for the duration of the works.</p> <p>e) Where the work is identified in the CNVMP and approved as part of the Construction Environmental Management Plan.</p> <p>f) As agreed by Department of Planning and or Department of Environment, Climate Change and Water in an EPL for the construction of the Proposal.</p> <p>Local residents and the Department of Environment, Climate Change and Water must be informed of the timing and duration of work approved under items (d) and (e) at least 48 hours before that work commences.</p>		<b>Appendix C</b>
	N5	All reasonable attempts will be made to contact sensitive receivers located within 500 metres of a blast location. The contact will be at least 48 hours before a blast and will include a schedule of blast time(s), and a telephone contact name and number.	Construction	Chapter 8
	N6	<p>Where complaints relating to noise or vibration impacts as a result of extended workings cannot be satisfactorily resolved with the affected residents then works hours will revert back to standard working hours at that particular location for that particular activity. Resident(s) will be consulted before recommencing any works outside standard working hours.</p> <p>Any complaints received in relation to working hours will be made available to DoP and DECCW.</p>	Construction	Chapter 8

## 4 Existing environment

### 4.1 Sensitive receivers

The Project is located within the Nambucca local government area. Land use is characterised by a mix of agricultural land uses, bushland, forests, small settlements and the townships of Warrell Creek, Macksville and Nambucca Heads. These townships are situated on Warrell Creek and the Nambucca River.

The noise assessment identified and considered potential noise impacts for each individual dwelling along the 19.5 kilometre alignment and within one kilometre either side (the study area). A total of 632 residences are located within the study area. The location of these receivers is presented in **Error! Reference source not found.**

For ease of reference, specific areas of the Project have been grouped together into noise catchment areas (NCAs). These have been presented in Figure 1-1. Table 4-1 describes the location of each noise catchment area.

**Table 4-1 Noise catchment areas**

Noise Catchment Area	Location
NCA01	Approximately 500m from existing Pacific Highway alignment from southern Project boundary to Warrell Creek (both sides of highway)
NCA02	Greater than 500m from existing Pacific Highway alignment from southern Project boundary to Nambucca River (eastern side of highway).
NCA03	Greater Macksville area and southern commercial zone
NCA04	Macksville – north of Nambucca River to 500m north of existing highway
NCA05	Existing highway alignment – between Macksville north and Nambucca Heads
NCA06	Proposed highway alignment between Macksville north and Nambucca Heads, generally following Old Coast road.

### 4.2 Ambient noise

Noise monitoring was conducted at eleven locations as part of the Operational Noise Modelling Assessment in 2012 by Roads and Maritime. Many of these locations were in close proximity to each other, and provided similar background noise levels, as such three were considered suitable for the establishment of construction noise criteria. In addition, noise monitoring has been carried out at a further three locations. Monitoring was undertaken to provide background noise levels and to establish appropriate construction noise assessment criteria. Locations were selected to be representative of receivers that would experience a noise impact from the existing highway or from the Project (see Appendix A6 of the CEMP for monitoring locations).

Table 4-2 incorporates NSW EPA requirements that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. These periods are defined as follows:

- Day is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- Evening is defined as 6:00pm to 10:00pm, Monday to Sunday and Public Holidays.
- Night is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays and Public Holidays.

**Table 4-2 Ambient noise levels for NCA**

Address	NCA	Rating Background Level (RBL) (dB(A))		
		Day	Evening	Night
43 Albert Drive	NCA1	40	40	35
69 Rosewood Road	NCA2	36	35	31
38 Kerr Drive	NCA3	40	36	34
22 Letitia Close	NCA4	49	43	41
64 Florence Wilmont Drive (east)	NCA5	40	41	39
Florence Wilmont Drive / Old Coast Road (west)	NCA6	34	32	33

Noise sensitive receivers are provided in Appendix D.

## 5 Noise and vibration criteria for NSW

The EPA recommends management levels and goals when assessing construction noise and vibration. These are outlined in:

- The ICNG,
- *Assessing Vibration: a technical guideline.*
- *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration.*

Relevant elements of these documents are summarised and discussed in this Chapter.

### 5.1 Construction noise and assessment objectives

The DECC Interim Construction Noise Guideline (ICNG, July 2009) provides guidelines for the assessment and management of construction noise. The ICNG focuses on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels.

The main objectives of the ICNG are to:

- Identify and minimise noise from construction works.
- Focus on applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts.
- Encourage construction during the recommended standard hours only, unless approval is given for works that cannot be undertaken during these hours.
- Reduce time spent dealing with complaints at the project implementation stage.
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

### 5.2 Quantitative noise assessment criteria

Construction noise assessment goals presented in the ICNG are referenced to noise management levels for residential, sensitive land uses and commercial/ industrial premises.

#### Residential Premises

Table 5-1 sets out management levels for noise at residences and how they are to be applied.

In Table 5-1 the rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (EPA, 2000).

As a guide, the difference between the internal noise level and the external noise level is typically 10dB with windows open for adequate ventilation.

**Table 5-1 Noise at residents using quantitative assessment**

Time of day	Management Level $L_{Aeq (15 min)}$ *	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none"> <li>Where the predicted or measured <math>L_{Aeq (15 min)}</math> is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>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.</li> </ul>
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. <ul style="list-style-type: none"> <li>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ul style="list-style-type: none"> <li>times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences</li> <li>if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ul> </li> </ul>
Outside recommended standard hours	Noise affected RBL + 5 dB	<ul style="list-style-type: none"> <li>A strong justification would typically be required for works outside the recommended standard hours.</li> <li>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</li> </ul>

\* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

## Other land uses

Other sensitive land uses, such as schools, typically find noise from construction to be disruptive when the properties are being used (such as during school times). Table 5-2 presents management levels for noise at other sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed. Consultation should be undertaken with noise sensitive land use occupants likely to be affected by noise from the works to schedule the project's work hours to achieve a reasonable noise outcome.

Internal noise levels are assessed at the centre of the occupied room. External noise levels are assessed at the most affected point within 50 metres of the area boundary. Where internal noise levels cannot be measured, external noise levels may be used. A

conservative estimate of the difference between internal and external noise levels is 10dB for buildings other than residences. Some buildings may achieve greater performance, such as where windows are fixed (that is, cannot be opened). The management levels in Table 5-2 are 5dB above the corresponding road traffic noise levels in the Environmental Criteria for Road Traffic Noise (EPA 1999) (and the 'maximum' levels in the NSW Industrial Noise Policy (EPA 2000) for commercial and industrial uses) to account for the variable and short-term nature of construction noise.

**Table 5-2 Noise at sensitive land uses (non-residents) using quantitative assessment**

Land use	Noise assessment location	Noise management level ( $L_{Aeq,15min}$ )
Classrooms at schools and other educational institutions	Internal	45
Hospitals and operating theatres		
Places of worship		
Active recreation areas <sup>1</sup>	External	65
Passive recreation areas <sup>2</sup>	External	60
Community centres	Dependent on intended use	Maximum internal levels recommended in AS2107 for specific use
Industrial premises	External	75
Office, retail outlets	External	70
Other noise sensitive businesses	Investigation to determine suitable noise levels on project-by-project basis	

Notes:

1. Active recreation areas are characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.
2. Passive recreation areas are characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion (eg. reading, meditation).

### 5.3 Sleep disturbance criteria

For the assessment of potential sleep disturbance impacts, the Interim Guidelines refer to the NSW Environmental Criteria for Road and Traffic Noise. These criteria have been discussed further below.

An accurate representation of sleep disturbance impacts on a community from a noise source is particularly difficult to quantify mainly due to differing responses of individuals to sleep disturbance - this is found even within a single subject monitored at different stages of a single night's sleep or during different periods of sleep. In addition the differing grades of sleep state make a definitive definition difficult, and even where sleep disturbance is not noted by the subject, factors such as heart rate, mood and performance can still be negatively affected (WHO, 1995).

An assessment of sleep disturbance should consider the maximum noise level or  $L_{A1(1\text{ minute})}$ , and the extent to which the maximum noise level exceeds the background level and the number of times this may happen during the night-time period. Factors that may be important in assessing the extent of impacts on sleep include:

- how often high noise events will occur;



- time of day (normally between 10pm and 7am); and
- whether there are times of day when there is a clear change in the existing noise environment (such as during early morning shoulder periods).

Currently the information relating to sleep disturbance impacts indicates that:

- Maximum noise levels below 50-55 dB(A) are unlikely to cause an awakening from a sleep state.
- One or two noise events per night with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

The ENMM employs a methodology to assess these impacts based on the emergence of a noise event over ambient noise levels in numerical terms so that the risk of sleep disturbance can be quantified. A maximum noise event is defined as an  $L_{Amax}$  noise level above is 65 dB(A) where the emergence of the  $L_{Amax}$  level above the  $L_{Aeq(1hr)}$  noise level is greater than 15 dB(A), ie:

$$L_{Amax} = L_{A90(15min)} + 15 \text{ dB(A)}$$

Once identified, the number and associated levels of all events are compared to the current guidelines for these impacts to identify the potential for exceedances. An exceedance of sleep disturbance criteria for a project does not necessarily constitute a need for mitigation, however the assessment of maximum noise levels is recommended to assist in mitigation strategies during the Proposal stage.

The sleep disturbance criteria and results measured are further discussed in Section 7.2.2.

## 5.4 Adopted project noise management levels

Based on measured noise levels described in Section 4.2, the project-specific  $L_{Aeq, 15 \text{ minute}}$  construction noise management levels (NMLs) for each representative monitoring location have been determined and are presented in Table 5-3. Considering the possibility of works outside standard construction hours additional management levels for these times are also included in the NMLs.

**Table 5-3 Project-specific construction noise objectives**

NCA	Setback from existing highway (m)	Standard hours 7am – 6pm Mon-Fri 8am – 1pm Sat		Extended hours 6am – 7am Mon-Fri 7am – 8am Sat		Extended hours 6pm – 7pm Mon-Fri 1pm – 4pm Sat		Night time works – other hours	
		RBL	NML	RBL	NML	RBL	NML	RBL	NML
1	170	40	<b>50</b>	40	<b>45</b>	40	<b>45</b>	35	<b>40</b>
2	750	36	<b>46</b>	35	<b>40</b>	35	<b>40</b>	31	<b>36</b>
3	130	40	<b>50</b>	36	<b>41</b>	36	<b>41</b>	34	<b>39</b>
4	150	49	<b>59</b>	43	<b>48</b>	43	<b>48</b>	41	<b>46</b>
5	480	40	<b>50</b>	41	<b>46</b>	41	<b>46</b>	39	<b>44</b>
6	2000	34	<b>44</b>	32	<b>37</b>	32	<b>37</b>	33	<b>38</b>

## 5.5 Vibration criteria

Effects of ground vibration on buildings resulting from construction may be segregated into the following three categories:

- Human exposure – disturbance to building occupants: vibration in which the occupants or users of the building are inconvenienced or possibly disturbed.
- Effects on building contents – vibration where the building contents may be affected.
- Effects on building structures – vibration in which the integrity of the building or structure itself may be prejudiced.

Vibration criteria relating to human comfort that are applicable to this project are taken from the DEC (2006) document Assessing Vibration – A Technical Guideline and include the following.

- Continuous vibration – from uninterrupted sources (see Table 5-4).
- Impulsive vibration – up to three instances of sudden impact e.g. dropping heavy items, per monitoring period (see Table 5-5).
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously (see Table 5-6).

Two standards by which building damage from construction-induced vibration are commonly assessed include:

- British Standard 7385: Part 2-1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993)
- German DIN 4150: Part 3 – 1999 Effects of Vibration on Structure (DIN 1999).

The German standard provides the most stringent criteria and will be used in this CNVMP. The DIN guideline values for peak particle velocity (mm/s) measured at the foundation of the building are summarised in Table 5-7. The criteria are frequency dependent and specific to particular categories of structure.

**Table 5-4 Continuous vibration acceleration criteria (m/s<sup>2</sup>) 1-80Hz**

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
Workshops	Day or night-time	0.04	0.029	0.080	0.058

**Table 5-5 Impulsive vibration acceleration criteria (m/s<sup>2</sup>) 1-80Hz**

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

**Table 5-6 Intermittent vibration impacts criteria (m/s<sup>1.75</sup>) 1-80Hz**

Location	Daytime		Night-time	
	Preferred Values	Maximum Values	Preferred Values	Maximum Values
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

**Table 5-7 Structural damage criteria**

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of:			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz*	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

\* For frequencies above 100Hz, at least the values specified in this column shall be applied.

## 5.6 Blast criteria

Guidelines documented in the ANZECC "Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration" has been used to establish goals for assessing blast air-blast overpressure and ground vibration.

The following blast assessment parameters, as detailed in CoA C9 and C10 have been adopted for assessing and managing blast impacts.

As detailed in CoA C11, C9 and C10 do not apply where the Proponent has a written agreement with the relevant landowners to exceed and the Director General has approved the terms of the written agreement. In obtaining the Director General approval for any such agreement, the Proponent must submit to the Director General:

- a) details of the proposed blasting program and justification for the proposed increase to blasting criteria including alternatives considered (where relevant);
- b) an assessment of the environmental impacts of the increased blast limits on the surrounding environment and most affected residences or other sensitive receivers including, but not limited to noise, vibration and air quality and any risk to surrounding utilities, services or other structures;
- c) details of the blast management, mitigation and monitoring procedures to be implemented; and
- d) details of consultation undertaken and agreement reached with the relevant landowners (including a copy of the agreement in relation to increased blasting limits).

It also should be noted that the following exclusions apply to the application of this condition:

- a) any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved;
- b) the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 25 mm/s or maximum Airblast Overpressure level of 125 dBL; and
- c) the provisions under condition C11 (to increase applicable blast criteria in agreement with the relevant landowners) do not apply where the property is a heritage property.

**Table 5-8 Airblast overpressure criteria**

Airblast overpressure (dB(Lin Peak))	Allowable exceedance
115	5% of total number of blasts over a 12 month period
120	0%

**Table 5-9 Peak particle velocity criteria**

Peak particle velocity (mms-1)	Allowable exceedance
5	5% of total number of blasts over a 12 month period
10	0%

For assessment of air-blast overpressure the DECC/ANZECC guidelines recommend measurement at any sensitive receiver at least 3.5 metres from building or structure, and ground vibration measured at any point on the noise sensitive site at least the longest dimension of the foundations of a building or structure away from the building or structure.

## 6 Environmental aspects and impacts

### 6.1 Environmental aspects

The Project will involve a range of activities incorporating various heavy machinery, plant and equipment that will operate in a number of locations across the Project. In order to assess the level of potential impact on noise and vibration sensitive receivers, the broad categories of construction activity likely to interact with these receivers are identified below.

- Site establishment.
- Clearing, grubbing and mulching
- Demolition.
- Earthworks and drainage.
- Drilling and blasting.
- Quarrying – crushing and screening and rock hammering.
- Concrete batching (batch plant).
- Bridgeworks (piling).
- Paving and concrete saw cutting.
- Road furnishing.

### 6.2 Impacts

The potential for noise and vibration impacts on sensitive receivers or structures will depend on a number of factors. Typically these might include:

- The type of equipment in use.
- The number of equipment simultaneously in use.
- Ground condition.
- Topography and other physical barriers.
- Proximity to sensitive receivers.
- The condition of sensitive receivers.
- Hours/duration of construction works.
- Proximity of heavy traffic areas such as the highway.

Relevant aspects and the potential for related impacts have been considered in a risk assessment at Section 3.4/Appendix A2 of the CEMP.

Noise and vibration impacts attributable to the Project are anticipated. Chapter 8 provides a suite of mitigation measures that will be implemented to avoid or minimise impacts on the receiving community and/or built environment.

## 7 Construction noise and vibration assessment

A range of plant and equipment will be required to undertake activities associated with the Project. A summary of anticipated construction scenarios and predicted noise levels are provided below. This information will be used to determine potential impacts on the receiving community. An adaptive management approach will be applied to the implementation of mitigation measures to minimise impacts on the community.

### 7.1 Construction activities

Table 7-1 provides a summary of construction scenarios, and associated plant and equipment required for the works. Plant and equipment may be used in isolation or simultaneously. Appendix A provides a list of equipment and a correlating sound pressure level.

**Table 7-1 Construction scenarios and associated plant and equipment**

Scenario reference	Construction scenario	Typical plant and equipment required
01_GEO	Geotechnical works	Piling rig (small) Back hoe Excavator (20t) Concrete pump Generator 2 x Bogies Piling rig (large)
02_DCL	Discrete clearing	2 x Excavator (30t) Chipper 2 x Dumper Chain saw
03_BCL	Broad clearing	4 x Excavator (30t) 2 x Chipper 2 x Dumper 2 x Water cart 2 x Dozer
04_SER	Services	Suction truck Excavator (20t) 4 x Bogies
05_FIL	Filling activities	Compactor Grader Water cart Roller (non-vibratory) Smooth drum roller 8 x Truck and dog 5 x Dump truck 5 x Scraper
06_CFL	Compaction of fill	Roller (non-vibratory) 4 x Compactor Water cart
07_CUT	Cut activities	4 x Excavator (40t) 2 x Excavator (20t) breaker Water cart 2 x Dumper Dozer 5 x Scraper 8 x Truck and dog

Scenario reference	Construction scenario	Typical plant and equipment required
08_HTR	Trucks hauling materials	3 x Loaded truck (30t) on haul road Water cart 3 x Dumper
09_SCR	Scraper fleet movements	3 x Scraper Water cart
10_CRU	Crushing	2 x Excavator (30t) Excavator (20t) breaker 2 x Front end loader Water cart Mobile jaw crusher (50t) Mobile screen
11_VMW	Verge and median works	Paving machine 4 x Bogies Grader Bobcat Roller (non-vibratory) Water cart Road sweeper Smooth drum roller
12_SST	Soft soils treatment	3 x Excavator (40t) Back hoe Piling rig (vibratory) 2 x Concrete truck / agitator Concrete pump
13_ENV	Installation of environmental controls	Back hoe Grader Bogies
14_DRL	Drilling for blasting	2 x Drill rig Back hoe Truck and dog Explosives truck
15_DRC	Installation of drainage and conduit	Excavator (20t) Back hoe 2 x Dumper Franna crane Smooth drum roller Whacker packer 2 x Hand tools (electric)
16_SPS	Spray sealing	Road sweeper Bitumen spray truck 2 x Bogies 2 x Multi tyred roller Ute Water cart
17_ASP	Asphalt paving	Paving machine Support vehicle 5 x Truck and dog 2 x Bobcat 2 x Smooth drum roller Multi tyred roller Ute

Scenario reference	Construction scenario	Typical plant and equipment required
18_CCP	Concrete paving	Paving machine Texture curer 6 x Bogies Back hoe 4 x Hand tools Ute
19_CSC	Concrete saw cutting	2 x Saw cutting machine 2 x Daymakers
20_KCB	Kerb and concrete barrier	Kerb slipform machine Barrier slipform machine 4 x Concrete truck / agitator
21_BBR	Bridges – bored piling (river crossings)	Piling rig (large) Barge Tug boat Work boat 2 x Mobile crane (100t) Mobile crane (300t) 2 x Delivery trucks Generator 4 x Ute
22_BBF	Bridges – bored piling (floodplains/overpasses)	Piling rig (large) 4 x Mobile crane (100t) 2 x Delivery truck Generator 4 x Ute
23_BHR	Bridges – hammered piles (river crossings)	Piling rig (impact) Hammer power pack Barge Tug boat Work boat 2 x Mobile crane (100t) 2 x Mobile crane (300t) 2 x Delivery trucks Generator 4 x Ute
24_BHF	Bridges – hammered piles (floodplains/overpasses)	Piling rig (impact) Hammer power pack 2 x Mobile crane (100t) 2 x Delivery truck Generator 4 x Ute
25_RFI	Road furniture installation	Excavator (20t) Excavator (12t) Bobcat 2 x Bogies Water cart Delivery truck 2 x Hand tools Concrete truck / agitator Hand tools Hand held rattle gun 2 x Elevated work platform



## 7.2 Construction noise impacts

### 7.2.1 General construction

Table 7-3 provides a summary of predicted noise impacts from each related construction scenario. Noise management level targets for each key sensitive receiver location have also been provided. Predicted noise levels for each construction scenario have been derived by calculating the combined noise output from the sound power levels of each piece of equipment under maximum typical operating conditions listed in Appendix A.

Terrain used in the model considers the final alignment, with noise sources placed in the centre of the construction corridor at a height of 2m. Modelled noise levels in cutting areas may be up to 3dB(A) above those modelled when work commences however will approach modelled levels as work progresses. Likewise modelled noise levels in fill areas may be up to 3dB(A) below those modelled at the start of construction however will increase as the elevation of the design increases.

As noise sources are modelled at the centre of the alignment, some increase / decrease in noise may occur when works are underway at the road boundary. The average distance between the road boundary and the centre of the corridor is approximately 40m. A calculation of the likely change in noise level using simple distance attenuation has been presented in Table 7-2. This quantification of impacts along the width of the corridor allows for greater flexibility in programming out of hours works (in particular an allowance for activities away from sensitive receivers during such periods).

**Table 7-2 Change in noise level as work approaches project boundary**

	Distance of receiver from centre of alignment (m)						
	100m	150m	200m	250m	500m	750m	1000m
Change in noise level	± 4dB(A)	± 3dB(A)	± 2.5dB(A)	± 2dB(A)	± 1dB(A)	± 0.5dB(A)	No change

Predicted impacts are the maximum predicted noise level of each construction scenario, i.e. where works are at their shortest distance from receivers. Hence, noise levels will increase as activity moves toward this nearest point and will then decrease as it moves away again. The distances listed in the table are the shortest distance between the centre of the corridor and receiver; however, where works are at the corridor boundary, higher noise levels are expected, as discussed below.

For activities considered to be annoying such as rock drilling, vibratory rolling, road profiling, impact piling and rock hammering, a 5 dB(A) penalty has been applied to predicted levels in line with the ICNG.

Predictions of both maximum  $L_{Aeq(15\text{ minute})}$  noise levels and internal  $L_{A1(1\text{ minute})}$  noise levels are summarised in Table 7-3 with the following highlights for quick analysis:

	expected to exceed the night NML
	expected to exceed the evening NML
	expected to exceed the day NML

### 7.2.2 Sleep Disturbance

Monitoring carried out at active construction sites by Jacobs on recent projects, has shown that  $L_{A1(1\text{ minute})}$  noise levels for standard operating construction equipment typically are in the

order of 5 – 10 dB(A) greater than the  $L_{Aeq}$  levels. For the purposes of this assessment a conservative level of 10dB(A) will be assumed. However it is noted that Sleep disturbance criteria apply to internal sleeping areas, and as such 10dB(A) has been deducted from the predicted noise levels to allow for attenuation across an open window as sound moves into the residence.

Predictions of potential  $L_{A1(1min)}$  sleep disturbance noise levels have been outlined in Table 7-3 and Table 7-4. A summary of these results is presented below in Table 7-12.

**Table 7-3 Predicted construction noise levels – Activity set A**

NCA	Rec ID	Sleep dist goal LA1(1min)	NML Predicted maximum noise level during construction stage [ $L_{Aeq(15\text{ minute})} / L_{A1(1\text{ minute})}$ dB(A)]																
			Day	Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV	
			1	1	50	50	45	40	34	39	42	37	44	31	53	38	38	23	40
1	2	50	50	45	40	31	36	39	34	36	23	50	35	35	22	37	25	23	
1	3	50	50	45	40	33	38	41	36	37	24	52	37	37	22	39	38	25	
1	4	50	50	45	40	71	76	79	74	82	69	85	75	75	3	77	41	63	
1	5	50	50	45	40	39	44	47	42	48	35	57	43	43	22	45	39	31	
1	6	50	50	45	40	67	72	75	70	48	35	84	71	71	24	73	45	59	
1	10	50	50	45	40	35	40	43	38	45	32	52	39	39	28	41	49	27	
1	11	50	50	45	40	52	57	60	55	51	38	65	56	56	26	58	51	44	
1	12	50	50	45	40	30	35	38	33	40	27	49	34	34	31	36	44	22	
1	13	50	50	45	40	44	49	52	47	54	41	59	48	48	28	50	58	36	
1	14	50	50	45	40	36	41	44	39	46	33	54	40	40	30	42	50	28	
1	16	50	50	45	40	51	56	59	54	61	48	65	55	55	28	57	65	43	
1	17	50	50	45	40	31	36	39	34	41	28	50	35	35	32	37	43	23	
1	18	50	50	45	40	47	52	55	50	57	44	65	51	51	25	53	47	39	
1	19	50	50	45	40	60	65	68	63	70	57	74	64	64	26	66	50	52	
1	20	50	50	45	40	28	33	36	31	38	25	47	32	32	39	34	42	20	
1	21	50	50	45	40	26	31	34	29	36	23	44	30	30	37	32	40	18	
1	22	50	50	45	40	32	37	40	35	42	29	51	36	36	34	38	41	24	
1	23	50	50	45	40	32	37	40	35	42	29	51	36	36	27	38	39	24	
1	24	50	50	45	40	33	38	41	36	43	30	51	37	37	36	39	40	25	
1	25	50	50	45	40	33	38	41	36	43	30	51	37	37	37	39	41	25	
1	26	50	50	45	40	33	38	41	36	43	30	51	37	37	37	39	41	25	
1	27	50	50	45	40	33	38	41	36	43	30	51	37	37	31	39	42	25	
1	28	50	50	45	40	33	38	41	36	43	30	52	37	37	46	39	47	25	
1	29	50	50	45	40	33	38	41	36	43	30	51	37	37	38	39	42	25	
1	30	50	50	45	40	33	38	41	36	43	30	51	37	37	32	39	42	25	
1	31	50	50	45	40	33	38	41	36	43	30	51	37	37	38	39	43	25	
1	32	50	50	45	40	33	38	41	36	43	30	51	37	37	31	39	43	25	
1	33	50	50	45	40	34	39	42	37	43	30	52	38	38	47	40	47	26	
1	34	50	50	45	40	32	37	40	35	42	29	51	36	36	24	38	43	24	
1	35	50	50	45	40	32	37	40	35	42	29	51	36	36	23	38	37	24	
1	36	50	50	45	40	32	37	40	35	42	29	51	36	36	24	38	43	24	
1	37	50	50	45	40	33	38	41	36	43	30	52	37	37	39	39	44	25	
1	38	50	50	45	40	35	40	43	38	43	30	52	39	39	47	41	47	27	
1	39	50	50	45	40	33	38	41	36	43	30	51	37	37	39	39	44	25	
1	40	50	50	45	40	35	40	43	38	43	30	53	39	39	47	41	46	27	
1	41	50	50	45	40	32	37	40	35	42	29	50	36	36	42	38	46	24	
1	42	50	50	45	40	35	40	43	38	44	31	54	39	39	46	41	48	27	
1	43	50	50	45	40	31	36	39	34	40	27	50	35	35	43	37	40	23	

Pacific Highway Upgrade – Warrell Creek to Nambucca Heads  
**Noise and Vibration Management Sub Plan**

NCA	Rec ID	Sleep dist goal LA1(1min)	NML Predicted maximum noise level during construction stage [ $L_{Aeq(15\text{ minute})} / L_{A1(1\text{ minute})}$ dB(A)]																
			Day	Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV	
1	44	50	50	45	40	27	32	35	30	37	24	45	31	31	28	33	32	19	
1	45	50	50	45	40	46	51	54	49	53	40	65	50	50	36	52	41	38	
1	46	50	50	45	40	32	37	40	35	41	28	51	36	36	43	38	44	24	
1	47	50	50	45	40	34	39	42	37	44	31	52	38	38	44	40	48	26	
1	48	50	50	45	40	34	39	42	37	44	31	52	38	38	42	40	48	26	
1	49	50	50	45	40	35	40	43	38	45	32	53	39	39	34	41	49	27	
1	50	50	50	45	40	36	41	44	39	46	33	53	40	40	44	42	50	28	
1	51	50	50	45	40	37	42	45	40	47	34	54	41	41	45	43	51	29	
1	52	50	50	45	40	37	42	45	40	47	34	54	41	41	45	43	51	29	
1	53	50	50	45	40	37	42	45	40	48	35	55	41	41	46	43	51	29	
1	54	50	50	45	40	37	42	45	40	48	35	55	41	41	46	43	51	29	
1	55	50	50	45	40	40	45	48	43	50	37	59	44	44	41	46	48	32	
1	56	50	50	45	40	39	44	47	42	49	36	58	43	43	50	45	52	31	
1	57	50	50	45	40	43	48	51	46	48	35	62	47	47	54	49	52	35	
1	58	50	50	45	40	47	52	55	50	56	43	66	51	51	52	53	59	39	
1	59	50	50	45	40	55	60	63	58	65	52	68	59	59	47	61	69	47	
1	61	50	50	45	40	59	64	67	62	47	34	68	63	63	65	65	55	51	
1	62	50	50	45	40	32	37	40	35	41	28	51	36	36	46	38	42	24	
1	63	50	50	45	40	69	74	77	72	58	45	87	73	73	83	75	64	61	
1	65	50	50	45	40	36	41	44	39	46	33	55	40	40	50	42	47	28	
1	74	50	50	45	40	67	72	75	70	76	63	62	71	71	57	73	58	59	
1	75	50	50	45	40	50	55	58	53	58	45	61	54	54	56	56	55	42	
1	78	50	50	45	40	45	50	53	48	54	41	58	49	49	53	51	52	37	
1	79	50	50	45	40	70	75	78	73	79	66	57	74	74	52	76	51	62	
1	81	50	50	45	40	57	62	65	60	57	44	76	61	61	71	63	59	49	
1	83	50	50	45	40	68	73	76	71	78	65	57	72	72	52	74	52	60	
1	85	50	50	45	40	69	74	77	72	79	66	58	73	73	53	75	51	61	
1	87	50	50	45	40	63	68	71	66	72	59	71	67	67	66	69	53	55	
1	89	50	50	45	40	50	55	58	53	60	47	44	54	54	44	56	37	42	
1	90	50	50	45	40	54	59	62	57	63	50	71	58	58	66	60	53	46	
1	91	50	50	45	40	54	59	62	57	62	49	73	58	58	68	60	54	46	
1	92	50	50	45	40	75	80	83	78	56	43	94	79	79	89	81	48	67	
1	93	50	50	45	40	48	53	56	51	58	45	57	52	52	52	54	49	40	
1	94	50	50	45	40	47	52	55	50	56	43	61	51	51	56	53	40	39	
1	96	50	50	45	40	71	76	79	74	59	46	90	75	75	86	77	49	63	
1	97	50	50	45	40	57	62	65	60	66	53	76	61	61	71	63	49	49	
1	99	50	50	45	40	69	74	77	72	61	48	88	73	73	83	75	53	61	
1	100	50	50	45	40	61	66	69	64	56	43	80	65	65	75	67	49	53	
1	102	50	50	45	40	50	55	58	53	52	39	70	54	54	65	56	46	42	
1	103	50	50	45	40	64	69	72	67	64	51	83	68	68	78	70	50	56	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	NML	Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]														
					Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
1	104	50	50	45	40	43	48	51	46	49	36	63	47	47	58	49	34	35	
1	106	50	50	45	40	57	62	65	60	59	46	76	61	61	71	63	42	49	
1	107	50	50	45	40	49	54	57	52	52	39	68	53	53	63	55	34	41	
1	108	50	50	45	40	42	47	50	45	47	34	61	46	46	55	48	31	34	
1	109	50	50	45	40	43	48	51	46	38	25	52	47	47	56	49	29	35	
1	110	50	50	45	40	52	57	60	55	58	45	71	56	56	66	58	38	44	
1	112	50	50	45	40	47	52	55	50	57	44	49	51	51	61	53	60	39	
1	114	50	50	45	40	44	49	52	47	51	38	63	48	48	58	50	31	36	
1	115	50	50	45	40	45	50	53	48	53	40	64	49	49	59	51	35	37	
1	151	50	50	45	40	44	49	52	47	54	41	47	48	48	58	50	49	36	
1	163	50	50	45	40	56	61	64	59	65	52	49	60	60	70	62	60	48	
2	7	46	46	40	36	30	35	38	33	42	29	49	34	34	20	36	35	22	
2	8	46	46	40	36	31	36	39	34	42	29	49	35	35	20	37	36	23	
2	9	46	46	40	36	34	39	42	37	44	31	53	38	38	23	40	39	26	
2	15	46	46	40	36	34	39	42	37	43	30	52	38	38	25	40	41	26	
2	60	46	46	40	36	40	45	48	43	50	37	57	44	44	36	46	42	32	
2	64	46	46	40	36	61	66	69	64	72	59	67	65	65	47	67	74	53	
2	66	46	46	40	36	36	41	44	39	46	33	54	40	40	39	42	45	28	
2	67	46	46	40	36	37	42	45	40	47	34	56	41	41	40	43	46	29	
2	68	46	46	40	36	41	46	49	44	51	38	60	45	45	42	47	54	33	
2	69	46	46	40	36	32	37	40	35	42	29	51	36	36	36	38	41	24	
2	70	46	46	40	36	28	33	36	31	38	25	47	32	32	30	34	37	20	
2	71	46	46	40	36	36	41	44	39	46	33	55	40	40	39	42	46	28	
2	72	46	46	40	36	30	35	38	33	40	27	49	34	34	35	36	39	22	
2	73	46	46	40	36	36	41	44	39	46	33	55	40	40	39	42	47	28	
2	76	46	46	40	36	42	47	50	45	49	36	61	46	46	56	48	53	34	
2	77	46	46	40	36	43	48	51	46	50	37	62	47	47	57	49	53	35	
2	80	46	46	40	36	39	44	47	42	47	34	58	43	43	52	45	51	31	
2	82	46	46	40	36	25	30	33	28	35	22	44	29	29	31	31	36	17	
2	84	46	46	40	36	43	48	51	46	52	39	62	47	47	39	49	56	35	
2	86	46	46	40	36	41	46	49	44	51	38	56	45	45	51	47	45	33	
2	88	46	46	40	36	37	42	45	40	47	34	54	41	41	49	43	48	29	
2	95	46	46	40	36	33	38	41	36	43	30	51	37	37	45	39	47	25	
2	98	46	46	40	36	33	38	41	36	43	30	51	37	37	46	39	46	25	
2	101	46	46	40	36	37	42	45	40	47	34	47	41	41	42	43	41	29	
2	105	46	46	40	36	34	39	42	37	44	31	45	38	38	40	40	44	26	
2	111	46	46	40	36	31	36	39	34	41	28	44	35	35	39	37	42	23	
2	157	46	46	40	36	29	34	37	32	39	26	42	33	33	37	35	40	21	
2	342	46	46	40	36	32	37	40	35	41	28	50	36	36	45	38	35	24	
2	349	46	46	40	36	36	41	44	39	47	34	52	40	40	40	42	50	28	

NCA	Rec ID	Sleep dist goal LA1(1min)	NML Predicted maximum noise level during construction stage [LAeq(15 minute) / LA1(1minute)dB(A)]																
			Day	Evening		Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				Day	Evening														
2	353	46	46	40	36	41	46	49	44	51	38	40	45	45	18	47	55	33	
2	356	46	46	40	36	36	41	44	39	44	31	53	40	40	45	42	47	28	
3	113	49	50	41	39	30	35	38	33	36	23	45	34	34	37	36	41	22	
3	116	49	50	41	39	31	36	39	34	41	28	48	35	35	41	37	44	23	
3	117	49	50	41	39	37	42	45	40	40	27	50	41	41	43	43	45	29	
3	118	49	50	41	39	29	34	37	32	34	21	44	33	33	38	35	39	21	
3	119	49	50	41	39	23	28	31	26	33	20	38	27	27	29	29	37	15	
3	120	49	50	41	39	24	29	32	27	34	21	39	28	28	31	30	38	16	
3	121	49	50	41	39	25	30	33	28	35	22	43	29	29	32	31	39	17	
3	122	49	50	41	39	24	29	32	27	34	21	43	28	28	32	30	38	16	
3	123	49	50	41	39	37	42	45	40	40	27	49	41	41	43	43	45	29	
3	124	49	50	41	39	26	31	34	29	36	23	45	30	30	32	32	39	18	
3	125	49	50	41	39	26	31	34	29	36	23	45	30	30	32	32	39	18	
3	126	49	50	41	39	26	31	34	29	32	19	43	30	30	35	32	38	18	
3	127	49	50	41	39	25	30	33	28	32	19	43	29	29	35	31	38	17	
3	128	49	50	41	39	23	28	31	26	32	19	41	27	27	31	29	36	15	
3	129	49	50	41	39	24	29	32	27	31	18	41	28	28	34	30	36	16	
3	130	49	50	41	39	25	30	33	28	35	22	43	29	29	32	31	38	17	
3	131	49	50	41	39	40	45	48	43	44	31	53	44	44	46	46	47	32	
3	132	49	50	41	39	39	44	47	42	41	28	50	43	43	43	45	45	31	
3	133	49	50	41	39	26	31	34	29	36	23	44	30	30	19	32	40	18	
3	134	49	50	41	39	32	37	40	35	41	28	49	36	36	40	38	44	24	
3	135	49	50	41	39	32	37	40	35	40	27	49	36	36	40	38	44	24	
3	136	49	50	41	39	27	32	35	30	36	23	45	31	31	35	33	40	19	
3	137	49	50	41	39	30	35	38	33	40	27	46	34	34	36	36	44	22	
3	138	49	50	41	39	26	31	34	29	33	20	42	30	30	37	32	33	18	
3	139	49	50	41	39	34	39	42	37	38	25	47	38	38	41	40	42	26	
3	140	49	50	41	39	40	45	48	43	41	28	51	44	44	40	46	46	32	
3	141	49	50	41	39	21	26	29	24	27	14	35	25	25	31	27	31	13	
3	142	49	50	41	39	23	28	31	26	32	19	35	27	27	37	29	36	15	
3	143	49	50	41	39	38	43	46	41	39	26	49	42	42	23	44	45	30	
3	144	49	50	41	39	21	26	29	24	30	17	34	25	25	34	27	32	13	
3	145	49	50	41	39	40	45	48	43	41	28	51	44	44	43	46	46	32	
3	146	49	50	41	39	40	45	48	43	41	28	51	44	44	42	46	46	32	
3	147	49	50	41	39	30	35	38	33	39	26	44	34	34	33	36	40	22	
3	148	49	50	41	39	35	40	43	38	37	24	47	39	39	40	41	42	27	
3	149	49	50	41	39	40	45	48	43	41	28	51	44	44	42	46	46	32	
3	150	49	50	41	39	40	45	48	43	41	28	51	44	44	42	46	46	32	
3	152	49	50	41	39	31	36	39	34	41	28	40	35	35	22	37	45	23	
3	153	49	50	41	39	31	36	39	34	41	28	47	35	35	23	37	45	23	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	NML	Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]														
					Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
3	154	49	50	41	39	27	32	35	30	37	24	45	31	31	35	33	41	19	
3	155	49	50	41	39	40	45	48	43	45	32	54	44	44	46	46	39	32	
3	156	49	50	41	39	38	43	46	41	44	31	53	42	42	43	44	48	30	
3	158	49	50	41	39	31	36	39	34	41	28	43	35	35	25	37	45	23	
3	159	49	50	41	39	27	32	35	30	37	24	45	31	31	33	33	41	19	
3	160	49	50	41	39	42	47	50	45	46	33	55	46	46	45	48	50	34	
3	161	49	50	41	39	31	36	39	34	41	28	49	35	35	33	37	45	23	
3	162	49	50	41	39	29	34	37	32	39	26	47	33	33	37	35	43	21	
3	164	49	50	41	39	29	34	37	32	39	26	47	33	33	38	35	41	21	
3	165	49	50	41	39	32	37	40	35	42	29	47	36	36	38	38	43	24	
3	166	49	50	41	39	27	32	35	30	37	24	44	31	31	35	33	39	19	
3	167	49	50	41	39	31	36	39	34	41	28	48	35	35	39	37	45	23	
3	168	49	50	41	39	31	36	39	34	41	28	48	35	35	39	37	45	23	
3	169	49	50	41	39	31	36	39	34	41	28	48	35	35	38	37	45	23	
3	170	49	50	41	39	31	36	39	34	41	28	48	35	35	38	37	45	23	
3	171	49	50	41	39	26	31	34	29	36	23	44	30	30	10	32	39	18	
3	172	49	50	41	39	56	61	64	59	47	34	59	60	60	45	62	54	48	
3	173	49	50	41	39	31	36	39	34	41	28	48	35	35	38	37	44	23	
3	174	49	50	41	39	28	33	36	31	38	25	39	32	32	9	34	42	20	
3	175	49	50	41	39	54	59	62	57	52	39	62	58	58	53	60	57	46	
3	176	49	50	41	39	31	36	39	34	41	28	48	35	35	38	37	44	23	
3	177	49	50	41	39	31	36	39	34	41	28	46	35	35	21	37	45	23	
3	178	49	50	41	39	30	35	38	33	40	27	48	34	34	36	36	43	22	
3	179	49	50	41	39	27	32	35	30	37	24	43	31	31	34	33	40	19	
3	180	49	50	41	39	65	70	73	68	63	50	72	69	69	63	71	61	57	
3	181	49	50	41	39	41	46	49	44	51	38	60	45	45	45	47	52	33	
3	182	49	50	41	39	43	48	51	46	53	40	61	47	47	46	49	53	35	
3	183	49	50	41	39	31	36	39	34	41	28	44	35	35	30	37	45	23	
3	184	49	50	41	39	37	42	45	40	47	34	55	41	41	40	43	47	29	
3	185	49	50	41	39	35	40	43	38	45	32	52	39	39	33	41	49	27	
3	186	49	50	41	39	58	63	66	61	60	47	76	62	62	32	64	64	50	
3	187	49	50	41	39	38	43	46	41	48	35	52	42	42	28	44	51	30	
3	188	49	50	41	39	44	49	52	47	54	41	59	48	48	43	50	55	36	
3	189	49	50	41	39	33	38	41	36	43	30	36	37	37	23	39	43	25	
3	190	49	50	41	39	47	52	55	50	57	44	64	51	51	45	53	58	39	
3	191	49	50	41	39	46	51	54	49	56	43	60	50	50	44	52	58	38	
3	192	49	50	41	39	59	64	67	62	64	51	73	63	63	67	65	51	51	
3	193	49	50	41	39	61	66	69	64	66	53	75	65	65	67	67	56	53	
3	194	49	50	41	39	40	45	48	43	50	37	55	44	44	54	46	46	32	
3	195	49	50	41	39	44	49	52	47	53	40	54	48	48	40	50	57	36	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	NML Evening	Night	Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]														
						NML		GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
						Day	Evening													
3	196	49	50	41	39	47	52	55	50	52	39	63	51	51	59	53	50	39		
3	197	49	50	41	39	72	77	80	75	63	50	72	76	76	60	78	64	64		
3	198	49	50	41	39	52	57	60	55	55	42	69	56	56	64	58	51	44		
3	199	49	50	41	39	56	61	64	59	62	49	71	60	60	62	62	58	48		
3	200	49	50	41	39	57	62	65	60	64	51	73	61	61	67	63	52	49		
3	201	49	50	41	39	49	54	57	52	56	43	69	53	53	64	55	52	41		
3	202	49	50	41	39	58	63	66	61	61	48	70	62	62	60	64	60	50		
3	203	49	50	41	39	32	37	40	35	42	29	43	36	36	33	38	46	24		
3	204	49	50	41	39	33	38	41	36	43	30	44	37	37	33	39	47	25		
3	205	49	50	41	39	33	38	41	36	43	30	43	37	37	33	39	47	25		
3	206	49	50	41	39	51	56	59	54	58	45	67	55	55	61	57	53	43		
3	207	49	50	41	39	32	37	40	35	42	29	37	36	36	12	38	46	24		
3	208	49	50	41	39	33	38	41	36	43	30	37	37	37	15	39	47	25		
3	209	49	50	41	39	32	37	40	35	42	29	37	36	36	15	38	46	24		
3	210	49	50	41	39	33	38	41	36	43	30	36	37	37	18	39	47	25		
3	211	49	50	41	39	33	38	41	36	43	30	36	37	37	17	39	47	25		
3	212	49	50	41	39	33	38	41	36	43	30	37	37	37	12	39	47	25		
3	213	49	50	41	39	32	37	40	35	42	29	37	36	36	13	38	46	24		
3	214	49	50	41	39	33	38	41	36	43	30	43	37	37	33	39	47	25		
3	215	49	50	41	39	33	38	41	36	43	30	36	37	37	17	39	47	25		
3	216	49	50	41	39	32	37	40	35	42	29	37	36	36	17	38	46	24		
3	217	49	50	41	39	32	37	40	35	42	29	37	36	36	11	38	41	24		
3	218	49	50	41	39	32	37	40	35	42	29	37	36	36	20	38	46	24		
3	219	49	50	41	39	33	38	41	36	43	30	42	37	37	23	39	47	25		
3	220	49	50	41	39	32	37	40	35	42	29	36	36	36	13	38	46	24		
3	221	49	50	41	39	32	37	40	35	42	29	34	36	36	19	38	45	24		
3	222	49	50	41	39	31	36	39	34	41	28	38	35	35	16	37	45	23		
3	223	49	50	41	39	32	37	40	35	42	29	41	36	36	31	38	45	24		
3	224	49	50	41	39	32	37	40	35	42	29	37	36	36	14	38	45	24		
3	225	49	50	41	39	57	62	65	60	54	41	63	61	61	56	63	51	49		
3	226	49	50	41	39	31	36	39	34	41	28	38	35	35	14	37	45	23		
3	227	49	50	41	39	31	36	39	34	41	28	40	35	35	31	37	40	23		
3	228	49	50	41	39	27	32	35	30	36	23	30	31	31	17	33	39	19		
3	229	49	50	41	39	31	36	39	34	41	28	40	35	35	30	37	45	23		
3	230	49	50	41	39	31	36	39	34	41	28	38	35	35	13	37	44	23		
3	231	49	50	41	39	64	69	72	67	41	28	51	68	68	46	70	47	56		
3	232	49	50	41	39	31	36	39	34	41	28	40	35	35	12	37	44	23		
3	233	49	50	41	39	33	38	41	36	43	30	41	37	37	31	39	46	25		
3	234	49	50	41	39	32	37	40	35	42	29	40	36	36	31	38	46	24		
3	235	49	50	41	39	44	49	52	47	52	39	61	48	48	56	50	37	36		



NCA	Rec ID	Sleep dist goal LA1(1min)	NML Predicted maximum noise level during construction stage [LAeq(15 minute) / LA1(1minute)dB(A)]																
			Day	Evening		Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				Day	Evening														
3	236	49	50	41	39	52	57	60	55	51	38	60	56	56	55	58	46	44	
3	237	49	50	41	39	32	37	40	35	42	29	39	36	36	30	38	39	24	
3	238	49	50	41	39	32	37	40	35	42	29	39	36	36	12	38	44	24	
3	239	49	50	41	39	32	37	40	35	42	29	39	36	36	14	38	41	24	
3	240	49	50	41	39	32	37	40	35	42	29	39	36	36	18	38	44	24	
3	241	49	50	41	39	31	36	39	34	41	28	39	35	35	15	37	43	23	
3	242	49	50	41	39	29	34	37	32	39	26	40	33	33	27	35	36	21	
3	243	49	50	41	39	34	39	42	37	44	31	41	38	38	30	40	46	26	
3	244	49	50	41	39	31	36	39	34	41	28	39	35	35	9	37	38	23	
3	245	49	50	41	39	42	47	50	45	48	35	60	46	46	41	48	37	34	
3	246	49	50	41	39	31	36	39	34	41	28	39	35	35	15	37	43	23	
3	247	49	50	41	39	32	37	40	35	41	28	39	36	36	29	38	43	24	
3	248	49	50	41	39	31	36	39	34	41	28	39	35	35	19	37	43	23	
3	249	49	50	41	39	31	36	39	34	41	28	39	35	35	23	37	43	23	
3	250	49	50	41	39	30	35	38	33	40	27	40	34	34	28	36	36	22	
3	251	49	50	41	39	31	36	39	34	41	28	39	35	35	12	37	42	23	
3	252	49	50	41	39	31	36	39	34	41	28	40	35	35	29	37	42	23	
3	253	49	50	41	39	31	36	39	34	41	28	40	35	35	29	37	42	23	
3	254	49	50	41	39	29	34	37	32	39	26	36	33	33	27	35	36	21	
3	255	49	50	41	39	33	38	41	36	43	30	42	37	37	28	39	44	25	
3	256	49	50	41	39	31	36	39	34	41	28	40	35	35	13	37	42	23	
3	257	49	50	41	39	29	34	37	32	39	26	36	33	33	27	35	39	21	
3	258	49	50	41	39	31	36	39	34	41	28	40	35	35	28	37	42	23	
3	259	49	50	41	39	31	36	39	34	41	28	40	35	35	17	37	41	23	
3	260	49	50	41	39	31	36	39	34	41	28	40	35	35	20	37	41	23	
3	261	49	50	41	39	40	45	48	43	48	35	58	44	44	53	46	36	32	
3	262	49	50	41	39	31	36	39	34	41	28	40	35	35	27	37	41	23	
3	263	49	50	41	39	31	36	39	34	41	28	40	35	35	28	37	41	23	
3	264	49	50	41	39	30	35	38	33	40	27	40	34	34	10	36	41	22	
3	265	49	50	41	39	30	35	38	33	40	27	40	34	34	14	36	41	22	
3	266	49	50	41	39	52	57	60	55	44	31	54	56	56	49	58	48	44	
3	267	49	50	41	39	30	35	38	33	40	27	41	34	34	16	36	40	22	
3	268	49	50	41	39	33	38	41	36	43	30	40	37	37	30	39	46	25	
3	269	49	50	41	39	30	35	38	33	40	27	41	34	34	28	36	40	22	
3	270	49	50	41	39	32	37	40	35	42	29	44	36	36	27	38	42	24	
3	271	49	50	41	39	30	35	38	33	40	27	41	34	34	11	36	35	22	
3	272	49	50	41	39	30	35	38	33	40	27	41	34	34	14	36	39	22	
3	273	49	50	41	39	32	37	40	35	42	29	44	36	36	27	38	42	24	
3	274	49	50	41	39	32	37	40	35	42	29	41	36	36	16	38	41	24	
3	275	49	50	41	39	29	34	37	32	39	26	37	33	33	13	35	41	21	

NCA	Rec ID	Sleep dist goal LA1(1min)	Day	NML Predicted maximum noise level during construction stage [LAeq(15 minute) / LA1(1minute)dB(A)]															
				Evening		Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
3	276	49	50	41	39	34	39	42	37	44	31	37	38	38	26	40	43	26	
3	277	49	50	41	39	35	40	43	38	45	32	39	39	39	30	41	47	27	
3	278	49	50	41	39	52	57	60	55	51	38	60	56	56	54	58	43	44	
3	279	49	50	41	39	34	39	42	37	45	32	39	38	38	30	40	47	26	
3	280	49	50	41	39	46	51	54	49	47	34	55	50	50	48	52	49	38	
3	281	49	50	41	39	32	37	40	35	42	29	35	36	36	26	38	38	24	
3	282	49	50	41	39	45	50	53	48	39	26	54	49	49	50	51	36	37	
3	283	49	50	41	39	29	34	37	32	39	26	35	33	33	26	35	39	21	
3	284	49	50	41	39	37	42	45	40	34	21	54	41	41	47	43	37	29	
3	285	49	50	41	39	31	36	39	34	41	28	35	35	35	26	37	39	23	
3	286	49	50	41	39	34	39	42	37	43	30	52	38	38	47	40	36	26	
3	287	49	50	41	39	31	36	39	34	41	28	35	35	35	26	37	39	23	
3	288	49	50	41	39	31	36	39	34	41	28	35	35	35	26	37	39	23	
3	289	49	50	41	39	42	47	50	45	47	34	57	46	46	47	48	50	34	
3	292	49	50	41	39	30	35	38	33	40	27	35	34	34	26	36	39	22	
3	294	49	50	41	39	40	45	48	43	47	34	56	44	44	46	46	50	32	
3	295	49	50	41	39	27	32	35	30	37	24	35	31	31	26	33	39	19	
3	298	49	50	41	39	34	39	42	37	44	31	35	38	38	27	40	39	26	
3	301	49	50	41	39	35	40	43	38	45	32	38	39	39	29	41	40	27	
3	302	49	50	41	39	35	40	43	38	41	28	45	39	39	46	41	38	27	
3	306	49	50	41	39	33	38	41	36	43	30	34	37	37	27	39	36	25	
3	308	49	50	41	39	34	39	42	37	44	31	37	38	38	13	40	40	26	
3	309	49	50	41	39	34	39	42	37	44	31	37	38	38	27	40	41	26	
3	311	49	50	41	39	33	38	41	36	43	30	29	37	37	20	39	40	25	
3	318	49	50	41	39	34	39	42	37	38	25	43	38	38	8	40	37	26	
3	320	49	50	41	39	32	37	40	35	43	30	35	36	36	27	38	40	24	
3	323	49	50	41	39	36	41	44	39	41	28	50	40	40	45	42	45	28	
3	328	49	50	41	39	35	40	43	38	45	32	44	39	39	7	41	40	27	
3	339	49	50	41	39	36	41	44	39	46	33	35	40	40	27	42	40	28	
3	343	49	50	41	39	36	41	44	39	46	33	35	40	40	27	42	40	28	
3	347	49	50	41	39	37	42	45	40	47	34	35	41	41	27	43	36	29	
3	348	49	50	41	39	38	43	46	41	48	35	36	42	42	27	44	41	30	
3	350	49	50	41	39	38	43	46	41	48	35	36	42	42	27	44	41	30	
3	352	49	50	41	39	39	44	47	42	49	36	36	43	43	27	45	41	31	
3	354	49	50	41	39	39	44	47	42	49	36	36	43	43	27	45	41	31	
3	357	49	50	41	39	40	45	48	43	50	37	36	44	44	27	46	41	32	
3	360	49	50	41	39	40	45	48	43	50	37	36	44	44	27	46	41	32	
3	362	49	50	41	39	40	45	48	43	50	37	36	44	44	27	46	41	32	
3	364	49	50	41	39	42	47	50	45	52	39	36	46	46	27	48	41	34	
3	366	49	50	41	39	43	48	51	46	53	40	36	47	47	27	49	41	35	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	NML	Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]														
					Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
3	368	49	50	41	39	44	49	52	47	54	41	36	48	48	27	50	41	36	
3	370	49	50	41	39	44	49	52	47	54	41	36	48	48	27	50	41	36	
3	372	49	50	41	39	45	50	53	48	54	41	35	49	49	27	51	41	37	
3	374	49	50	41	39	46	51	54	49	56	43	36	50	50	27	52	41	38	
3	376	49	50	41	39	47	52	55	50	57	44	35	51	51	27	53	41	39	
3	378	49	50	41	39	49	54	57	52	59	46	35	53	53	27	55	41	41	
3	379	49	50	41	39	50	55	58	53	60	47	35	54	54	27	56	41	42	
3	381	49	50	41	39	51	56	59	54	61	48	35	55	55	27	57	41	43	
3	382	49	50	41	39	54	59	62	57	64	51	35	58	58	27	60	41	46	
3	383	49	50	41	39	56	61	64	59	66	53	35	60	60	27	62	41	48	
3	386	49	50	41	39	48	53	56	51	57	44	39	52	52	26	54	41	40	
3	387	49	50	41	39	44	49	52	47	53	40	40	48	48	26	50	40	36	
3	389	49	50	41	39	43	48	51	46	52	39	47	47	47	26	49	40	35	
3	390	49	50	41	39	40	45	48	43	48	35	48	44	44	26	46	40	32	
3	391	49	50	41	39	38	43	46	41	47	34	48	42	42	26	44	40	30	
3	394	49	50	41	39	37	42	45	40	41	28	48	41	41	6	43	40	29	
3	395	49	50	41	39	35	40	43	38	44	31	47	39	39	26	41	40	27	
3	399	49	50	41	39	35	40	43	38	41	28	47	39	39	6	41	40	27	
3	401	49	50	41	39	34	39	42	37	41	28	47	38	38	6	40	40	26	
4	290	56	59	48	46	30	35	38	33	40	27	38	34	34	29	36	41	22	
4	291	56	59	48	46	29	34	37	32	39	26	33	33	33	25	35	32	21	
4	293	56	59	48	46	33	38	41	36	43	30	38	37	37	29	39	41	25	
4	296	56	59	48	46	31	36	39	34	40	27	38	35	35	29	37	41	23	
4	297	56	59	48	46	27	32	35	30	37	24	33	31	31	23	33	29	19	
4	299	56	59	48	46	30	35	38	33	39	26	28	34	34	13	36	32	22	
4	300	56	59	48	46	34	39	42	37	44	31	38	38	38	29	40	41	26	
4	303	56	59	48	46	33	38	41	36	43	30	48	37	37	28	39	40	25	
4	304	56	59	48	46	35	40	43	38	44	31	38	39	39	29	41	41	27	
4	305	56	59	48	46	30	35	38	33	40	27	27	34	34	16	36	36	22	
4	307	56	59	48	46	34	39	42	37	43	30	48	38	38	28	40	40	26	
4	310	56	59	48	46	35	40	43	38	41	28	51	39	39	5	41	42	27	
4	312	56	59	48	46	33	38	41	36	43	30	36	37	37	28	39	40	25	
4	313	56	59	48	46	33	38	41	36	42	29	47	37	37	5	39	41	25	
4	314	56	59	48	46	29	34	37	32	38	25	44	33	33	6	35	39	21	
4	315	56	59	48	46	34	39	42	37	43	30	49	38	38	28	40	40	26	
4	316	56	59	48	46	29	34	37	32	37	24	38	33	33	24	35	35	21	
4	317	56	59	48	46	34	39	42	37	43	30	37	38	38	28	40	39	26	
4	319	56	59	48	46	36	41	44	39	45	32	38	40	40	29	42	41	28	
4	321	56	59	48	46	30	35	38	33	37	24	43	34	34	4	36	38	22	
4	322	56	59	48	46	30	35	38	33	38	25	28	34	34	17	36	35	22	

NCA	Rec ID	Sleep dist goal L <sub>A1</sub> (1min)	Day	NML Predicted maximum noise level during construction stage [L <sub>Aeq</sub> (15 minute) / L <sub>A1</sub> (1minute)dB(A)]															
				NML			GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				Evening	Night	Day													
4	324	56	59	48	46	27	32	35	30	29	16	45	31	31	3	33	39	19	
4	325	56	59	48	46	30	35	38	33	39	26	42	34	34	4	36	34	22	
4	326	56	59	48	46	9	14	17	12	18	5	28	13	13	10	15	22	1	
4	327	56	59	48	46	32	37	40	35	42	29	34	36	36	25	38	37	24	
4	329	56	59	48	46	20	25	28	23	30	17	38	24	24	4	26	34	12	
4	330	56	59	48	46	30	35	38	33	39	26	46	34	34	24	36	39	22	
4	331	56	59	48	46	32	37	40	35	41	28	48	36	36	4	38	42	24	
4	332	56	59	48	46	30	35	38	33	38	25	46	34	34	3	36	40	22	
4	333	56	59	48	46	33	38	41	36	42	29	34	37	37	25	39	37	25	
4	334	56	59	48	46	30	35	38	33	38	25	46	34	34	3	36	40	22	
4	335	56	59	48	46	29	34	37	32	38	25	46	33	33	4	35	40	21	
4	336	56	59	48	46	30	35	38	33	38	25	47	34	34	3	36	40	22	
4	337	56	59	48	46	27	32	35	30	37	24	46	31	31	5	33	40	19	
4	338	56	59	48	46	33	38	41	36	43	30	34	37	37	25	39	37	25	
4	340	56	59	48	46	29	34	37	32	38	25	46	33	33	3	35	40	21	
4	341	56	59	48	46	34	39	42	37	42	29	50	38	38	3	40	44	26	
4	344	56	59	48	46	32	37	40	35	41	28	48	36	36	3	38	43	24	
4	345	56	59	48	46	33	38	41	36	43	30	34	37	37	25	39	37	25	
4	346	56	59	48	46	34	39	42	37	43	30	34	38	38	25	40	38	26	
4	351	56	59	48	46	35	40	43	38	43	30	51	39	39	24	41	44	27	
4	355	56	59	48	46	35	40	43	38	44	31	34	39	39	25	41	38	27	
4	358	56	59	48	46	36	41	44	39	45	32	34	40	40	25	42	38	28	
4	359	56	59	48	46	36	41	44	39	45	32	34	40	40	25	42	38	28	
4	361	56	59	48	46	36	41	44	39	45	32	34	40	40	25	42	38	28	
4	363	56	59	48	46	37	42	45	40	45	32	34	41	41	25	43	38	29	
4	365	56	59	48	46	37	42	45	40	46	33	34	41	41	25	43	38	29	
4	367	56	59	48	46	38	43	46	41	46	33	34	42	42	25	44	38	30	
4	369	56	59	48	46	38	43	46	41	46	33	34	42	42	25	44	38	30	
4	371	56	59	48	46	38	43	46	41	46	33	34	42	42	25	44	38	30	
4	373	56	59	48	46	39	44	47	42	46	33	34	43	43	25	45	38	31	
4	375	56	59	48	46	39	44	47	42	46	33	34	43	43	25	45	38	31	
4	377	56	59	48	46	40	45	48	43	46	33	33	44	44	25	46	38	32	
4	380	56	59	48	46	40	45	48	43	46	33	49	44	44	5	46	41	32	
4	384	56	59	48	46	42	47	50	45	46	33	50	46	46	25	48	42	34	
4	385	56	59	48	46	55	60	63	58	46	33	51	59	59	5	61	43	47	
4	388	56	59	48	46	60	65	68	63	46	33	36	64	64	24	66	37	52	
4	393	56	59	48	46	74	79	82	77	83	70	68	78	78	23	80	53	66	
4	396	56	59	48	46	63	68	71	66	57	44	68	67	67	0	69	66	55	
4	397	56	59	48	46	61	66	69	64	53	40	68	65	65	21	67	71	53	
4	400	56	59	48	46	66	71	74	69	55	42	65	70	70	20	72	59	58	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	Evening	Night	NML Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]												
						GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
						4	404	56	59	48	46	73	78	81	76	83	70	90
4	406	56	59	48	46	63	68	71	66	61	48	74	67	67	22	69	63	55
4	407	56	59	48	46	57	62	65	60	63	50	72	61	61	26	63	51	49
4	410	56	59	48	46	69	74	77	72	53	40	60	73	73	4	75	69	61
4	412	56	59	48	46	43	48	51	46	51	38	51	47	47	22	49	44	35
4	413	56	59	48	46	54	59	62	57	48	35	60	58	58	21	60	59	46
4	415	56	59	48	46	39	44	47	42	45	32	53	43	43	23	45	34	31
4	416	56	59	48	46	39	44	47	42	45	32	53	43	43	23	45	34	31
4	417	56	59	48	46	39	44	47	42	45	32	53	43	43	23	45	34	31
4	418	56	59	48	46	40	45	48	43	45	32	53	44	44	14	46	34	32
4	419	56	59	48	46	40	45	48	43	45	32	53	44	44	23	46	34	32
4	420	56	59	48	46	38	43	46	41	46	33	53	42	42	3	44	33	30
4	421	56	59	48	46	40	45	48	43	45	32	52	44	44	23	46	34	32
4	422	56	59	48	46	40	45	48	43	45	32	50	44	44	23	46	34	32
4	423	56	59	48	46	34	39	42	37	37	24	34	38	38	7	40	28	26
4	424	56	59	48	46	40	45	48	43	46	33	49	44	44	22	46	34	32
4	427	56	59	48	46	33	38	41	36	37	24	33	37	37	15	39	27	25
4	428	56	59	48	46	38	43	46	41	44	31	42	42	42	11	44	23	30
4	430	56	59	48	46	33	38	41	36	32	19	34	37	37	6	39	22	25
4	431	56	59	48	46	38	43	46	41	44	31	41	42	42	3	44	30	30
4	432	56	59	48	46	33	38	41	36	33	20	38	37	37	12	39	27	25
4	433	56	59	48	46	40	45	48	43	45	32	44	44	44	2	46	34	32
4	434	56	59	48	46	33	38	41	36	30	17	33	37	37	17	39	22	25
4	435	56	59	48	46	34	39	42	37	38	25	41	38	38	3	40	21	26
4	436	56	59	48	46	34	39	42	37	44	31	41	38	38	3	40	21	26
4	437	56	59	48	46	39	44	47	42	45	32	44	43	43	2	45	35	31
4	438	56	59	48	46	33	38	41	36	43	30	38	37	37	3	39	21	25
4	439	56	59	48	46	62	67	70	65	55	42	64	66	66	12	68	62	54
4	440	56	59	48	46	39	44	47	42	45	32	44	43	43	2	45	36	31
4	441	56	59	48	46	33	38	41	36	37	24	40	37	37	3	39	33	25
4	443	56	59	48	46	33	38	41	36	36	23	38	37	37	3	39	21	25
4	445	56	59	48	46	39	44	47	42	45	32	44	43	43	2	45	36	31
4	446	56	59	48	46	33	38	41	36	36	23	38	37	37	3	39	21	25
4	447	56	59	48	46	55	60	63	58	47	34	58	59	59	1	61	55	47
4	448	56	59	48	46	33	38	41	36	39	26	40	37	37	2	39	25	25
4	449	56	59	48	46	33	38	41	36	35	22	46	37	37	3	39	21	25
4	450	56	59	48	46	33	38	41	36	35	22	38	37	37	3	39	20	25
4	451	56	59	48	46	38	43	46	41	44	31	45	42	42	2	44	37	30
4	452	56	59	48	46	32	37	40	35	33	20	37	36	36	3	38	20	24
4	453	56	59	48	46	32	37	40	35	38	25	39	36	36	3	38	27	24

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	Day	NML Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]															
				NML			GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				Evening	Night	Day													
4	454	56	59	48	46	38	43	46	41	44	31	45	42	42	2	44	37	30	
4	455	56	59	48	46	32	37	40	35	34	21	42	36	36	3	38	31	24	
4	456	56	59	48	46	32	37	40	35	33	20	36	36	36	3	38	28	24	
4	458	56	59	48	46	37	42	45	40	44	31	45	41	41	2	43	38	29	
4	459	56	59	48	46	32	37	40	35	43	30	45	36	36	2	38	37	24	
4	461	56	59	48	46	26	31	34	29	32	19	28	30	30	2	32	28	18	
4	462	56	59	48	46	31	36	39	34	37	24	45	35	35	21	37	36	23	
4	463	56	59	48	46	28	33	36	31	43	30	45	32	32	2	34	38	20	
4	464	56	59	48	46	37	42	45	40	43	30	45	41	41	2	43	39	29	
4	465	56	59	48	46	31	36	39	34	32	19	37	35	35	3	37	29	23	
4	467	56	59	48	46	33	38	41	36	42	29	34	37	37	2	39	33	25	
4	468	56	59	48	46	46	51	54	49	47	34	56	50	50	20	52	54	38	
4	469	56	59	48	46	37	42	45	40	43	30	45	41	41	2	43	41	29	
4	470	56	59	48	46	35	40	43	38	43	30	30	39	39	2	41	29	27	
4	471	56	59	48	46	32	37	40	35	41	28	30	36	36	2	38	30	24	
4	472	56	59	48	46	30	35	38	33	28	15	30	34	34	2	36	28	22	
4	473	56	59	48	46	36	41	44	39	43	30	45	40	40	2	42	43	28	
4	474	56	59	48	46	32	37	40	35	36	23	36	36	36	2	38	34	24	
4	475	56	59	48	46	23	28	31	26	29	16	28	27	27	2	29	27	15	
4	476	56	59	48	46	36	41	44	39	43	30	46	40	40	2	42	44	28	
4	477	56	59	48	46	32	37	40	35	35	22	33	36	36	2	38	32	24	
4	478	56	59	48	46	27	32	35	30	35	22	33	31	31	2	33	32	19	
4	479	56	59	48	46	31	36	39	34	35	22	33	35	35	2	37	31	23	
4	480	56	59	48	46	31	36	39	34	34	21	29	35	35	2	37	30	23	
4	481	56	59	48	46	23	28	31	26	31	18	27	27	27	2	29	26	15	
4	482	56	59	48	46	31	36	39	34	36	23	31	35	35	2	37	30	23	
4	483	56	59	48	46	36	41	44	39	42	29	46	40	40	2	42	44	28	
4	485	56	59	48	46	44	49	52	47	48	35	58	48	48	22	50	54	36	
4	486	56	59	48	46	40	45	48	43	48	35	56	44	44	0	46	52	32	
4	500	56	59	48	46	29	34	37	32	39	26	47	33	33	20	35	42	21	
5	548	54	50	46	44	32	37	40	35	42	29	45	36	36	0	38	43	24	
5	549	54	50	46	44	37	42	45	40	47	34	54	41	41	0	43	48	29	
5	550	54	50	46	44	37	42	45	40	47	34	53	41	41	0	43	47	29	
5	551	54	50	46	44	30	35	38	33	40	27	47	34	34	0	36	43	22	
5	552	54	50	46	44	35	40	43	38	45	32	51	39	39	0	41	45	27	
5	554	54	50	46	44	31	36	39	34	41	28	40	35	35	0	37	30	23	
5	556	54	50	46	44	37	42	45	40	47	34	52	41	41	0	43	46	29	
5	557	54	50	46	44	38	43	46	41	48	35	51	42	42	0	44	45	30	
5	558	54	50	46	44	37	42	45	40	47	34	50	41	41	0	43	38	29	
5	559	54	50	46	44	37	42	45	40	47	34	49	41	41	0	43	39	29	

NCA	Rec ID	Sleep dist goal L <sub>A1</sub> (1min)	Day	NML Predicted maximum noise level during construction stage [L <sub>Aeq</sub> (15 minute) / L <sub>A1</sub> (1minute)dB(A)]														
				Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
5	560	54	50	46	44	30	35	38	33	40	27	41	34	34	0	36	42	22
5	561	54	50	46	44	30	35	38	33	40	27	40	34	34	0	36	34	22
5	562	54	50	46	44	28	33	36	31	37	24	44	32	32	0	34	29	20
5	563	54	50	46	44	36	41	44	39	46	33	51	40	40	0	42	45	28
5	564	54	50	46	44	37	42	45	40	47	34	49	41	41	0	43	39	29
5	565	54	50	46	44	33	38	41	36	43	30	50	37	37	0	39	44	25
5	566	54	50	46	44	32	37	40	35	42	29	47	36	36	0	38	42	24
5	567	54	50	46	44	36	41	44	39	46	33	49	40	40	0	42	45	28
5	568	54	50	46	44	39	44	47	42	49	36	52	43	43	0	45	40	31
5	569	54	50	46	44	26	31	34	29	35	22	39	30	30	0	32	33	18
5	570	54	50	46	44	24	29	32	27	30	17	38	28	28	0	30	23	16
5	571	54	50	46	44	36	41	44	39	46	33	49	40	40	0	42	23	28
5	572	54	50	46	44	36	41	44	39	46	33	49	40	40	0	42	38	28
5	573	54	50	46	44	22	27	30	25	32	19	41	26	26	0	28	35	14
5	574	54	50	46	44	35	40	43	38	45	32	51	39	39	0	41	45	27
5	575	54	50	46	44	28	33	36	31	38	25	38	32	32	0	34	27	20
5	576	54	50	46	44	27	32	35	30	35	22	41	31	31	0	33	25	19
5	577	54	50	46	44	26	31	34	29	32	19	44	30	30	0	32	30	18
5	578	54	50	46	44	36	41	44	39	46	33	49	40	40	0	42	38	28
5	579	54	50	46	44	23	28	31	26	34	21	35	27	27	0	29	23	15
5	580	54	50	46	44	23	28	31	26	33	20	42	27	27	0	29	36	15
5	581	54	50	46	44	32	37	40	35	42	29	48	36	36	0	38	38	24
5	582	54	50	46	44	38	43	46	41	48	35	51	42	42	0	44	40	30
5	583	54	50	46	44	29	34	37	32	37	24	45	33	33	0	35	25	21
5	584	54	50	46	44	35	40	43	38	45	32	48	39	39	0	41	44	27
5	586	54	50	46	44	32	37	40	35	42	29	43	36	36	0	38	40	24
5	587	54	50	46	44	34	39	42	37	44	31	52	38	38	0	40	46	26
5	588	54	50	46	44	35	40	43	38	45	32	38	39	39	0	41	37	27
5	589	54	50	46	44	33	38	41	36	43	30	50	37	37	0	39	44	25
5	590	54	50	46	44	35	40	43	38	45	32	49	39	39	0	41	38	27
5	591	54	50	46	44	35	40	43	38	45	32	48	39	39	0	41	37	27
5	592	54	50	46	44	35	40	43	38	45	32	37	39	39	0	41	38	27
5	593	54	50	46	44	22	27	30	25	32	19	41	26	26	0	28	35	14
5	595	54	50	46	44	30	35	38	33	40	27	40	34	34	0	36	35	22
5	596	54	50	46	44	21	26	29	24	31	18	31	25	25	0	27	22	13
5	597	54	50	46	44	34	39	42	37	44	31	48	38	38	0	40	44	26
5	598	54	50	46	44	32	37	40	35	41	28	50	36	36	0	38	32	24
5	599	54	50	46	44	34	39	42	37	44	31	47	38	38	0	40	37	26
5	600	54	50	46	44	32	37	40	35	42	29	49	36	36	0	38	43	24
5	601	54	50	46	44	24	29	32	27	34	21	35	28	28	0	30	23	16

NCA	Rec ID	Sleep dist goal LA1(1min)	Day	NML Predicted maximum noise level during construction stage [LAeq(15 minute) / LA1(1minute)dB(A)]														
				Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				5	602	54	50	46	44	33	38	41	36	43	30	51	37	37
5	603	54	50	46	44	24	29	32	27	34	21	34	28	28	0	30	30	16
5	604	54	50	46	44	33	38	41	36	33	20	41	37	37	0	39	29	25
5	605	54	50	46	44	18	23	26	21	28	15	37	22	22	0	24	24	10
5	606	54	50	46	44	28	33	36	31	36	23	41	32	32	0	34	32	20
5	608	54	50	46	44	23	28	31	26	33	20	35	27	27	0	29	28	15
5	609	54	50	46	44	27	32	35	30	36	23	43	31	31	0	33	32	19
5	610	54	50	46	44	34	39	42	37	44	31	51	38	38	0	40	45	26
5	611	54	50	46	44	31	36	39	34	41	28	49	35	35	0	37	43	23
5	614	54	50	46	44	33	38	41	36	43	30	50	37	37	0	39	44	25
5	615	54	50	46	44	22	27	30	25	32	19	41	26	26	0	28	35	14
5	617	54	50	46	44	22	27	30	25	31	18	40	26	26	0	28	35	14
5	618	54	50	46	44	29	34	37	32	39	26	47	33	33	0	35	41	21
5	621	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	622	54	50	46	44	30	35	38	33	40	27	47	34	34	0	36	42	22
5	623	54	50	46	44	18	23	26	21	28	15	34	22	22	0	24	32	10
5	624	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	625	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	628	54	50	46	44	22	27	30	25	31	18	40	26	26	0	28	35	14
5	630	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	631	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	30	11
5	632	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	633	54	50	46	44	30	35	38	33	40	27	47	34	34	0	36	42	22
5	634	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	31	12
5	635	54	50	46	44	21	26	29	24	31	18	40	25	25	0	27	34	13
5	636	54	50	46	44	21	26	29	24	31	18	40	25	25	0	27	34	13
5	637	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	30	11
5	638	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	30	11
5	639	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	32	12
5	641	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	31	11
5	642	54	50	46	44	20	25	28	23	30	17	38	24	24	0	26	33	12
5	643	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	30	11
5	645	54	50	46	44	30	35	38	33	40	27	46	34	34	0	36	42	22
5	646	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	33	12
5	648	54	50	46	44	29	34	37	32	39	26	46	33	33	0	35	42	21
5	650	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	34	12
5	651	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	30	11
5	652	54	50	46	44	21	26	29	24	30	17	39	25	25	0	27	34	13
5	653	54	50	46	44	18	23	26	21	28	15	37	22	22	0	24	30	10
5	654	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	31	11



NCA	Rec ID	Sleep dist goal L <sub>A1</sub> (1min)	NML Predicted maximum noise level during construction stage [L <sub>Aeq</sub> (15 minute) / L <sub>A1</sub> (1minute)dB(A)]															
			Day	Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
5	657	54	50	46	44	19	24	27	22	29	16	38	23	23	0	25	33	11
5	659	54	50	46	44	20	25	28	23	30	17	39	24	24	0	26	33	12
5	660	54	50	46	44	18	23	26	21	28	15	37	22	22	0	24	29	10
5	661	54	50	46	44	20	25	28	23	30	17	38	24	24	0	26	33	12
6	392	48	44	37	38	40	45	48	43	50	37	57	44	44	0	46	50	32
6	398	48	44	37	38	52	57	60	55	62	49	69	56	56	0	58	61	44
6	402	48	44	37	38	55	60	63	58	65	52	74	59	59	0	61	53	47
6	403	48	44	37	38	52	57	60	55	59	46	68	56	56	0	58	47	44
6	405	48	44	37	38	60	65	68	63	71	58	78	64	64	0	66	69	52
6	408	48	44	37	38	72	77	80	75	82	69	91	76	76	0	78	56	64
6	409	48	44	37	38	66	71	74	69	71	58	85	70	70	0	72	51	58
6	411	48	44	37	38	55	60	63	58	61	48	69	59	59	0	61	41	47
6	414	48	44	37	38	65	70	73	68	78	65	68	69	69	0	71	73	57
6	425	48	44	37	38	72	77	80	75	83	70	65	76	76	0	78	69	64
6	426	48	44	37	38	29	34	37	32	35	22	44	33	33	0	35	27	21
6	429	48	44	37	38	44	49	52	47	54	41	59	48	48	0	50	51	36
6	442	48	44	37	38	67	72	75	70	78	65	62	71	71	0	73	48	59
6	444	48	44	37	38	52	57	60	55	57	44	65	56	56	0	58	59	44
6	460	48	44	37	38	53	58	61	56	65	52	63	57	57	0	59	45	45
6	466	48	44	37	38	59	64	67	62	69	56	58	63	63	0	65	43	51
6	484	48	44	37	38	24	29	32	27	34	21	43	28	28	0	30	27	16
6	487	48	44	37	38	50	55	58	53	60	47	60	54	54	0	56	42	42
6	488	48	44	37	38	44	49	52	47	54	41	56	48	48	0	50	41	36
6	489	48	44	37	38	39	44	47	42	49	36	55	43	43	0	45	48	31
6	490	48	44	37	38	40	45	48	43	50	37	58	44	44	0	46	22	32
6	491	48	44	37	38	38	43	46	41	48	35	54	42	42	0	44	48	30
6	492	48	44	37	38	36	41	44	39	42	29	54	40	40	0	42	23	28
6	493	48	44	37	38	30	35	38	33	39	26	48	34	34	0	36	17	22
6	495	48	44	37	38	62	67	70	65	72	59	75	66	66	0	68	38	54
6	496	48	44	37	38	39	44	47	42	40	27	48	43	43	0	45	26	31
6	497	48	44	37	38	32	37	40	35	42	29	51	36	36	0	38	33	24
6	498	48	44	37	38	31	36	39	34	41	28	50	35	35	0	37	27	23
6	499	48	44	37	38	33	38	41	36	40	27	53	37	37	0	39	41	25
6	501	48	44	37	38	53	58	61	56	37	24	49	57	57	0	59	27	45
6	502	48	44	37	38	33	38	41	36	43	30	55	37	37	0	39	45	25
6	503	48	44	37	38	33	38	41	36	43	30	50	37	37	0	39	35	25
6	504	48	44	37	38	28	33	36	31	33	20	41	32	32	0	34	24	20
6	505	48	44	37	38	39	44	47	42	49	36	58	43	43	0	45	28	31
6	506	48	44	37	38	30	35	38	33	36	23	49	34	34	0	36	20	22
6	507	48	44	37	38	24	29	32	27	34	21	43	28	28	0	30	24	16

NCA	Rec ID	Sleep dist goal L <sub>A1</sub> (1min)	NML Predicted maximum noise level during construction stage [L <sub>Aeq</sub> (15 minute) / L <sub>A1</sub> (1minute)dB(A)]																
			Day	Evening		Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
				Day	Evening														
6	508	48	44	37	38	30	35	38	33	34	21	49	34	34	0	36	20	22	
6	509	48	44	37	38	28	33	36	31	39	26	47	32	32	0	34	24	20	
6	510	48	44	37	38	30	35	38	33	40	27	48	34	34	0	36	20	22	
6	511	48	44	37	38	32	37	40	35	39	26	50	36	36	0	38	24	24	
6	512	48	44	37	38	30	35	38	33	34	21	48	34	34	0	36	20	22	
6	513	48	44	37	38	31	36	39	34	34	21	49	35	35	0	37	20	23	
6	514	48	44	37	38	30	35	38	33	39	26	47	34	34	0	36	35	22	
6	515	48	44	37	38	32	37	40	35	39	26	51	36	36	0	38	25	24	
6	516	48	44	37	38	30	35	38	33	40	27	47	34	34	0	36	35	22	
6	517	48	44	37	38	34	39	42	37	39	26	51	38	38	0	40	25	26	
6	518	48	44	37	38	36	41	44	39	46	33	55	40	40	0	42	30	28	
6	519	48	44	37	38	28	33	36	31	38	25	47	32	32	0	34	27	20	
6	520	48	44	37	38	29	34	37	32	39	26	47	33	33	0	35	35	21	
6	521	48	44	37	38	34	39	42	37	39	26	51	38	38	0	40	25	26	
6	522	48	44	37	38	29	34	37	32	39	26	47	33	33	0	35	35	21	
6	523	48	44	37	38	25	30	33	28	34	21	44	29	29	0	31	21	17	
6	524	48	44	37	38	26	31	34	29	30	17	41	30	30	0	32	18	18	
6	525	48	44	37	38	34	39	42	37	39	26	51	38	38	0	40	25	26	
6	526	48	44	37	38	30	35	38	33	40	27	49	34	34	0	36	37	22	
6	527	48	44	37	38	26	31	34	29	31	18	45	30	30	0	32	15	18	
6	528	48	44	37	38	33	38	41	36	39	26	51	37	37	0	39	25	25	
6	529	48	44	37	38	30	35	38	33	40	27	49	34	34	0	36	38	22	
6	530	48	44	37	38	30	35	38	33	36	23	48	34	34	0	36	24	22	
6	531	48	44	37	38	24	29	32	27	28	15	42	28	28	0	30	18	16	
6	532	48	44	37	38	33	38	41	36	39	26	51	37	37	0	39	25	25	
6	533	48	44	37	38	26	31	34	29	33	20	44	30	30	0	32	20	18	
6	534	48	44	37	38	31	36	39	34	38	25	49	35	35	0	37	21	23	
6	535	48	44	37	38	15	20	23	18	24	11	32	19	19	0	21	13	7	
6	536	48	44	37	38	28	33	36	31	35	22	44	32	32	0	34	26	20	
6	537	48	44	37	38	26	31	34	29	33	20	44	30	30	0	32	20	18	
6	538	48	44	37	38	28	33	36	31	32	19	46	32	32	0	34	15	20	
6	539	48	44	37	38	16	21	24	19	25	12	35	20	20	0	22	21	8	
6	540	48	44	37	38	29	34	37	32	39	26	48	33	33	0	35	25	21	
6	541	48	44	37	38	30	35	38	33	40	27	49	34	34	0	36	38	22	
6	542	48	44	37	38	26	31	34	29	32	19	44	30	30	0	32	20	18	
6	543	48	44	37	38	27	32	35	30	34	21	46	31	31	0	33	21	19	
6	544	48	44	37	38	19	24	27	22	29	16	38	23	23	0	25	21	11	
6	545	48	44	37	38	27	32	35	30	36	23	46	31	31	0	33	35	19	
6	546	48	44	37	38	24	29	32	27	28	15	37	28	28	0	30	31	16	
6	547	48	44	37	38	35	40	43	38	35	22	43	39	39	0	41	36	27	

NCA	Rec ID	Sleep dist goal L <sub>A1(1min)</sub>	NML Predicted maximum noise level during construction stage [L <sub>Aeq(15 minute)</sub> / L <sub>A1(1minute)</sub> dB(A)]															
			Day	Evening	Night	GEO	DCL	BCL	SER	FIL	CFL	CUT	HTR	SCR	CRU	VMW	SST	ENV
6	553	48	44	37	38	38	43	46	41	48	35	50	42	42	0	44	41	30
6	555	48	44	37	38	29	34	37	32	38	25	43	33	33	0	35	30	21

**Table 7-4 Predicted construction noise levels – Activity set B**

NCA	Receiver	Sleep dist goal LA1(1min)	Day	NML		Predicted maximum L <sub>Aeq</sub> (15 minute) during construction stage [dB(A)]											
				Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
1	1		50	45	40	15	36	31	40	39	33	41	35	31	0	0	35
1	2	50	50	45	40	14	33	28	37	36	30	38	20	14	0	0	32
1	3	50	50	45	40	14	35	30	39	38	32	40	33	27	0	0	34
1	4	50	50	45	40	0	73	68	77	76	70	78	42	30	0	0	72
1	5	50	50	45	40	14	41	36	45	44	38	46	37	28	0	0	40
1	6	50	50	45	40	16	69	64	73	72	66	74	58	34	0	0	68
1	10	50	50	45	40	20	37	32	41	40	34	42	36	38	0	0	36
1	11	50	50	45	40	18	54	49	58	57	51	59	50	40	0	0	53
1	12	50	50	45	40	23	32	27	36	35	29	37	31	33	0	0	31
1	13	50	50	45	40	20	46	41	50	49	43	51	43	47	0	0	45
1	14	50	50	45	40	22	38	33	42	41	35	43	36	39	0	0	37
1	16	50	50	45	40	20	53	48	57	56	50	58	48	54	0	0	52
1	17	50	50	45	40	24	33	28	37	36	30	38	30	32	0	0	32
1	18	50	50	45	40	17	49	44	53	52	46	54	50	36	0	0	48
1	19	50	50	45	40	18	62	57	66	65	59	67	59	39	0	0	61
1	20	50	50	45	40	31	30	25	34	33	27	35	22	31	0	0	29
1	21	50	50	45	40	29	28	23	32	31	25	33	21	29	0	0	27
1	22	50	50	45	40	26	34	29	38	37	31	39	28	30	0	0	33
1	23	50	50	45	40	19	34	29	38	37	31	39	27	28	0	0	33
1	24	50	50	45	40	28	35	30	39	38	32	40	27	29	0	0	34
1	25	50	50	45	40	29	35	30	39	38	32	40	26	30	0	0	34
1	26	50	50	45	40	29	35	30	39	38	32	40	19	30	0	0	34
1	27	50	50	45	40	23	35	30	39	38	32	40	25	31	0	0	34
1	28	50	50	45	40	38	35	30	39	38	32	40	27	36	0	20	34
1	29	50	50	45	40	30	35	30	39	38	32	40	19	31	0	0	34
1	30	50	50	45	40	24	35	30	39	38	32	40	7	31	0	0	34
1	31	50	50	45	40	30	35	30	39	38	32	40	20	32	0	0	34
1	32	50	50	45	40	23	35	30	39	38	32	40	10	32	0	0	34
1	33	50	50	45	40	39	36	31	40	39	33	41	27	36	0	20	35
1	34	50	50	45	40	16	34	29	38	37	31	39	4	32	0	0	33
1	35	50	50	45	40	15	34	29	38	37	31	39	4	26	0	0	33
1	36	50	50	45	40	17	34	29	38	37	31	39	4	32	0	0	33
1	37	50	50	45	40	31	35	30	39	38	32	40	20	33	0	0	34
1	38	50	50	45	40	39	37	32	41	40	34	42	28	36	0	21	36
1	39	50	50	45	40	31	35	30	39	38	32	40	21	33	0	0	34
1	40	50	50	45	40	39	37	32	41	40	34	42	28	35	0	21	36
1	41	50	50	45	40	34	34	29	38	37	31	39	22	35	0	0	33
1	42	50	50	45	40	38	37	32	41	40	34	42	28	37	0	17	36

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
1	43	50	50	45	40	35	33	28	37	36	30	38	23	29	0	16	32
1	44	50	50	45	40	20	29	24	33	32	26	34	5	21	0	0	28
1	45	50	50	45	40	28	48	43	52	51	45	53	28	30	0	0	47
1	46	50	50	45	40	36	34	29	38	37	31	39	23	33	0	16	33
1	47	50	50	45	40	36	36	31	40	39	33	41	23	37	0	16	35
1	48	50	50	45	40	35	36	31	40	39	33	41	22	37	0	0	35
1	49	50	50	45	40	26	37	32	41	40	34	42	21	38	0	0	36
1	50	50	50	45	40	36	38	33	42	41	35	43	23	39	0	0	37
1	51	50	50	45	40	37	39	34	43	42	36	44	11	40	0	3	38
1	52	50	50	45	40	37	39	34	43	42	36	44	23	40	0	16	38
1	53	50	50	45	40	38	39	34	43	42	36	44	24	40	0	16	38
1	54	50	50	45	40	39	39	34	43	42	36	44	24	40	0	16	38
1	55	50	50	45	40	33	42	37	46	45	39	47	24	37	0	0	41
1	56	50	50	45	40	42	41	36	45	44	38	46	25	41	0	17	40
1	57	50	50	45	40	46	45	40	49	48	42	50	26	41	0	0	44
1	58	50	50	45	40	44	49	44	53	52	46	54	26	48	0	17	48
1	59	50	50	45	40	39	57	52	61	60	54	62	24	58	0	16	56
1	61	50	50	45	40	57	61	56	65	64	58	66	24	44	0	19	60
1	62	50	50	45	40	38	34	29	38	37	31	39	35	31	0	4	33
1	63	50	50	45	40	75	71	66	75	74	68	76	31	53	0	19	70
1	65	50	50	45	40	42	38	33	42	41	35	43	40	36	0	28	37
1	74	50	50	45	40	49	69	64	73	72	66	74	15	47	0	0	68
1	75	50	50	45	40	48	52	47	56	55	49	57	16	44	0	0	51
1	78	50	50	45	40	45	47	42	51	50	44	52	16	41	0	0	46
1	79	50	50	45	40	44	72	67	76	75	69	77	16	40	0	2	71
1	81	50	50	45	40	63	59	54	63	62	56	64	42	48	0	25	58
1	83	50	50	45	40	44	70	65	74	73	67	75	17	41	0	1	69
1	85	50	50	45	40	45	71	66	75	74	68	76	17	40	0	2	70
1	87	50	50	45	40	58	65	60	69	68	62	70	38	42	0	22	64
1	89	50	50	45	40	36	52	47	56	55	49	57	16	26	0	1	51
1	90	50	50	45	40	58	56	51	60	59	53	61	22	42	0	2	55
1	91	50	50	45	40	60	56	51	60	59	53	61	34	43	0	2	55
1	92	50	50	45	40	81	77	72	81	80	74	82	51	37	0	27	76
1	93	50	50	45	40	44	50	45	54	53	47	55	25	38	0	3	49
1	94	50	50	45	40	48	49	44	53	52	46	54	36	29	0	3	48
1	96	50	50	45	40	77	73	68	77	76	70	78	54	38	0	27	72
1	97	50	50	45	40	63	59	54	63	62	56	64	61	38	16	24	58
1	99	50	50	45	40	75	71	66	75	74	68	76	56	42	0	30	70
1	100	50	50	45	40	67	63	58	67	66	60	68	51	38	0	27	62
1	102	50	50	45	40	57	52	47	56	55	49	57	47	35	0	25	51

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
1	103	50	50	45	40	70	66	61	70	69	63	71	61	39	0	26	65
1	104	50	50	45	40	50	45	40	49	48	42	50	44	23	0	23	44
1	106	50	50	45	40	63	59	54	63	62	56	64	54	31	0	27	58
1	107	50	50	45	40	55	51	46	55	54	48	56	47	23	0	23	50
1	108	50	50	45	40	48	44	39	48	47	41	49	34	20	0	23	43
1	109	50	50	45	40	49	45	40	49	48	42	50	30	18	0	3	44
1	110	50	50	45	40	58	54	49	58	57	51	59	53	27	0	27	53
1	112	50	50	45	40	52	49	44	53	52	46	54	35	49	2	7	48
1	114	50	50	45	40	50	46	41	50	49	43	51	46	20	0	10	45
1	115	50	50	45	40	51	47	42	51	50	44	52	48	24	0	4	46
1	151	50	50	45	40	50	46	41	50	49	43	51	47	38	20	30	45
1	163	50	50	45	40	62	58	53	62	61	55	63	51	49	3	9	57
2	7	50	46	40	36	12	32	27	36	35	29	37	21	24	0	0	31
2	8	46	46	40	36	12	33	28	37	36	30	38	31	25	0	0	32
2	9	46	46	40	36	15	36	31	40	39	33	41	35	28	0	0	35
2	15	46	46	40	36	17	36	31	40	39	33	41	36	30	0	0	35
2	60	46	46	40	36	28	42	37	46	45	39	47	26	31	0	0	41
2	64	46	46	40	36	39	63	58	67	66	60	68	25	63	0	16	62
2	66	46	46	40	36	31	38	33	42	41	35	43	29	34	0	0	37
2	67	46	46	40	36	32	39	34	43	42	36	44	28	35	0	0	38
2	68	46	46	40	36	34	43	38	47	46	40	48	21	43	0	0	42
2	69	46	46	40	36	28	34	29	38	37	31	39	24	30	0	0	33
2	70	46	46	40	36	22	30	25	34	33	27	35	15	26	0	0	29
2	71	46	46	40	36	31	38	33	42	41	35	43	22	35	0	0	37
2	72	46	46	40	36	27	32	27	36	35	29	37	18	28	0	0	31
2	73	46	46	40	36	31	38	33	42	41	35	43	22	36	0	0	37
2	76	46	46	40	36	48	44	39	48	47	41	49	21	42	0	0	43
2	77	46	46	40	36	49	45	40	49	48	42	50	21	42	0	0	44
2	80	46	46	40	36	44	41	36	45	44	38	46	20	40	0	0	40
2	82	46	46	40	36	23	27	22	31	30	24	32	24	25	0	0	26
2	84	46	46	40	36	31	45	40	49	48	42	50	21	45	0	1	44
2	86	46	46	40	36	43	43	38	47	46	40	48	16	34	0	0	42
2	88	46	46	40	36	41	39	34	43	42	36	44	30	37	0	19	38
2	95	46	46	40	36	37	35	30	39	38	32	40	28	36	0	0	34
2	98	46	46	40	36	38	35	30	39	38	32	40	29	35	0	0	34
2	101	46	46	40	36	33	39	34	43	42	36	44	31	30	0	20	38
2	105	46	46	40	36	33	36	31	40	39	33	41	30	33	0	19	35
2	111	46	46	40	36	31	33	28	37	36	30	38	28	31	0	0	32
2	157	46	46	40	36	30	31	26	35	34	28	36	17	29	0	2	30
2	342	46	46	40	36	37	34	29	38	37	31	39	31	24	5	17	33

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
2	349	46	46	40	36	32	38	33	42	41	35	43	25	33	30	48	37
2	353	46	46	40	36	10	43	38	47	46	40	48	4	18	34	53	42
2	356	46	46	40	36	37	38	33	42	41	35	43	30	36	23	41	37
3	113	46	50	41	39	29	32	27	36	35	29	37	23	30	28	37	31
3	116	49	50	41	39	33	33	28	37	36	30	38	27	24	32	42	32
3	117	49	50	41	39	35	39	34	43	42	36	44	28	34	25	37	38
3	118	49	50	41	39	30	31	26	35	34	28	36	24	28	25	26	30
3	119	49	50	41	39	21	25	20	29	28	22	30	19	17	28	35	24
3	120	49	50	41	39	23	26	21	30	29	23	31	21	18	26	35	25
3	121	49	50	41	39	24	27	22	31	30	24	32	22	25	28	37	26
3	122	49	50	41	39	24	26	21	30	29	23	31	22	27	27	35	25
3	123	49	50	41	39	35	39	34	43	42	36	44	28	34	19	37	38
3	124	49	50	41	39	24	28	23	32	31	25	33	22	28	29	36	27
3	125	49	50	41	39	24	28	23	32	31	25	33	22	28	16	37	27
3	126	49	50	41	39	27	28	23	32	31	25	33	21	27	17	19	27
3	127	49	50	41	39	27	27	22	31	30	24	32	21	27	9	20	26
3	128	49	50	41	39	23	25	20	29	28	22	30	21	25	11	33	24
3	129	49	50	41	39	26	26	21	30	29	23	31	21	25	10	21	25
3	130	49	50	41	39	24	27	22	31	30	24	32	22	27	13	35	26
3	131	49	50	41	39	36	42	37	46	45	39	47	32	36	27	39	41
3	132	49	50	41	39	35	41	36	45	44	38	46	28	34	26	37	40
3	133	49	50	41	39	11	28	23	32	31	25	33	5	14	29	38	27
3	134	49	50	41	39	32	34	29	38	37	31	39	25	32	33	42	33
3	135	49	50	41	39	32	34	29	38	37	31	39	25	32	33	42	33
3	136	49	50	41	39	27	29	24	33	32	26	34	21	28	29	38	28
3	137	49	50	41	39	28	32	27	36	35	29	37	22	29	34	42	31
3	138	49	50	41	39	29	28	23	32	31	25	33	24	22	13	22	27
3	139	49	50	41	39	33	36	31	40	39	33	41	19	31	14	25	35
3	140	49	50	41	39	32	42	37	46	45	39	47	27	35	26	37	41
3	141	49	50	41	39	23	23	18	27	26	20	28	19	20	8	23	22
3	142	49	50	41	39	29	25	20	29	28	22	30	24	25	13	23	24
3	143	49	50	41	39	15	40	35	44	43	37	45	6	34	13	28	39
3	144	49	50	41	39	26	23	18	27	26	20	28	24	21	12	23	22
3	145	49	50	41	39	35	42	37	46	45	39	47	27	35	26	38	41
3	146	49	50	41	39	34	42	37	46	45	39	47	27	35	26	38	41
3	147	49	50	41	39	25	32	27	36	35	29	37	19	27	14	38	31
3	148	49	50	41	39	31	37	32	41	40	34	42	12	31	19	34	36
3	149	49	50	41	39	34	42	37	46	45	39	47	27	35	27	39	41
3	150	49	50	41	39	34	42	37	46	45	39	47	27	35	27	39	41
3	152	49	50	41	39	14	33	28	37	36	30	38	7	23	38	43	32

NCA	Receiver	Sleep dist goal LA1(1min)	Day	NML		Predicted maximum LAeq(15 minute) during construction stage [dB(A)]											
				Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
3	153	49	50	41	39	14	33	28	37	36	30	38	8	32	34	43	32
3	154	49	50	41	39	27	29	24	33	32	26	34	19	28	15	39	28
3	155	49	50	41	39	38	42	37	46	45	39	47	30	27	25	37	41
3	156	49	50	41	39	35	40	35	44	43	37	45	28	37	32	44	39
3	158	49	50	41	39	17	33	28	37	36	30	38	9	27	35	43	32
3	159	49	50	41	39	25	29	24	33	32	26	34	11	28	15	39	28
3	160	49	50	41	39	37	44	39	48	47	41	49	26	39	32	44	43
3	161	49	50	41	39	25	33	28	37	36	30	38	15	31	35	43	32
3	162	49	50	41	39	29	31	26	35	34	28	36	22	29	17	41	30
3	164	49	50	41	39	30	31	26	35	34	28	36	14	30	30	39	30
3	165	49	50	41	39	30	34	29	38	37	31	39	18	30	33	41	33
3	166	49	50	41	39	27	29	24	33	32	26	34	17	27	31	37	28
3	167	49	50	41	39	30	33	28	37	36	30	38	24	31	20	43	32
3	168	49	50	41	39	30	33	28	37	36	30	38	24	31	31	43	32
3	169	49	50	41	39	30	33	28	37	36	30	38	24	31	36	43	32
3	170	49	50	41	39	30	33	28	37	36	30	38	24	31	31	43	32
3	171	49	50	41	39	2	28	23	32	31	25	33	0	23	38	33	27
3	172	49	50	41	39	37	58	53	62	61	55	63	17	43	29	42	57
3	173	49	50	41	39	30	33	28	37	36	30	38	24	31	32	42	32
3	174	49	50	41	39	1	30	25	34	33	27	35	0	22	38	40	29
3	175	49	50	41	39	45	56	51	60	59	53	61	35	46	14	38	55
3	176	49	50	41	39	30	33	28	37	36	30	38	24	30	36	42	32
3	177	49	50	41	39	13	33	28	37	36	30	38	4	26	28	42	32
3	178	49	50	41	39	28	32	27	36	35	29	37	22	28	22	41	31
3	179	49	50	41	39	26	29	24	33	32	26	34	19	26	32	38	28
3	180	49	50	41	39	54	67	62	71	70	64	72	35	50	25	37	66
3	181	49	50	41	39	36	43	38	47	46	40	48	28	41	19	48	42
3	182	49	50	41	39	38	45	40	49	48	42	50	29	41	34	50	44
3	183	49	50	41	39	22	33	28	37	36	30	38	17	23	40	43	32
3	184	49	50	41	39	32	39	34	43	42	36	44	25	36	29	42	38
3	185	49	50	41	39	25	37	32	41	40	34	42	4	27	30	47	36
3	186	49	50	41	39	24	60	55	64	63	57	65	10	53	28	44	59
3	187	49	50	41	39	20	40	35	44	43	37	45	12	23	31	49	39
3	188	49	50	41	39	35	46	41	50	49	43	51	27	39	23	53	45
3	189	49	50	41	39	15	35	30	39	38	32	40	7	18	31	41	34
3	190	49	50	41	39	37	49	44	53	52	46	54	29	43	10	55	48
3	191	49	50	41	39	36	48	43	52	51	45	53	29	40	21	56	47
3	192	49	50	41	39	57	61	56	65	64	58	66	21	40	5	17	60
3	193	49	50	41	39	59	63	58	67	66	60	68	38	45	6	19	62
3	194	49	50	41	39	47	42	37	46	45	39	47	40	35	19	35	41



NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
3	195	49	50	41	39	32	46	41	50	49	43	51	24	35	22	54	45
3	196	49	50	41	39	51	49	44	53	52	46	54	33	39	6	19	48
3	197	49	50	41	39	52	74	69	78	77	71	79	36	53	11	27	73
3	198	49	50	41	39	56	54	49	58	57	51	59	24	40	5	26	53
3	199	49	50	41	39	54	58	53	62	61	55	63	36	47	6	29	57
3	200	49	50	41	39	58	59	54	63	62	56	64	35	41	5	19	58
3	201	49	50	41	39	55	51	46	55	54	48	56	20	41	8	22	50
3	202	49	50	41	39	52	60	55	64	63	57	65	26	49	21	38	59
3	203	49	50	41	39	25	34	29	38	37	31	39	19	25	24	44	33
3	204	49	50	41	39	25	35	30	39	38	32	40	19	26	36	45	34
3	205	49	50	41	39	25	35	30	39	38	32	40	19	26	36	45	34
3	206	49	50	41	39	53	53	48	57	56	50	58	33	42	6	23	52
3	207	49	50	41	39	4	34	29	38	37	31	39	0	20	38	44	33
3	208	49	50	41	39	7	35	30	39	38	32	40	1	19	37	45	34
3	209	49	50	41	39	7	34	29	38	37	31	39	0	20	38	44	33
3	210	49	50	41	39	10	35	30	39	38	32	40	0	19	37	45	34
3	211	49	50	41	39	9	35	30	39	38	32	40	3	19	37	45	34
3	212	49	50	41	39	4	35	30	39	38	32	40	0	19	37	44	34
3	213	49	50	41	39	5	34	29	38	37	31	39	0	19	38	44	33
3	214	49	50	41	39	25	35	30	39	38	32	40	19	25	37	45	34
3	215	49	50	41	39	9	35	30	39	38	32	40	3	19	37	45	34
3	216	49	50	41	39	9	34	29	38	37	31	39	3	20	33	43	33
3	217	49	50	41	39	3	34	29	38	37	31	39	0	20	38	39	33
3	218	49	50	41	39	12	34	29	38	37	31	39	6	20	38	43	33
3	219	49	50	41	39	15	35	30	39	38	32	40	8	19	37	44	34
3	220	49	50	41	39	5	34	29	38	37	31	39	0	11	38	44	33
3	221	49	50	41	39	11	34	29	38	37	31	39	5	14	38	39	33
3	222	49	50	41	39	8	33	28	37	36	30	38	2	20	38	43	32
3	223	49	50	41	39	23	34	29	38	37	31	39	15	22	31	43	33
3	224	49	50	41	39	6	34	29	38	37	31	39	0	20	38	43	33
3	225	49	50	41	39	48	59	54	63	62	56	64	33	40	26	40	58
3	226	49	50	41	39	6	33	28	37	36	30	38	0	20	39	38	32
3	227	49	50	41	39	23	33	28	37	36	30	38	17	23	39	38	32
3	228	49	50	41	39	9	29	24	33	32	26	34	3	9	23	37	28
3	229	49	50	41	39	22	33	28	37	36	30	38	17	22	39	42	32
3	230	49	50	41	39	5	33	28	37	36	30	38	0	21	39	42	32
3	231	49	50	41	39	38	66	61	70	69	63	71	27	36	20	32	65
3	232	49	50	41	39	4	33	28	37	36	30	38	0	14	39	42	32
3	233	49	50	41	39	23	35	30	39	38	32	40	17	24	38	44	34
3	234	49	50	41	39	23	34	29	38	37	31	39	17	23	39	43	33

NCA	Receiver	Sleep dist goal LA1(1min)	Day	NML		Predicted maximum LAeq(15 minute) during construction stage [dB(A)]											
				Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
3	235	49	50	41	39	48	46	41	50	49	43	51	26	26	15	24	45
3	236	49	50	41	39	47	54	49	58	57	51	59	31	35	26	40	53
3	237	49	50	41	39	22	34	29	38	37	31	39	16	22	40	37	33
3	238	49	50	41	39	4	34	29	38	37	31	39	0	21	40	42	33
3	239	49	50	41	39	6	34	29	38	37	31	39	1	21	40	37	33
3	240	49	50	41	39	10	34	29	38	37	31	39	4	21	40	41	33
3	241	49	50	41	39	7	33	28	37	36	30	38	1	22	40	41	32
3	242	49	50	41	39	19	31	26	35	34	28	36	14	23	41	35	30
3	243	49	50	41	39	22	36	31	40	39	33	41	16	24	43	44	35
3	244	49	50	41	39	1	33	28	37	36	30	38	0	22	40	34	32
3	245	49	50	41	39	33	44	39	48	47	41	49	31	26	6	19	43
3	246	49	50	41	39	7	33	28	37	36	30	38	2	22	41	41	32
3	247	49	50	41	39	21	34	29	38	37	31	39	16	22	40	41	33
3	248	49	50	41	39	11	33	28	37	36	30	38	5	22	41	40	32
3	249	49	50	41	39	15	33	28	37	36	30	38	0	22	41	40	32
3	250	49	50	41	39	20	32	27	36	35	29	37	14	23	40	34	31
3	251	49	50	41	39	4	33	28	37	36	30	38	0	22	41	40	32
3	252	49	50	41	39	21	33	28	37	36	30	38	7	22	41	40	32
3	253	49	50	41	39	21	33	28	37	36	30	38	15	22	41	40	32
3	254	49	50	41	39	19	31	26	35	34	28	36	14	19	41	33	30
3	255	49	50	41	39	20	35	30	39	38	32	40	15	25	44	42	34
3	256	49	50	41	39	5	33	28	37	36	30	38	0	22	41	39	32
3	257	49	50	41	39	19	31	26	35	34	28	36	14	19	41	37	30
3	258	49	50	41	39	20	33	28	37	36	30	38	15	22	41	39	32
3	259	49	50	41	39	9	33	28	37	36	30	38	3	23	41	39	32
3	260	49	50	41	39	11	33	28	37	36	30	38	6	23	41	39	32
3	261	49	50	41	39	45	42	37	46	45	39	47	23	25	6	19	41
3	262	49	50	41	39	19	33	28	37	36	30	38	8	23	41	39	32
3	263	49	50	41	39	20	33	28	37	36	30	38	14	23	41	38	32
3	264	49	50	41	39	2	32	27	36	35	29	37	0	23	41	38	31
3	265	49	50	41	39	6	32	27	36	35	29	37	0	23	41	38	31
3	266	49	50	41	39	41	54	49	58	57	51	59	31	37	7	35	53
3	267	49	50	41	39	8	32	27	36	35	29	37	2	23	41	38	31
3	268	49	50	41	39	22	35	30	39	38	32	40	16	22	40	43	34
3	269	49	50	41	39	20	32	27	36	35	29	37	14	23	42	38	31
3	270	49	50	41	39	19	34	29	38	37	31	39	14	26	44	39	33
3	271	49	50	41	39	3	32	27	36	35	29	37	0	24	42	31	31
3	272	49	50	41	39	6	32	27	36	35	29	37	1	24	41	36	31
3	273	49	50	41	39	19	34	29	38	37	31	39	13	26	44	39	33
3	274	49	50	41	39	8	34	29	38	37	31	39	3	27	44	39	33

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
3	275	49	50	41	39	5	31	26	35	34	28	36	3	18	27	39	30
3	276	49	50	41	39	18	36	31	40	39	33	41	5	21	46	40	35
3	277	49	50	41	39	22	37	32	41	40	34	42	7	22	46	44	36
3	278	49	50	41	39	46	54	49	58	57	51	59	35	32	7	21	53
3	279	49	50	41	39	22	36	31	40	39	33	41	17	22	31	44	35
3	280	49	50	41	39	40	48	43	52	51	45	53	30	38	18	41	47
3	281	49	50	41	39	18	34	29	38	37	31	39	13	18	28	36	33
3	282	49	50	41	39	42	47	42	51	50	44	52	31	25	6	23	46
3	283	49	50	41	39	18	31	26	35	34	28	36	13	18	29	36	30
3	284	49	50	41	39	41	39	34	43	42	36	44	18	26	11	31	38
3	285	49	50	41	39	18	33	28	37	36	30	38	13	18	42	36	32
3	286	49	50	41	39	39	36	31	40	39	33	41	20	25	11	29	35
3	287	49	50	41	39	18	33	28	37	36	30	38	13	18	36	36	32
3	288	49	50	41	39	18	33	28	37	36	30	38	13	18	27	36	32
3	289	49	50	41	39	39	44	39	48	47	41	49	29	39	8	41	43
3	292	49	50	41	39	18	32	27	36	35	29	37	13	18	32	37	31
3	294	49	50	41	39	38	42	37	46	45	39	47	19	39	22	44	41
3	295	49	50	41	39	18	29	24	33	32	26	34	13	18	27	37	28
3	298	49	50	41	39	19	36	31	40	39	33	41	13	18	43	37	35
3	301	49	50	41	39	21	37	32	41	40	34	42	16	21	29	38	36
3	302	49	50	41	39	38	37	32	41	40	34	42	34	27	7	21	36
3	306	49	50	41	39	18	35	30	39	38	32	40	12	17	31	32	34
3	308	49	50	41	39	5	36	31	40	39	33	41	0	18	45	38	35
3	309	49	50	41	39	19	36	31	40	39	33	41	14	21	46	38	35
3	311	49	50	41	39	12	35	30	39	38	32	40	6	12	32	37	34
3	318	49	50	41	39	0	36	31	40	39	33	41	0	26	46	31	35
3	320	49	50	41	39	19	34	29	38	37	31	39	13	18	31	37	33
3	323	49	50	41	39	37	38	33	42	41	35	43	29	34	24	38	37
3	328	49	50	41	39	0	37	32	41	40	34	42	0	26	46	38	36
3	339	49	50	41	39	19	38	33	42	41	35	43	13	18	44	38	37
3	343	49	50	41	39	19	38	33	42	41	35	43	13	18	42	38	37
3	347	49	50	41	39	19	39	34	43	42	36	44	13	18	37	34	38
3	348	49	50	41	39	19	40	35	44	43	37	45	14	19	50	38	39
3	350	49	50	41	39	19	40	35	44	43	37	45	13	13	42	38	39
3	352	49	50	41	39	19	41	36	45	44	38	46	13	18	37	38	40
3	354	49	50	41	39	19	41	36	45	44	38	46	13	18	38	38	40
3	357	49	50	41	39	19	42	37	46	45	39	47	13	18	45	38	41
3	360	49	50	41	39	19	42	37	46	45	39	47	13	18	38	38	41
3	362	49	50	41	39	19	42	37	46	45	39	47	13	18	40	38	41
3	364	49	50	41	39	19	44	39	48	47	41	49	13	18	54	38	43

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
3	366	49	50	41	39	19	45	40	49	48	42	50	13	18	46	38	44
3	368	49	50	41	39	19	46	41	50	49	43	51	13	18	50	38	45
3	370	49	50	41	39	19	46	41	50	49	43	51	13	18	47	38	45
3	372	49	50	41	39	19	47	42	51	50	44	52	13	18	43	38	46
3	374	49	50	41	39	19	48	43	52	51	45	53	13	18	52	39	47
3	376	49	50	41	39	19	49	44	53	52	46	54	13	18	47	39	48
3	378	49	50	41	39	19	51	46	55	54	48	56	13	18	49	39	50
3	379	49	50	41	39	19	52	47	56	55	49	57	13	18	58	39	51
3	381	49	50	41	39	19	53	48	57	56	50	58	13	18	52	39	52
3	382	49	50	41	39	19	56	51	60	59	53	61	13	18	66	39	55
3	383	49	50	41	39	19	58	53	62	61	55	63	13	18	67	39	57
3	386	49	50	41	39	18	50	45	54	53	47	55	13	21	60	38	49
3	387	49	50	41	39	18	46	41	50	49	43	51	13	22	56	38	45
3	389	49	50	41	39	18	45	40	49	48	42	50	13	29	55	37	44
3	390	49	50	41	39	18	42	37	46	45	39	47	13	29	52	37	41
3	391	49	50	41	39	18	40	35	44	43	37	45	13	29	50	37	39
3	394	49	50	41	39	0	39	34	43	42	36	44	0	29	49	19	38
3	395	49	50	41	39	18	37	32	41	40	34	42	13	29	47	36	36
3	399	49	50	41	39	0	37	32	41	40	34	42	0	29	47	18	36
3	401	49	50	41	39	0	36	31	40	39	33	41	0	29	46	18	35
4	290	49	59	48	46	21	32	27	36	35	29	37	16	21	37	38	31
4	291	56	59	48	46	17	31	26	35	34	28	36	12	16	41	30	30
4	293	56	59	48	46	21	35	30	39	38	32	40	16	21	35	38	34
4	296	56	59	48	46	21	33	28	37	36	30	38	16	21	33	38	32
4	297	56	59	48	46	16	29	24	33	32	26	34	2	9	30	27	28
4	299	56	59	48	46	5	32	27	36	35	29	37	0	12	42	29	31
4	300	56	59	48	46	21	36	31	40	39	33	41	16	21	46	38	35
4	303	56	59	48	46	20	35	30	39	38	32	40	15	27	45	37	34
4	304	56	59	48	46	21	37	32	41	40	34	42	16	21	47	39	36
4	305	56	59	48	46	8	32	27	36	35	29	37	2	8	42	34	31
4	307	56	59	48	46	20	36	31	40	39	33	41	15	27	46	37	35
4	310	56	59	48	46	0	37	32	41	40	34	42	0	31	47	31	36
4	312	56	59	48	46	20	35	30	39	38	32	40	14	19	45	37	34
4	313	56	59	48	46	0	35	30	39	38	32	40	0	30	45	36	34
4	314	56	59	48	46	0	31	26	35	34	28	36	0	28	41	19	30
4	315	56	59	48	46	20	36	31	40	39	33	41	15	27	46	37	35
4	316	56	59	48	46	16	31	26	35	34	28	36	11	22	41	32	30
4	317	56	59	48	46	20	36	31	40	39	33	41	15	20	46	37	35
4	319	56	59	48	46	21	38	33	42	41	35	43	16	21	48	39	37
4	321	56	59	48	46	0	32	27	36	35	29	37	0	27	42	13	31

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
4	322	56	59	48	46	9	32	27	36	35	29	37	4	9	41	32	31
4	324	56	59	48	46	0	29	24	33	32	26	34	0	28	26	15	28
4	325	56	59	48	46	0	32	27	36	35	29	37	0	23	42	25	31
4	326	56	59	48	46	2	11	6	15	14	8	16	0	11	21	14	10
4	327	56	59	48	46	17	34	29	38	37	31	39	12	17	44	35	33
4	329	56	59	48	46	0	22	17	26	25	19	27	0	23	23	13	21
4	330	56	59	48	46	16	32	27	36	35	29	37	11	28	42	32	31
4	331	56	59	48	46	0	34	29	38	37	31	39	0	31	44	27	33
4	332	56	59	48	46	0	32	27	36	35	29	37	0	29	42	25	31
4	333	56	59	48	46	17	35	30	39	38	32	40	12	17	45	35	34
4	334	56	59	48	46	0	32	27	36	35	29	37	0	29	42	24	31
4	335	56	59	48	46	0	31	26	35	34	28	36	0	29	41	23	30
4	336	56	59	48	46	0	32	27	36	35	29	37	0	29	32	20	31
4	337	56	59	48	46	0	29	24	33	32	26	34	0	29	29	15	28
4	338	56	59	48	46	17	35	30	39	38	32	40	12	17	45	35	34
4	340	56	59	48	46	0	31	26	35	34	28	36	0	29	41	14	30
4	341	56	59	48	46	0	36	31	40	39	33	41	0	33	46	26	35
4	344	56	59	48	46	0	34	29	38	37	31	39	0	32	44	12	33
4	345	56	59	48	46	17	35	30	39	38	32	40	12	17	40	35	34
4	346	56	59	48	46	17	36	31	40	39	33	41	12	17	46	35	35
4	351	56	59	48	46	16	37	32	41	40	34	42	10	33	47	32	36
4	355	56	59	48	46	17	37	32	41	40	34	42	12	17	47	35	36
4	358	56	59	48	46	17	38	33	42	41	35	43	12	17	48	35	37
4	359	56	59	48	46	17	38	33	42	41	35	43	12	17	48	35	37
4	361	56	59	48	46	17	38	33	42	41	35	43	12	17	48	35	37
4	363	56	59	48	46	17	39	34	43	42	36	44	12	17	49	35	38
4	365	56	59	48	46	17	39	34	43	42	36	44	12	17	49	35	38
4	367	56	59	48	46	17	40	35	44	43	37	45	12	17	50	35	39
4	369	56	59	48	46	17	40	35	44	43	37	45	12	17	50	35	39
4	371	56	59	48	46	17	40	35	44	43	37	45	12	17	50	35	39
4	373	56	59	48	46	17	41	36	45	44	38	46	12	16	51	35	40
4	375	56	59	48	46	17	41	36	45	44	38	46	12	16	51	35	40
4	377	56	59	48	46	17	42	37	46	45	39	47	12	16	52	35	41
4	380	56	59	48	46	0	42	37	46	45	39	47	0	30	52	26	41
4	384	56	59	48	46	17	44	39	48	47	41	49	11	31	54	35	43
4	385	56	59	48	46	0	57	52	61	60	54	62	0	32	67	16	56
4	388	56	59	48	46	16	62	57	66	65	59	67	11	21	72	34	61
4	393	56	59	48	46	15	76	71	80	79	73	81	10	42	80	31	75
4	396	56	59	48	46	0	65	60	69	68	62	70	0	55	28	10	64
4	397	56	59	48	46	13	63	58	67	66	60	68	8	60	48	29	62

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
4	400	56	59	48	46	12	68	63	72	71	65	73	0	48	44	28	67
4	404	56	59	48	46	0	75	70	79	78	72	80	0	55	25	8	74
4	406	56	59	48	46	14	65	60	69	68	62	70	8	52	55	30	64
4	407	56	59	48	46	18	59	54	63	62	56	64	13	40	57	34	58
4	410	56	59	48	46	0	71	66	75	74	68	76	0	58	45	17	70
4	412	56	59	48	46	14	45	40	49	48	42	50	0	33	51	30	44
4	413	56	59	48	46	13	56	51	60	59	53	61	8	48	40	30	55
4	415	56	59	48	46	15	41	36	45	44	38	46	10	22	47	32	40
4	416	56	59	48	46	15	41	36	45	44	38	46	10	22	47	32	40
4	417	56	59	48	46	15	41	36	45	44	38	46	10	22	47	32	40
4	418	56	59	48	46	6	42	37	46	45	39	47	2	23	47	31	41
4	419	56	59	48	46	15	42	37	46	45	39	47	4	23	47	31	41
4	420	56	59	48	46	0	40	35	44	43	37	45	0	22	46	13	39
4	421	56	59	48	46	15	42	37	46	45	39	47	7	23	47	31	41
4	422	56	59	48	46	15	42	37	46	45	39	47	10	23	47	31	41
4	423	56	59	48	46	0	36	31	40	39	33	41	0	11	46	24	35
4	424	56	59	48	46	14	42	37	46	45	39	47	10	23	47	31	41
4	427	56	59	48	46	7	35	30	39	38	32	40	0	10	45	25	34
4	428	56	59	48	46	3	40	35	44	43	37	45	0	12	46	19	39
4	430	56	59	48	46	0	35	30	39	38	32	40	0	11	45	16	34
4	431	56	59	48	46	0	40	35	44	43	37	45	0	19	46	13	39
4	432	56	59	48	46	4	35	30	39	38	32	40	0	16	45	22	34
4	433	56	59	48	46	0	42	37	46	45	39	47	0	23	47	12	41
4	434	56	59	48	46	9	35	30	39	38	32	40	3	11	45	19	34
4	435	56	59	48	46	0	36	31	40	39	33	41	0	10	45	14	35
4	436	56	59	48	46	0	36	31	40	39	33	41	0	10	46	12	35
4	437	56	59	48	46	0	41	36	45	44	38	46	0	24	46	13	40
4	438	56	59	48	46	0	35	30	39	38	32	40	0	10	45	13	34
4	439	56	59	48	46	4	64	59	68	67	61	69	0	51	49	31	63
4	440	56	59	48	46	0	41	36	45	44	38	46	0	25	46	12	40
4	441	56	59	48	46	0	35	30	39	38	32	40	0	22	45	13	34
4	443	56	59	48	46	0	35	30	39	38	32	40	0	10	45	13	34
4	445	56	59	48	46	0	41	36	45	44	38	46	0	25	46	13	40
4	446	56	59	48	46	0	35	30	39	38	32	40	0	10	45	11	34
4	447	56	59	48	46	0	57	52	61	60	54	62	0	44	46	18	56
4	448	56	59	48	46	0	35	30	39	38	32	40	0	14	45	13	34
4	449	56	59	48	46	0	35	30	39	38	32	40	0	10	45	13	34
4	450	56	59	48	46	0	35	30	39	38	32	40	0	9	45	12	34
4	451	56	59	48	46	0	40	35	44	43	37	45	0	26	46	15	39
4	452	56	59	48	46	0	34	29	38	37	31	39	0	9	44	14	33

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
4	453	56	59	48	46	0	34	29	38	37	31	39	0	16	44	13	33
4	454	56	59	48	46	0	40	35	44	43	37	45	0	26	45	12	39
4	455	56	59	48	46	0	34	29	38	37	31	39	0	20	44	12	33
4	456	56	59	48	46	0	34	29	38	37	31	39	0	17	44	15	33
4	458	56	59	48	46	0	39	34	43	42	36	44	0	27	45	12	38
4	459	56	59	48	46	0	34	29	38	37	31	39	0	26	44	12	33
4	461	56	59	48	46	0	28	23	32	31	25	33	0	17	33	12	27
4	462	56	59	48	46	13	33	28	37	36	30	38	8	25	37	28	32
4	463	56	59	48	46	0	30	25	34	33	27	35	0	27	30	11	29
4	464	56	59	48	46	0	39	34	43	42	36	44	0	28	45	11	38
4	465	56	59	48	46	0	33	28	37	36	30	38	0	18	43	14	32
4	467	56	59	48	46	0	35	30	39	38	32	40	0	22	44	12	34
4	468	56	59	48	46	12	48	43	52	51	45	53	8	43	44	28	47
4	469	56	59	48	46	0	39	34	43	42	36	44	0	30	45	11	38
4	470	56	59	48	46	0	37	32	41	40	34	42	0	18	44	13	36
4	471	56	59	48	46	0	34	29	38	37	31	39	0	19	44	12	33
4	472	56	59	48	46	0	32	27	36	35	29	37	0	17	42	13	31
4	473	56	59	48	46	0	38	33	42	41	35	43	0	32	44	12	37
4	474	56	59	48	46	0	34	29	38	37	31	39	0	23	44	11	33
4	475	56	59	48	46	0	25	20	29	28	22	30	0	16	33	12	24
4	476	56	59	48	46	0	38	33	42	41	35	43	0	33	44	12	37
4	477	56	59	48	46	0	34	29	38	37	31	39	0	21	44	12	33
4	478	56	59	48	46	0	29	24	33	32	26	34	0	21	34	16	28
4	479	56	59	48	46	0	33	28	37	36	30	38	0	20	43	13	32
4	480	56	59	48	46	0	33	28	37	36	30	38	0	19	43	13	32
4	481	56	59	48	46	0	25	20	29	28	22	30	0	15	35	12	24
4	482	56	59	48	46	0	33	28	37	36	30	38	0	19	43	11	32
4	483	56	59	48	46	0	38	33	42	41	35	43	0	33	44	12	37
4	485	56	59	48	46	14	46	41	50	49	43	51	0	43	31	30	45
4	486	56	59	48	46	0	42	37	46	45	39	47	0	41	24	7	41
4	500	56	59	48	46	12	31	26	35	34	28	36	0	31	38	27	30
5	548	56	50	46	44	0	34	29	38	37	31	39	0	32	0	0	33
5	549	54	50	46	44	0	39	34	43	42	36	44	0	37	0	0	38
5	550	54	50	46	44	0	39	34	43	42	36	44	0	36	0	0	38
5	551	54	50	46	44	0	32	27	36	35	29	37	0	32	0	0	31
5	552	54	50	46	44	0	37	32	41	40	34	42	0	34	0	0	36
5	554	54	50	46	44	0	33	28	37	36	30	38	0	19	0	0	32
5	556	54	50	46	44	0	39	34	43	42	36	44	0	35	0	0	38
5	557	54	50	46	44	0	40	35	44	43	37	45	0	34	0	0	39
5	558	54	50	46	44	0	39	34	43	42	36	44	0	27	0	0	38

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
5	559	54	50	46	44	0	39	34	43	42	36	44	0	28	0	0	38
5	560	54	50	46	44	0	32	27	36	35	29	37	0	31	0	0	31
5	561	54	50	46	44	0	32	27	36	35	29	37	0	23	0	0	31
5	562	54	50	46	44	0	30	25	34	33	27	35	0	18	0	0	29
5	563	54	50	46	44	0	38	33	42	41	35	43	0	34	0	0	37
5	564	54	50	46	44	0	39	34	43	42	36	44	0	28	0	0	38
5	565	54	50	46	44	0	35	30	39	38	32	40	0	33	0	0	34
5	566	54	50	46	44	0	34	29	38	37	31	39	0	31	0	0	33
5	567	54	50	46	44	0	38	33	42	41	35	43	0	34	0	0	37
5	568	54	50	46	44	0	41	36	45	44	38	46	0	29	0	0	40
5	569	54	50	46	44	0	28	23	32	31	25	33	0	22	0	0	27
5	570	54	50	46	44	0	26	21	30	29	23	31	0	12	0	0	25
5	571	54	50	46	44	0	38	33	42	41	35	43	0	12	0	0	37
5	572	54	50	46	44	0	38	33	42	41	35	43	0	27	0	0	37
5	573	54	50	46	44	0	24	19	28	27	21	29	0	24	0	0	23
5	574	54	50	46	44	0	37	32	41	40	34	42	0	34	0	0	36
5	575	54	50	46	44	0	30	25	34	33	27	35	0	16	0	0	29
5	576	54	50	46	44	0	29	24	33	32	26	34	0	14	0	0	28
5	577	54	50	46	44	0	28	23	32	31	25	33	0	19	0	0	27
5	578	54	50	46	44	0	38	33	42	41	35	43	0	27	0	0	37
5	579	54	50	46	44	0	25	20	29	28	22	30	0	12	0	0	24
5	580	54	50	46	44	0	25	20	29	28	22	30	0	25	0	0	24
5	581	54	50	46	44	0	34	29	38	37	31	39	0	27	0	0	33
5	582	54	50	46	44	0	40	35	44	43	37	45	0	29	0	0	39
5	583	54	50	46	44	0	31	26	35	34	28	36	0	14	0	0	30
5	584	54	50	46	44	0	37	32	41	40	34	42	0	33	0	0	36
5	586	54	50	46	44	0	34	29	38	37	31	39	0	29	0	0	33
5	587	54	50	46	44	0	36	31	40	39	33	41	0	35	0	0	35
5	588	54	50	46	44	0	37	32	41	40	34	42	0	26	0	0	36
5	589	54	50	46	44	0	35	30	39	38	32	40	0	33	0	0	34
5	590	54	50	46	44	0	37	32	41	40	34	42	0	27	0	0	36
5	591	54	50	46	44	0	37	32	41	40	34	42	0	26	0	0	36
5	592	54	50	46	44	0	37	32	41	40	34	42	0	27	0	0	36
5	593	54	50	46	44	0	24	19	28	27	21	29	0	24	0	0	23
5	595	54	50	46	44	0	32	27	36	35	29	37	0	24	0	0	31
5	596	54	50	46	44	0	23	18	27	26	20	28	0	11	0	0	22
5	597	54	50	46	44	0	36	31	40	39	33	41	0	33	0	0	35
5	598	54	50	46	44	0	34	29	38	37	31	39	0	21	0	0	33
5	599	54	50	46	44	0	36	31	40	39	33	41	0	26	0	0	35
5	600	54	50	46	44	0	34	29	38	37	31	39	0	32	0	0	33



NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
5	601	54	50	46	44	0	26	21	30	29	23	31	0	12	0	0	25
5	602	54	50	46	44	0	35	30	39	38	32	40	0	34	0	0	34
5	603	54	50	46	44	0	26	21	30	29	23	31	0	19	0	0	25
5	604	54	50	46	44	0	35	30	39	38	32	40	0	18	0	0	34
5	605	54	50	46	44	0	20	15	24	23	17	25	0	13	0	0	19
5	606	54	50	46	44	0	30	25	34	33	27	35	0	21	0	0	29
5	608	54	50	46	44	0	25	20	29	28	22	30	0	17	0	0	24
5	609	54	50	46	44	0	29	24	33	32	26	34	0	21	0	0	28
5	610	54	50	46	44	0	36	31	40	39	33	41	0	34	0	0	35
5	611	54	50	46	44	0	33	28	37	36	30	38	0	32	0	0	32
5	614	54	50	46	44	0	35	30	39	38	32	40	0	33	0	0	34
5	615	54	50	46	44	0	24	19	28	27	21	29	0	24	0	0	23
5	617	54	50	46	44	0	24	19	28	27	21	29	0	24	0	0	23
5	618	54	50	46	44	0	31	26	35	34	28	36	0	30	0	0	30
5	621	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	622	54	50	46	44	0	32	27	36	35	29	37	0	31	0	0	31
5	623	54	50	46	44	0	20	15	24	23	17	25	0	21	0	0	19
5	624	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	625	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	628	54	50	46	44	0	24	19	28	27	21	29	0	24	0	0	23
5	630	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	631	54	50	46	44	0	21	16	25	24	18	26	0	19	0	0	20
5	632	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	633	54	50	46	44	0	32	27	36	35	29	37	0	31	0	0	31
5	634	54	50	46	44	0	22	17	26	25	19	27	0	20	0	0	21
5	635	54	50	46	44	0	23	18	27	26	20	28	0	23	0	0	22
5	636	54	50	46	44	0	23	18	27	26	20	28	0	23	0	0	22
5	637	54	50	46	44	0	21	16	25	24	18	26	0	19	0	0	20
5	638	54	50	46	44	0	21	16	25	24	18	26	0	19	0	0	20
5	639	54	50	46	44	0	22	17	26	25	19	27	0	21	0	0	21
5	641	54	50	46	44	0	21	16	25	24	18	26	0	20	0	0	20
5	642	54	50	46	44	0	22	17	26	25	19	27	0	22	0	0	21
5	643	54	50	46	44	0	21	16	25	24	18	26	0	19	0	0	20
5	645	54	50	46	44	0	32	27	36	35	29	37	0	31	0	0	31
5	646	54	50	46	44	0	22	17	26	25	19	27	0	22	0	0	21
5	648	54	50	46	44	0	31	26	35	34	28	36	0	31	0	0	30
5	650	54	50	46	44	0	22	17	26	25	19	27	0	23	0	0	21
5	651	54	50	46	44	0	21	16	25	24	18	26	0	19	0	0	20
5	652	54	50	46	44	0	23	18	27	26	20	28	0	23	0	0	22
5	653	54	50	46	44	0	20	15	24	23	17	25	0	19	0	0	19

NCA	Receiver	Sleep dist goal LA1(1min)	Day	NML		Predicted maximum LAeq(15 minute) during construction stage [dB(A)]											
				Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
5	654	54	50	46	44	0	21	16	25	24	18	26	0	20	0	0	20
5	657	54	50	46	44	0	21	16	25	24	18	26	0	22	0	0	20
5	659	54	50	46	44	0	22	17	26	25	19	27	0	22	0	0	21
5	660	54	50	46	44	0	20	15	24	23	17	25	0	18	0	0	19
5	661	54	50	46	44	0	22	17	26	25	19	27	0	22	0	0	21
6	392	54	44	37	38	0	42	37	46	45	39	47	0	39	36	12	41
6	398	48	44	37	38	0	54	49	58	57	51	59	0	50	15	4	53
6	402	48	44	37	38	0	57	52	61	60	54	62	0	42	41	15	56
6	403	48	44	37	38	0	54	49	58	57	51	59	0	36	31	22	53
6	405	48	44	37	38	0	62	57	66	65	59	67	0	58	14	3	61
6	408	48	44	37	38	0	74	69	78	77	71	79	0	45	39	26	73
6	409	48	44	37	38	0	68	63	72	71	65	73	0	40	28	11	67
6	411	48	44	37	38	0	57	52	61	60	54	62	0	30	26	18	56
6	414	48	44	37	38	0	67	62	71	70	64	72	0	62	34	23	66
6	425	48	44	37	38	0	74	69	78	77	71	79	0	58	34	22	73
6	426	48	44	37	38	0	31	26	35	34	28	36	0	16	17	0	30
6	429	48	44	37	38	0	46	41	50	49	43	51	0	40	34	22	45
6	442	48	44	37	38	0	69	64	73	72	66	74	0	37	34	23	68
6	444	48	44	37	38	0	54	49	58	57	51	59	0	48	13	2	53
6	460	48	44	37	38	0	55	50	59	58	52	60	0	34	36	25	54
6	466	48	44	37	38	0	61	56	65	64	58	66	0	32	28	17	60
6	484	48	44	37	38	0	26	21	30	29	23	31	0	16	0	0	25
6	487	48	44	37	38	0	52	47	56	55	49	57	0	31	33	21	51
6	488	48	44	37	38	0	46	41	50	49	43	51	0	30	33	21	45
6	489	48	44	37	38	0	41	36	45	44	38	46	0	37	34	23	40
6	490	48	44	37	38	0	42	37	46	45	39	47	0	11	0	0	41
6	491	48	44	37	38	0	40	35	44	43	37	45	0	37	34	23	39
6	492	48	44	37	38	0	38	33	42	41	35	43	0	12	1	0	37
6	493	48	44	37	38	0	32	27	36	35	29	37	0	6	0	0	31
6	495	48	44	37	38	0	64	59	68	67	61	69	0	27	27	0	63
6	496	48	44	37	38	0	41	36	45	44	38	46	0	15	17	0	40
6	497	48	44	37	38	0	34	29	38	37	31	39	0	22	0	0	33
6	498	48	44	37	38	0	33	28	37	36	30	38	0	16	0	0	32
6	499	48	44	37	38	0	35	30	39	38	32	40	0	30	35	24	34
6	501	48	44	37	38	0	55	50	59	58	52	60	0	16	17	0	54
6	502	48	44	37	38	0	35	30	39	38	32	40	0	34	33	23	34
6	503	48	44	37	38	0	35	30	39	38	32	40	0	24	23	0	34
6	504	48	44	37	38	0	30	25	34	33	27	35	0	13	13	0	29
6	505	48	44	37	38	0	41	36	45	44	38	46	0	17	0	0	40
6	506	48	44	37	38	0	32	27	36	35	29	37	0	9	4	0	31

NCA	Receiver	Sleep dist goal		NML		Predicted maximum L <sub>Aeq(15 minute)</sub> during construction stage [dB(A)]											
		L <sub>A1(1min)</sub>	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
6	507	48	44	37	38	0	26	21	30	29	23	31	0	13	3	0	25
6	508	48	44	37	38	0	32	27	36	35	29	37	0	9	4	0	31
6	509	48	44	37	38	0	30	25	34	33	27	35	0	13	3	0	29
6	510	48	44	37	38	0	32	27	36	35	29	37	0	9	6	0	31
6	511	48	44	37	38	0	34	29	38	37	31	39	0	13	3	0	33
6	512	48	44	37	38	0	32	27	36	35	29	37	0	9	5	0	31
6	513	48	44	37	38	0	33	28	37	36	30	38	0	9	3	0	32
6	514	48	44	37	38	0	32	27	36	35	29	37	0	24	23	0	31
6	515	48	44	37	38	0	34	29	38	37	31	39	0	14	2	0	33
6	516	48	44	37	38	0	32	27	36	35	29	37	0	24	23	0	31
6	517	48	44	37	38	0	36	31	40	39	33	41	0	14	3	0	35
6	518	48	44	37	38	0	38	33	42	41	35	43	0	19	0	0	37
6	519	48	44	37	38	0	30	25	34	33	27	35	0	16	5	0	29
6	520	48	44	37	38	0	31	26	35	34	28	36	0	24	24	0	30
6	521	48	44	37	38	0	36	31	40	39	33	41	0	14	2	0	35
6	522	48	44	37	38	0	31	26	35	34	28	36	0	24	23	0	30
6	523	48	44	37	38	0	27	22	31	30	24	32	0	10	7	0	26
6	524	48	44	37	38	0	28	23	32	31	25	33	0	7	14	0	27
6	525	48	44	37	38	0	36	31	40	39	33	41	0	14	2	0	35
6	526	48	44	37	38	0	32	27	36	35	29	37	0	26	26	0	31
6	527	48	44	37	38	0	28	23	32	31	25	33	0	4	3	0	27
6	528	48	44	37	38	0	35	30	39	38	32	40	0	14	2	0	34
6	529	48	44	37	38	0	32	27	36	35	29	37	0	27	27	0	31
6	530	48	44	37	38	0	32	27	36	35	29	37	0	13	3	0	31
6	531	48	44	37	38	0	26	21	30	29	23	31	0	7	2	0	25
6	532	48	44	37	38	0	35	30	39	38	32	40	0	14	2	0	34
6	533	48	44	37	38	0	28	23	32	31	25	33	0	9	4	0	27
6	534	48	44	37	38	0	33	28	37	36	30	38	0	10	7	0	32
6	535	48	44	37	38	0	17	12	21	20	14	22	0	2	2	0	16
6	536	48	44	37	38	0	30	25	34	33	27	35	0	15	18	0	29
6	537	48	44	37	38	0	28	23	32	31	25	33	0	9	4	0	27
6	538	48	44	37	38	0	30	25	34	33	27	35	0	4	3	0	29
6	539	48	44	37	38	0	18	13	22	21	15	23	0	10	12	0	17
6	540	48	44	37	38	0	31	26	35	34	28	36	0	14	2	0	30
6	541	48	44	37	38	0	32	27	36	35	29	37	0	27	27	0	31
6	542	48	44	37	38	0	28	23	32	31	25	33	0	9	3	0	27
6	543	48	44	37	38	0	29	24	33	32	26	34	0	10	2	0	28
6	544	48	44	37	38	0	21	16	25	24	18	26	0	10	2	0	20
6	545	48	44	37	38	0	29	24	33	32	26	34	0	24	21	0	28
6	546	48	44	37	38	0	26	21	30	29	23	31	0	20	0	0	25

NCA	Receiver	Sleep dist goal		NML		Predicted maximum $L_{Aeq(15 \text{ minute})}$ during construction stage [dB(A)]											
		$L_{A1(1min)}$	Day	Evening	Night	DRL	DRC	SPS	ASP	CCP	CSC	KCB	BBR	BBF	BHR	BHF	RFI
6	547	48	44	37	38	0	37	32	41	40	34	42	0	25	0	0	36
6	553	48	44	37	38	0	40	35	44	43	37	45	0	30	0	0	39
6	555	48	44	37	38	0	31	26	35	34	28	36	0	19	0	0	30

### 7.2.3 Summary of predicted impacts

Receiver identifications are provided in Appendix D.

Table 7-3 and Table 7-4 show that exceedances of the project NMLs are likely during a number of work stages, with the highest levels predicted to occur during the creation of cuts. Other noisy work stages will include fill activities, broad scale clearing and asphalt paving.

NCA 1, NCA 3 and NCA 6 are likely to be the most severely affected. Table 7-5 shows the extent of exceedances predicted for each NCA. The high number of receivers in NCA 1 and 6 are reflected by the high number of low level exceedances.

**Table 7-5 Extent of project NML exceedances – Excavating for cut activities (highest noise levels)**

NCA	Number of receivers exceeding the day NML by		
	0-10 dB	10-20 dB	20 + dB
1	49	17	17
2	19	8	1
3	33	15	8
4	7	2	1
5	17	0	0
6	44	14	11

The lowest noise impacts are predicted to occur during the following activities:

- Installation of environmental controls
- Bored pile installations at the river crossings
- All bridge works at floodplains or overpasses

Generally, exceedances have been predicted for locations where a clear line of sight exists between the source and receiver location. In particular at locations within 400m of the alignment.

Geographically, primary areas of exceedence include:

- Pacific Highway at the southern extent of alignment
- Donnellyville, Albert Drive, Main Street and O'Dells Road
- Donnellyville, Bald Hill Road and Kerr Drive
- Macksville, Gumma Road
- Macksville, Bellevue Drive / Nursery Road
- Macksville, Old Cost Road / Letitia Close
- Macksville, Old Cost Road / Mattick Road

The 'Highly Impacted' level outlined in the NSW ICNG is 75dB(A) during daytime hours, in instances where construction noise levels exceed this, additional feasible and reasonable mitigation measures will be considered and determined following consultation with the

relevant stakeholders. Noise levels greater than 75dB(A) have been predicted to occur at 26 properties. These properties are presented below:

**Table 7-6 Highly impacted properties**

Reference	Location	Work stages [predicted noise level dB(A)]	
4	Pacific Hwy Warrell Creek	Discrete clearing [76] Broad clearing [79] Fill works [82] Cut works [85]	Verge and median works [77] Asphalt paving [77] Concrete paving [76] Barrier installation [78]
6	Pacific Hwy Warrell Creek	Cut works [84]	
63	O'Dells Road Donnellyville	Broad clearing [77] Cut works [87]	Crushing [83]
74	Albert Drive Donnellyville	Fill works [76]	
79	Albert Drive Donnellyville	Broad clearing [78] Fill works [79] Verge and median [76]	Asphalt paving [76] Barriers [77]
81	Albert Drive Donnellyville	Cut works [76]	
83	Albert Drive Donnellyville	Broad clearing [76]	Fill works [78]
85	Albert Drive Donnellyville	Broad clearing [77] Fill works [79]	Barriers [76]
92	Albert Drive Donnellyville	Discrete clearing [80] Broad clearing [83] Services [78] Cut works [94] Truck hauling [79] Scraper [79] Crushing [89]	Verge and median works [81] Drilling [81] Drainage [77] Asphalt paving [81] Concrete paving [80] Barrier installation [82] Road furniture [76]
96	Albert Drive Donnellyville	Discrete clearing [76] Broad clearing [79] Cut works [90] Crushing [86] Verge and median works [77]	Drilling [77] Asphalt paving [77] Concrete paving [76] Barrier installation [78]
97	Pacific Hwy Donnellyville	Cut works [76]	
99	Albert Drive Donnellyville	Broad clearing [77] Cut works [88]	Crushing [83] Barrier installation [76]
100	Albert Drive Donnellyville	Cut works [80]	
103	Albert Drive Donnellyville	Cut works [83]	Crushing [78]
106	Wesley Avenue Donnellyville	Cut works [76]	
186	Bald Hill Road Donnellyville	Cut works [76]	
197	Bald Hill Road Donnellyville	Discrete clearing [77] Broad clearing [80] Truck hauling [76] Scraping [76]	Verge and median works [78] Asphalt paving [78] Concrete paving [77] Barrier installation [79]
393	Old Coast Road Macksville	Discrete clearing [79] Broad clearing [82] Services [77] Fill works [83] Truck hauling [78] Scraping [78]	Verge and median works [80] Drainage [76] Asphalt paving [80] Concrete paving [79] Barrier installation [81] Bridge works [80]
404	Old Coast Road Macksville	Discrete clearing [78] Broad clearing [81] Services [76] Fill works [83]	Scraping [77] Verge and median works [79] Asphalt paving [79] Concrete paving [78]

Reference	Location	Work stages [predicted noise level dB(A)]	
		Cut works [90] Truck hauling [77]	Barrier installation [80]
410	Letitia Close Macksville	Broad clearing [77]	Barrier installation [80]
405	Old Coast Road Macksville	Cut works [78]	
408	Old Coast Road Macksville	Discrete clearing [77] Broad clearing [80] Fill works [82] Cut works [91] Truck hauling [76]	Scraping [76] Verge and median works [78] Asphalt paving [78] Concrete paving [77] Barrier installation [79]
409	Old Coast Road Macksville	Cut works [85]	
414	Mattick Road Macksville	Fill works [78]	
425	Mattick Road Macksville	Discrete clearing [77] Broad clearing [80] Fill works [83] Truck hauling [76] Scraping [76]	Verge and median works [78] Asphalt paving [78] Concrete paving [77] Barrier installation [79]
442	Mattick Road Macksville	Fill works [78]	

Mitigation measures to address all potential exceedences are presented in Section 8.

#### 7.2.4 Ancillary facilities and stockpile operation (including access)

The Project will require a main site compound, and a number ancillary facilities and stockpile sites. These compound and ancillary facilities will accommodate a range of activities, plant and equipment including, but not limited to:

- Office accommodation.
- Staff amenities.
- Light vehicle parking and access.
- A plant and equipment maintenance workshop.
- Material and chemical storage.
- Concrete batching plant.
- Equipment storage.
- Material storage.
- Concrete casting areas.

Not all sites will serve the same purpose and may include only one, or combinations of the activities listed above. Table 7-7 summarises the likely combination of activities, plant and equipment anticipated at facilities for the project. Appendix A4 of the CEMP and Appendix I of the SWMP provide a list and assessment of all ancillary facilities and stockpile sites on the Project, respectively.

**Table 7-7 Likely construction facilities and associated attributes**

Ancillary facility type	Approximate chainage	Activities	Typical plant and equipment required
Compound 1 (site compound / workshop)	45800 - 46100	Material storage and handling, plant workshop, site amenities and vehicle parking.	Forklift Franna crane Flatbed truck 5 x Ute

Ancillary facility type	Approximate chainage	Activities	Typical plant and equipment required
			2 x Hand tools (electric) 2 x Hand drills
Compound 1 (Batch plant)	45650 - 46200	Concrete batching and precast concrete formation activities, material storage and handling,	Concrete batch plant Water treatment plant 2 x Ute Dump truck 2 x Concrete truck / agitator Front end loader Water cart
Compound 2	48600 - 48700	Material storage and handling, site amenities and vehicle parking.	Forklift Franna crane Flatbed truck 5 x Ute
Compound 3	49350 - 49450		
Compound 4	52400 - 53000		
Compound 5 (concrete batch plant and precast facilities)	53200 - 54700	Concrete batching and precast concrete formation activities, material storage and handling, site amenities and vehicle parking, equipment storage.	Concrete batch plant Water treatment plant 8 x Ute Water cart Dump truck 2 x Concrete truck / agitator Front end loader Forklift Flatbed truck Franna crane
Stockpiling area 1	43400 - 43700	Material storage and handling.	FEL Dump truck
Stockpiling area 2	43900 - 44100		
Stockpiling area 3	44500 - 44750		
Stockpiling area 4	45250 - 45500		
Stockpiling area 5	46200 - 46400		
Stockpiling area 6	48700 - 49000		
Stockpiling area 7	49350 - 49600		
Stockpiling area 8	50900 - 51600		
Stockpiling area 9	56500 - 56700		



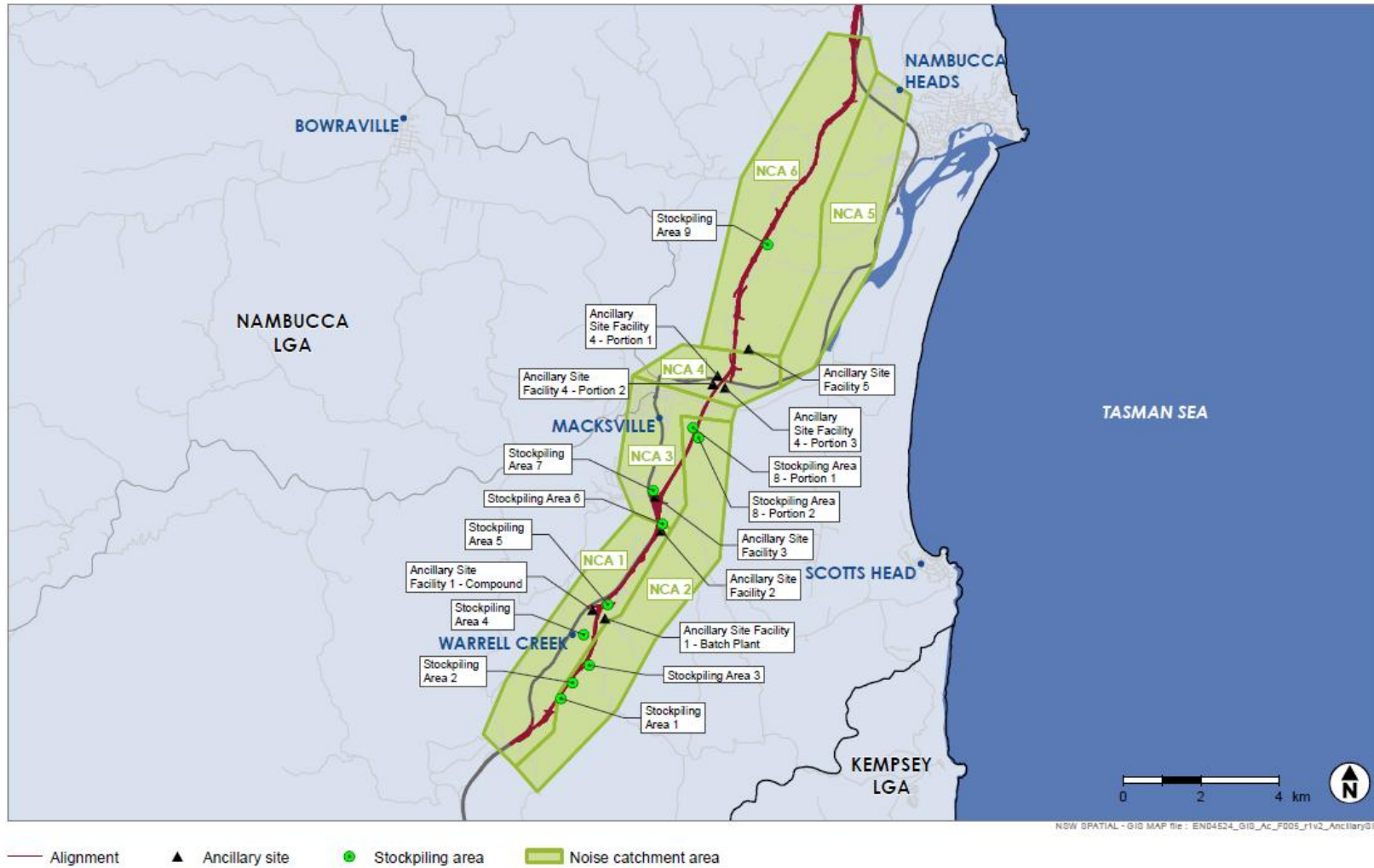
Table 7-8 provides predicted noise levels at various distances from each facility type. These predictions consider distance attenuation only and do not include attenuation by terrain, atmosphere or other features.

**Table 7-8 Predicted noise levels from facility type ( $L_{Aeq(15min)}$ )**

Facility type	Distance from facility				
	50 metres	100 metres	200 metres	300 metres	500 metres
Ancillary site facilities 1 and 5	71	65	59	55	51
Ancillary site facilities 2, 3 and 4	59	53	47	43	39
Storage areas 1 - 9	58	52	46	42	38

Table 7-9 provides the predicted noise levels at all of the affected residence from the proposed ancillary facilities. Table 7-9a provides details of the noise impacts on the most impacted residence. The results are based on a likely maximum  $L_{Aeq(15\text{ minute})}$  noise level. Cumulative impacts include noise from the facility in addition to the maximum predicted construction noise from staged work outlined in Section 7.2.3. The location of the Ancillary Site Facilities is shown in Figure 7.1 below.

Figure 7.1 Location of ancillary site facilities



**Table 7-9 Predicted noise levels from identified facilities (L<sub>Aeq</sub> 15min)**

NML				Predicted maximum L <sub>Aeq</sub> (15 minute) from compound [dB(A)]														
NCA	Receiver			SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9	
1	1	50	45	40	17	14	11	20	8	0	0	0	0	0	0	0	0	
1	2	50	45	40	1	9	6	15	3	0	0	0	0	0	0	0	0	
1	3	50	45	40	12	9	6	15	4	0	0	0	0	0	0	0	0	
1	4	50	45	40	15	6	0	1	0	0	0	0	0	0	0	0	0	
1	5	50	45	40	13	10	6	15	3	0	0	0	0	0	0	0	0	
1	6	50	45	40	18	13	9	17	6	1	0	0	0	0	0	0	0	
1	10	50	45	40	22	18	13	20	10	4	0	0	0	0	0	0	0	
1	11	50	45	40	21	15	11	18	8	2	0	0	0	0	0	0	0	
1	12	50	45	40	22	20	16	23	14	7	0	0	0	0	0	0	0	
1	13	50	45	40	25	19	14	21	10	4	0	0	0	0	0	0	0	
1	14	50	45	40	25	21	15	22	12	6	0	0	0	0	0	0	0	
1	16	50	45	40	26	19	14	20	10	4	0	0	0	0	0	0	0	
1	17	50	45	40	23	22	17	24	15	8	0	0	0	0	0	0	0	
1	18	50	45	40	5	10	0	18	7	1	0	0	0	0	0	0	0	
1	19	50	45	40	5	6	0	19	7	2	0	0	0	0	0	0	0	
1	20	50	45	40	17	19	19	31	23	15	3	2	0	0	0	0	0	
1	21	50	45	40	7	16	17	30	22	12	1	0	0	0	0	0	0	
1	22	50	45	40	22	23	20	26	18	10	0	0	0	0	0	0	0	
1	23	50	45	40	22	24	22	28	20	3	0	0	0	0	0	0	0	
1	24	50	45	40	21	24	22	28	21	11	0	0	0	0	0	0	0	
1	25	50	45	40	21	24	23	29	22	12	0	0	0	0	0	0	0	
1	26	50	45	40	20	23	23	29	23	12	0	0	0	0	0	0	0	
1	27	50	45	40	20	23	23	31	23	6	0	0	0	0	0	0	0	
1	28	50	45	40	12	19	21	38	30	21	7	6	0	4	0	0	0	
1	29	50	45	40	20	23	23	31	24	13	1	0	0	0	0	0	0	
1	30	50	45	40	19	23	23	31	24	8	0	0	0	0	0	0	0	
1	31	50	45	40	19	22	23	32	25	13	1	0	0	0	0	0	0	
1	32	50	45	40	19	22	23	32	25	7	0	0	0	0	0	0	0	
1	33	50	45	40	16	18	21	39	30	22	8	7	0	4	0	0	0	
1	34	50	45	40	19	22	23	32	18	0	0	0	0	0	0	0	0	
1	35	50	45	40	18	22	23	17	11	0	0	0	0	0	0	0	0	
1	36	50	45	40	4	21	23	18	14	0	0	0	0	0	0	0	0	
1	37	50	45	40	18	22	23	33	27	14	1	0	0	0	0	0	0	

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
1	38	50	45	40	15	17	20	41	29	22	9	7	0	5	0	0	0	0
1	39	50	45	40	18	21	23	33	27	14	2	0	0	0	0	0	0	0
1	40	50	45	40	15	17	20	42	29	23	9	7	0	5	0	0	0	0
1	41	50	45	40	14	18	20	34	31	16	3	1	0	0	0	0	0	0
1	42	50	45	40	12	15	17	42	30	22	8	6	0	1	0	0	0	0
1	43	50	45	40	14	16	20	34	18	17	3	2	0	0	0	0	0	0
1	44	50	45	40	14	17	11	28	13	3	0	0	0	0	0	0	0	0
1	45	50	45	40	27	35	26	30	20	11	0	0	0	0	0	0	0	0
1	46	50	45	40	14	17	20	34	30	18	3	2	0	0	0	0	0	0
1	47	50	45	40	14	17	20	35	33	18	4	2	0	0	0	0	0	0
1	48	50	45	40	16	19	23	37	36	17	0	0	0	0	0	0	0	0
1	49	50	45	40	15	18	23	35	35	5	0	0	0	0	0	0	0	0
1	50	50	45	40	15	18	23	37	42	18	3	2	0	0	0	0	0	0
1	51	50	45	40	0	5	22	38	44	13	0	0	0	0	0	0	0	0
1	52	50	45	40	0	6	22	38	46	19	4	2	0	0	0	0	0	0
1	53	50	45	40	14	17	22	39	45	19	4	3	0	0	0	0	0	0
1	54	50	45	40	14	17	21	39	45	20	4	3	0	0	0	0	0	0
1	55	50	45	40	19	24	30	34	30	15	2	1	0	0	0	0	0	0
1	56	50	45	40	13	16	19	41	45	22	5	4	0	0	0	0	0	0
1	57	50	45	40	12	15	19	43	40	24	6	4	0	0	0	0	0	0
1	58	50	45	40	0	0	7	46	31	23	5	4	0	1	0	0	0	0
1	59	50	45	40	0	8	27	44	34	20	4	3	0	0	0	0	0	0
1	61	50	45	40	10	12	16	53	27	32	8	6	0	2	0	0	0	0
1	62	50	45	40	4	6	8	42	14	22	0	0	0	0	0	0	0	0
1	63	50	45	40	9	12	16	54	26	37	8	7	0	3	0	0	0	0
1	65	50	45	40	3	5	13	46	14	26	17	16	5	12	5	0	0	0
1	74	50	45	40	8	11	15	48	21	52	0	0	0	0	0	0	0	0
1	75	50	45	40	8	11	16	47	22	40	0	0	0	0	0	0	0	0
1	78	50	45	40	9	12	16	52	22	35	0	0	0	0	0	0	0	0
1	79	50	45	40	7	10	14	44	6	46	0	0	0	4	0	0	0	0
1	81	50	45	40	0	0	0	56	2	51	15	14	3	9	2	0	0	0
1	83	50	45	40	0	0	14	43	12	43	0	0	0	0	0	0	0	0
1	85	50	45	40	0	0	0	44	13	41	0	0	0	5	0	0	0	0
1	87	50	45	40	6	9	13	51	14	42	11	10	0	5	0	0	0	0
1	89	50	45	40	7	10	15	32	9	37	0	0	0	0	0	0	0	0
1	90	50	45	40	8	11	15	51	20	39	0	0	0	6	0	0	0	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
1	91	50	45	40	10	12	12	52	21	40	0	0	0	0	0	0	0	0
1	92	50	45	40	0	0	0	50	7	31	17	16	5	11	4	0	0	0
1	93	50	45	40	6	8	12	40	17	34	0	0	0	0	0	0	0	0
1	94	50	45	40	6	8	12	42	16	31	0	0	0	0	0	0	0	0
1	96	50	45	40	0	0	0	49	0	30	18	16	6	11	4	0	0	0
1	97	50	45	40	0	0	4	27	0	18	15	14	1	9	1	0	0	0
1	99	50	45	40	0	0	0	47	0	13	20	20	6	11	8	0	0	0
1	100	50	45	40	0	0	0	46	4	23	18	16	6	11	4	0	0	0
1	102	50	45	40	0	0	0	38	1	23	13	13	4	9	2	0	0	0
1	103	50	45	40	0	0	0	42	0	8	6	15	5	10	3	0	0	0
1	104	50	45	40	0	0	0	27	7	17	13	12	1	7	0	0	0	0
1	106	50	45	40	0	0	0	45	0	27	4	15	6	11	4	0	0	0
1	107	50	45	40	0	4	8	39	0	18	7	12	2	7	0	0	0	0
1	108	50	45	40	0	0	0	25	14	11	5	11	1	6	0	0	0	0
1	109	50	45	40	0	0	0	32	4	13	0	0	0	0	0	0	0	0
1	110	50	45	40	0	0	0	44	0	20	4	8	6	11	4	0	0	0
1	112	50	45	40	0	1	3	30	7	15	20	11	0	0	0	0	0	0
1	114	50	45	40	0	0	0	35	3	18	0	0	0	7	0	0	0	0
1	115	50	45	40	0	0	8	38	3	14	0	0	0	7	0	0	0	0
1	151	50	45	40	0	1	3	26	6	13	26	24	11	16	6	0	0	0
1	163	50	45	40	0	1	4	29	8	15	19	14	0	0	0	0	0	0
2	7	46	40	36	11	7	4	13	1	0	0	0	0	0	0	0	0	0
2	8	46	40	36	11	8	5	13	1	0	0	0	0	0	0	0	0	0
2	9	46	40	36	14	11	8	16	4	0	0	0	0	0	0	0	0	0
2	15	46	40	36	16	13	10	18	6	2	0	0	0	0	0	0	0	0
2	60	46	40	36	22	29	35	30	19	12	0	0	0	0	0	0	0	0
2	64	46	40	36	10	15	21	55	33	21	0	3	0	0	0	0	0	0
2	66	46	40	36	23	27	32	34	21	15	0	0	0	0	0	0	0	0
2	67	46	40	36	23	27	34	35	22	12	0	0	0	0	0	0	0	0
2	68	46	40	36	15	19	30	42	26	18	0	0	0	0	0	0	0	0
2	69	46	40	36	18	22	27	31	18	12	0	0	0	0	0	0	0	0
2	70	46	40	36	8	21	20	24	14	7	0	0	0	0	0	0	0	0
2	71	46	40	36	16	21	30	35	21	15	0	0	0	0	0	0	0	0
2	72	46	40	36	14	24	23	28	16	8	0	0	0	0	0	0	0	0
2	73	46	40	36	16	20	28	36	22	15	3	1	0	0	0	0	0	0
2	76	46	40	36	14	17	23	57	29	32	0	0	0	0	0	0	0	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
2	77	46	40	36	14	17	22	59	28	34	0	0	0	0	0	0	0	0
2	80	46	40	36	13	16	21	53	27	30	0	0	0	0	0	0	0	0
2	82	46	40	36	16	18	19	26	12	8	0	0	0	0	0	0	0	0
2	84	46	40	36	14	17	23	55	32	17	0	0	0	0	0	0	0	0
2	86	46	40	36	9	12	17	48	22	32	0	0	0	0	0	0	0	0
2	88	46	40	36	9	12	17	47	22	28	8	7	0	3	0	0	0	0
2	95	46	40	36	10	13	19	44	22	23	0	0	0	2	0	0	0	0
2	98	46	40	36	9	12	17	42	21	24	0	0	0	0	0	0	0	0
2	101	46	40	36	0	0	0	37	9	26	9	8	0	3	0	0	0	0
2	105	46	40	36	0	0	8	35	8	24	8	7	0	3	0	0	0	0
2	111	46	40	36	9	12	17	33	6	21	0	0	0	0	0	0	0	0
2	157	46	40	36	7	10	14	31	8	20	0	0	0	0	0	0	0	0
2	342	46	40	36	0	0	0	19	0	0	25	25	12	20	0	0	0	0
2	349	46	40	36	0	0	0	15	0	2	17	18	22	21	21	9	0	0
2	353	46	40	36	0	0	0	0	0	0	0	0	7	15	26	12	19	0
2	356	46	40	36	0	0	0	19	0	3	23	24	24	24	13	1	6	0
3	113	50	41	39	0	0	0	8	0	0	4	14	21	21	14	6	13	0
3	116	50	41	39	0	0	0	16	0	2	8	18	17	14	18	11	17	0
3	117	50	41	39	0	0	0	20	1	6	9	19	26	27	12	4	11	0
3	118	50	41	39	0	0	0	9	0	0	5	15	20	17	9	3	10	0
3	119	50	41	39	0	0	0	8	0	0	0	1	4	6	12	7	13	0
3	120	50	41	39	0	0	0	11	0	2	0	1	5	8	12	4	11	0
3	121	50	41	39	0	0	0	0	0	0	0	2	6	9	13	6	13	0
3	122	50	41	39	0	0	0	1	0	0	0	4	8	16	12	5	12	0
3	123	50	41	39	0	0	0	20	1	6	9	19	26	27	12	4	10	0
3	124	50	41	39	0	0	0	11	0	1	0	0	19	18	13	7	14	0
3	125	50	41	39	0	0	0	5	0	0	0	3	19	18	13	0	0	0
3	126	50	41	39	0	0	0	0	0	0	0	12	18	19	0	0	5	0
3	127	50	41	39	0	0	0	0	0	0	0	12	19	19	0	0	0	0
3	128	50	41	39	0	0	0	2	0	0	0	10	16	17	0	0	0	0
3	129	50	41	39	0	0	0	0	0	0	0	11	16	17	0	0	0	0
3	130	50	41	39	0	0	0	10	0	1	0	12	19	18	12	0	0	0
3	131	50	41	39	0	0	0	21	2	6	13	23	21	30	14	6	13	0
3	132	50	41	39	0	0	0	19	0	5	9	19	27	29	12	4	11	0
3	133	50	41	39	0	0	0	0	0	0	0	0	3	4	15	8	14	0
3	134	50	41	39	0	0	0	15	0	1	6	17	23	24	19	12	18	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
3	135	50	41	39	0	0	0	5	0	0	6	17	23	25	19	12	18	0
3	136	50	41	39	0	0	0	8	0	0	2	13	19	20	15	8	14	0
3	137	50	41	39	0	0	0	5	0	0	6	13	19	21	19	12	19	0
3	138	50	41	39	0	0	0	18	0	0	6	14	15	15	0	0	0	0
3	139	50	41	39	0	0	0	18	0	4	7	18	23	25	0	0	0	0
3	140	50	41	39	0	0	0	19	0	5	8	19	28	30	12	5	11	0
3	141	50	41	39	0	0	0	10	0	0	0	6	11	12	0	0	0	0
3	142	50	41	39	0	0	0	6	0	0	0	7	11	12	0	0	0	0
3	143	50	41	39	0	0	0	0	0	0	0	17	26	28	1	0	0	0
3	144	50	41	39	0	0	0	7	0	0	0	6	10	11	0	0	0	0
3	145	50	41	39	0	0	0	19	0	5	8	19	28	31	13	5	12	0
3	146	50	41	39	0	0	0	19	0	5	8	19	28	31	13	5	12	0
3	147	50	41	39	0	0	0	11	0	0	1	11	17	18	4	0	0	0
3	148	50	41	39	0	0	0	3	0	0	7	16	23	25	8	0	4	0
3	149	50	41	39	0	0	0	19	0	5	8	19	28	31	13	5	12	0
3	150	50	41	39	0	0	0	13	0	0	8	19	28	31	14	5	12	0
3	152	50	41	39	0	0	0	0	0	0	0	0	5	7	20	17	23	0
3	153	50	41	39	0	0	0	0	0	0	0	12	22	22	20	12	16	0
3	154	50	41	39	0	0	0	8	0	0	1	12	19	20	15	0	0	0
3	155	50	41	39	0	0	0	16	0	6	11	22	16	28	12	4	11	0
3	156	50	41	39	0	0	0	17	0	3	10	20	28	32	19	11	17	0
3	158	50	41	39	0	0	0	0	0	0	0	3	18	17	20	13	19	0
3	159	50	41	39	0	0	0	4	0	0	1	10	17	18	0	0	0	0
3	160	50	41	39	0	0	0	17	0	4	11	22	31	35	19	10	17	0
3	161	50	41	39	0	0	0	0	0	0	0	11	16	19	21	12	8	0
3	162	50	41	39	0	0	0	3	0	0	3	14	20	21	19	0	0	0
3	164	50	41	39	0	0	0	15	0	0	3	15	20	16	19	9	15	0
3	165	50	41	39	0	0	0	0	0	0	3	15	20	20	21	12	18	0
3	166	50	41	39	0	0	0	0	0	0	0	12	18	17	17	11	18	0
3	167	50	41	39	0	0	0	18	0	4	4	16	22	22	21	0	0	0
3	168	50	41	39	0	0	0	18	0	4	4	16	22	22	21	10	15	0
3	169	50	41	39	0	0	0	18	0	4	4	16	22	22	21	13	7	0
3	170	50	41	39	0	0	0	18	0	4	4	16	22	22	22	9	8	0
3	171	50	41	39	0	0	0	0	0	0	0	0	0	0	19	18	24	0
3	172	50	41	39	0	0	0	0	0	0	5	22	38	41	16	7	14	0
3	173	50	41	39	0	0	0	18	0	3	3	16	22	22	22	9	4	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
3	174	50	41	39	0	0	0	0	0	0	0	0	0	0	21	17	22	0
3	175	50	41	39	0	0	2	24	5	10	17	29	41	41	12	0	0	0
3	176	50	41	39	0	0	0	18	0	3	3	15	21	22	22	14	20	0
3	177	50	41	39	0	0	0	0	0	0	0	11	17	16	23	4	9	0
3	178	50	41	39	0	0	0	3	0	0	1	14	20	20	20	0	0	0
3	179	50	41	39	0	0	0	13	0	0	0	11	17	18	18	11	16	0
3	180	50	41	39	0	0	0	5	0	0	18	34	29	30	12	3	11	0
3	181	50	41	39	0	0	0	17	0	3	8	21	33	40	19	9	13	0
3	182	50	41	39	0	0	0	17	0	3	9	23	33	40	21	11	18	0
3	183	50	41	39	0	0	0	0	0	0	0	8	13	13	24	18	23	0
3	184	50	41	39	0	0	0	11	0	2	4	17	26	29	10	8	15	0
3	185	50	41	39	0	0	0	1	0	0	0	11	15	14	15	8	15	0
3	186	50	41	39	0	0	0	0	0	0	9	24	27	31	16	6	13	0
3	187	50	41	39	0	0	0	0	0	0	0	6	12	12	20	9	15	0
3	188	50	41	39	0	0	0	19	0	5	7	20	30	34	16	2	0	0
3	189	50	41	39	0	0	0	0	0	0	0	0	7	7	21	9	15	0
3	190	50	41	39	0	0	0	20	2	6	11	25	32	36	20	0	0	0
3	191	50	41	39	0	0	0	15	0	0	8	22	25	29	25	2	9	0
3	192	50	41	39	0	0	0	11	0	0	16	54	19	17	0	0	0	0
3	193	50	41	39	0	0	2	24	5	11	14	42	28	25	0	0	0	0
3	194	50	41	39	0	0	0	22	3	8	45	60	17	19	4	0	5	0
3	195	50	41	39	0	0	0	15	0	2	3	17	25	28	22	3	0	0
3	196	50	41	39	0	0	0	15	0	4	36	58	18	23	0	0	0	0
3	197	50	41	39	0	0	2	24	5	10	21	36	38	38	0	0	0	0
3	198	50	41	39	0	0	0	7	0	0	27	59	18	23	0	0	0	0
3	199	50	41	39	0	0	1	23	4	9	18	38	30	30	0	0	0	0
3	200	50	41	39	0	0	3	25	5	11	19	43	12	18	0	0	0	0
3	201	50	41	39	0	0	0	3	0	0	22	59	18	23	0	0	0	0
3	202	50	41	39	0	0	0	22	3	7	17	28	35	34	10	2	0	0
3	203	50	41	39	0	0	0	12	0	0	0	10	15	16	25	0	0	0
3	204	50	41	39	0	0	0	0	0	0	0	11	16	16	25	13	19	0
3	205	50	41	39	0	0	0	1	0	0	0	10	16	15	26	14	19	0
3	206	50	41	39	0	0	1	23	4	9	29	40	27	21	0	0	0	0
3	207	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	20	0
3	208	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	19	0
3	209	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	20	0



NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
3	210	50	41	39	0	0	0	0	0	0	0	0	0	0	26	14	19	0
3	211	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	19	0
3	212	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	20	0
3	213	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	20	0
3	214	50	41	39	0	0	0	12	0	0	0	10	15	15	26	14	19	0
3	215	50	41	39	0	0	0	0	0	0	0	0	0	0	26	14	19	0
3	216	50	41	39	0	0	0	0	0	0	0	0	0	0	26	15	20	0
3	217	50	41	39	0	0	0	0	0	0	0	0	0	0	25	16	20	0
3	218	50	41	39	0	0	0	0	0	0	0	0	2	1	25	15	20	0
3	219	50	41	39	0	0	0	0	0	0	0	9	0	0	26	15	20	0
3	220	50	41	39	0	0	0	0	0	0	0	5	0	0	26	14	9	0
3	221	50	41	39	0	0	0	0	0	0	0	3	1	0	26	14	12	0
3	222	50	41	39	0	0	0	0	0	0	0	0	0	0	25	16	20	0
3	223	50	41	39	0	0	0	0	0	0	0	8	4	4	26	15	20	0
3	224	50	41	39	0	0	0	0	0	0	0	0	0	0	25	16	20	0
3	225	50	41	39	0	0	0	20	1	6	17	33	31	30	14	4	0	0
3	226	50	41	39	0	0	0	0	0	0	0	0	0	0	25	16	21	0
3	227	50	41	39	0	0	0	0	0	0	0	8	3	2	26	16	20	0
3	228	50	41	39	0	0	0	0	0	0	0	0	0	0	8	3	2	0
3	229	50	41	39	0	0	0	0	0	0	0	8	13	12	26	16	21	0
3	230	50	41	39	0	0	0	0	0	0	0	0	0	0	26	16	21	0
3	231	50	41	39	0	0	0	17	0	5	11	29	24	22	7	0	0	0
3	232	50	41	39	0	0	0	0	0	0	0	8	0	0	26	15	12	0
3	233	50	41	39	0	0	0	0	0	0	0	9	14	14	26	16	20	0
3	234	50	41	39	0	0	0	0	0	0	0	8	10	12	26	16	21	0
3	235	50	41	39	0	0	0	20	1	6	30	38	13	12	2	0	0	0
3	236	50	41	39	0	0	0	20	1	6	22	34	15	23	14	4	12	0
3	237	50	41	39	0	0	0	0	0	0	0	7	12	12	27	17	21	0
3	238	50	41	39	0	0	0	0	0	0	0	0	0	0	26	17	21	0
3	239	50	41	39	0	0	0	0	0	0	0	7	0	0	26	17	21	0
3	240	50	41	39	0	0	0	0	0	0	0	7	0	0	26	18	21	0
3	241	50	41	39	0	0	0	0	0	0	0	0	0	0	26	18	22	0
3	242	50	41	39	0	0	0	0	0	0	0	5	9	9	21	20	23	0
3	243	50	41	39	0	0	0	0	0	0	0	7	12	11	29	20	24	0
3	244	50	41	39	0	0	0	0	0	0	0	0	0	0	26	18	22	0
3	245	50	41	39	0	0	0	20	1	6	29	36	11	7	0	0	0	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
3	246	50	41	39	0	0	0	0	0	0	0	0	0	0	26	18	22	0
3	247	50	41	39	0	0	0	0	0	0	0	7	0	0	26	18	22	0
3	248	50	41	39	0	0	0	0	0	0	0	0	0	0	26	18	22	0
3	249	50	41	39	0	0	0	0	0	0	0	4	0	0	26	18	22	0
3	250	50	41	39	0	0	0	0	0	0	0	5	9	9	16	20	22	0
3	251	50	41	39	0	0	0	0	0	0	0	6	0	0	25	19	22	0
3	252	50	41	39	0	0	0	0	0	0	0	6	0	0	25	19	22	0
3	253	50	41	39	0	0	0	0	0	0	0	6	2	2	25	19	22	0
3	254	50	41	39	0	0	0	0	0	0	0	5	9	9	22	20	17	0
3	255	50	41	39	0	0	0	0	0	0	0	6	10	10	28	21	25	0
3	256	50	41	39	0	0	0	0	0	0	0	0	0	0	25	19	23	0
3	257	50	41	39	0	0	0	0	0	0	0	4	9	9	22	20	13	0
3	258	50	41	39	0	0	0	0	0	0	0	6	10	10	25	19	22	0
3	259	50	41	39	0	0	0	0	0	0	0	0	0	0	25	19	23	0
3	260	50	41	39	0	0	0	0	0	0	0	6	0	0	24	19	23	0
3	261	50	41	39	0	0	0	8	0	0	19	26	9	7	0	0	0	0
3	262	50	41	39	0	0	0	0	0	0	0	6	4	3	24	20	23	0
3	263	50	41	39	0	0	0	0	0	0	0	5	0	9	24	20	23	0
3	264	50	41	39	0	0	0	0	0	0	0	0	0	0	24	20	23	0
3	265	50	41	39	0	0	0	0	0	0	0	0	0	0	24	20	23	0
3	266	50	41	39	0	0	0	19	0	5	25	29	27	25	9	0	0	0
3	267	50	41	39	0	0	0	0	0	0	0	0	0	0	23	20	23	0
3	268	50	41	39	0	0	0	10	0	0	0	8	12	12	28	17	21	0
3	269	50	41	39	0	0	0	0	0	0	0	5	9	9	24	20	23	0
3	270	50	41	39	0	0	0	0	0	0	0	7	9	8	25	23	26	0
3	271	50	41	39	0	0	0	0	0	0	0	0	0	0	22	21	24	0
3	272	50	41	39	0	0	0	0	0	0	0	0	0	0	22	21	24	0
3	273	50	41	39	0	0	0	0	0	0	0	4	9	9	25	23	26	0
3	274	50	41	39	0	0	0	0	0	0	0	4	0	0	24	23	26	0
3	275	50	41	39	0	0	0	0	0	0	0	0	0	0	21	10	23	0
3	276	50	41	39	0	0	0	0	0	0	0	4	0	0	26	19	19	0
3	277	50	41	39	0	0	0	0	0	0	0	8	2	1	29	13	15	0
3	278	50	41	39	0	0	2	23	4	9	29	33	27	21	0	0	0	0
3	279	50	41	39	0	0	0	0	0	0	0	8	12	12	29	3	4	0
3	280	50	41	39	0	0	0	19	0	5	24	28	26	25	13	0	0	0
3	281	50	41	39	0	0	0	0	0	0	0	4	8	8	21	2	4	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
3	282	50	41	39	0	0	1	19	0	5	27	29	19	17	0	0	0	0
3	283	50	41	39	0	0	0	0	0	0	0	4	8	8	22	7	4	0
3	284	50	41	39	0	0	0	6	0	0	13	18	11	13	2	0	0	0
3	285	50	41	39	0	0	0	0	0	0	0	4	8	8	22	4	4	0
3	286	50	41	39	0	0	0	9	0	0	15	27	14	13	0	0	0	0
3	287	50	41	39	0	0	0	0	0	0	0	4	8	8	22	3	5	0
3	288	50	41	39	0	0	0	0	0	0	0	4	8	8	22	4	5	0
3	289	50	41	39	0	0	0	18	0	4	22	25	27	27	0	0	0	0
3	292	50	41	39	0	0	0	0	0	0	0	4	8	8	22	13	5	0
3	294	50	41	39	0	0	0	10	0	0	14	16	27	26	14	0	0	0
3	295	50	41	39	0	0	0	0	0	0	0	4	8	8	21	3	5	0
3	298	50	41	39	0	0	0	0	0	0	0	4	8	8	20	5	5	0
3	301	50	41	39	0	0	0	0	0	0	0	7	11	11	23	7	5	0
3	302	50	41	39	0	0	1	22	4	9	27	30	15	14	0	0	0	0
3	306	50	41	39	0	0	0	0	0	0	0	4	8	8	23	5	5	0
3	308	50	41	39	0	0	0	0	0	0	0	0	0	0	25	19	16	0
3	309	50	41	39	0	0	0	0	0	0	0	5	9	9	25	23	18	0
3	311	50	41	39	0	0	0	0	0	0	0	0	2	1	24	10	5	0
3	318	50	41	39	0	0	0	0	0	0	0	0	0	0	23	24	25	0
3	320	50	41	39	0	0	0	0	0	0	0	4	8	8	24	4	5	0
3	323	50	41	39	0	0	0	18	0	4	22	24	23	23	12	3	10	0
3	328	50	41	39	0	0	0	0	0	0	0	0	0	0	24	25	26	0
3	339	50	41	39	0	0	0	0	0	0	0	4	8	8	25	6	6	0
3	343	50	41	39	0	0	0	0	0	0	0	4	8	8	25	12	6	0
3	347	50	41	39	0	0	0	0	0	0	1	4	8	8	24	12	6	0
3	348	50	41	39	0	0	0	0	0	0	2	5	9	9	26	10	6	0
3	350	50	41	39	0	0	0	0	0	0	3	4	0	0	26	6	6	0
3	352	50	41	39	0	0	0	0	0	0	4	4	8	8	26	7	6	0
3	354	50	41	39	0	0	0	0	0	0	4	4	8	8	26	10	6	0
3	357	50	41	39	0	0	0	0	0	0	4	4	8	8	26	10	6	0
3	360	50	41	39	0	0	0	0	0	0	4	4	8	8	26	9	6	0
3	362	50	41	39	0	0	0	0	0	0	4	4	8	8	26	10	6	0
3	364	50	41	39	0	0	0	0	0	0	4	4	8	8	26	12	6	0
3	366	50	41	39	0	0	0	0	0	0	4	4	8	8	26	11	6	0
3	368	50	41	39	0	0	0	0	0	0	4	4	8	8	26	9	6	0
3	370	50	41	39	0	0	0	0	0	0	4	4	8	8	26	11	6	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
3	372	50	41	39	0	0	0	0	0	0	4	4	8	8	26	10	7	0
3	374	50	41	39	0	0	0	0	0	0	4	4	8	8	26	9	7	0
3	376	50	41	39	0	0	0	0	0	0	4	4	8	8	26	9	7	0
3	378	50	41	39	0	0	0	0	0	0	4	4	8	8	27	11	7	0
3	379	50	41	39	0	0	0	0	0	0	4	4	8	8	27	11	7	0
3	381	50	41	39	0	0	0	0	0	0	4	4	8	8	27	11	7	0
3	382	50	41	39	0	0	0	0	0	0	4	4	8	8	27	9	7	0
3	383	50	41	39	0	0	0	0	0	0	4	4	8	8	27	12	7	0
3	386	50	41	39	0	0	0	0	0	0	4	4	8	7	26	29	8	0
3	387	50	41	39	0	0	0	0	0	0	4	4	7	7	26	29	8	0
3	389	50	41	39	0	0	0	0	0	0	4	4	7	7	26	30	28	0
3	390	50	41	39	0	0	0	0	0	0	4	4	7	7	25	31	28	0
3	391	50	41	39	0	0	0	0	0	0	4	4	7	7	24	31	28	0
3	394	50	41	39	0	0	0	0	0	0	0	0	0	7	31	28	0	
3	395	50	41	39	0	0	0	0	0	0	3	4	7	7	23	31	28	0
3	399	50	41	39	0	0	0	0	0	0	0	0	0	4	31	28	0	
3	401	50	41	39	0	0	0	0	0	0	0	0	0	6	31	28	0	
4	290	59	48	46	0	0	0	0	0	0	0	7	11	11	23	3	6	0
4	291	59	48	46	0	0	0	0	0	0	0	2	6	6	11	14	6	0
4	293	59	48	46	0	0	0	0	0	0	0	7	11	11	23	8	6	0
4	296	59	48	46	0	0	0	0	0	0	0	7	11	11	23	10	6	0
4	297	59	48	46	0	0	0	0	0	0	0	2	0	0	18	9	6	0
4	299	59	48	46	0	0	0	0	0	0	0	0	0	0	19	9	9	0
4	300	59	48	46	0	0	0	0	0	0	0	7	11	11	23	4	6	0
4	303	59	48	46	0	0	0	0	0	0	0	6	9	9	22	28	14	0
4	304	59	48	46	0	0	0	0	0	0	0	7	11	11	24	9	10	0
4	305	59	48	46	0	0	0	0	0	0	0	0	0	0	19	14	9	0
4	307	59	48	46	0	0	0	0	0	0	0	6	10	10	22	28	12	0
4	310	59	48	46	0	0	0	0	0	0	0	0	0	0	16	29	31	0
4	312	59	48	46	0	0	0	0	0	0	0	5	9	9	22	10	6	0
4	313	59	48	46	0	0	0	0	0	0	0	0	0	0	19	27	29	0
4	314	59	48	46	0	0	0	0	0	0	0	0	0	0	17	17	27	0
4	315	59	48	46	0	0	0	0	0	0	0	6	10	10	22	29	15	0
4	316	59	48	46	0	0	0	0	0	0	0	1	5	5	17	25	17	0
4	317	59	48	46	0	0	0	0	0	0	0	6	10	10	22	29	24	0
4	319	59	48	46	0	0	0	0	0	0	0	7	11	11	24	11	6	0

NCA	Receiver	NML	Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]															
			SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9		
4	321	59	48	46	0	0	0	0	0	0	0	0	0	0	0	25	25	0
4	322	59	48	46	0	0	0	0	0	0	0	0	0	0	17	25	7	0
4	324	59	48	46	0	0	0	0	0	0	0	0	0	0	0	12	28	1
4	325	59	48	46	0	0	0	0	0	0	0	0	0	0	17	25	21	0
4	326	59	48	46	0	0	0	0	0	0	0	0	0	0	0	8	8	0
4	327	59	48	46	0	0	0	0	0	0	0	3	7	6	20	15	9	0
4	329	59	48	46	0	0	0	0	0	0	0	0	0	0	0	7	9	1
4	330	59	48	46	0	0	0	0	0	0	0	1	0	0	17	26	28	1
4	331	59	48	46	0	0	0	0	0	0	0	0	0	0	15	29	31	3
4	332	59	48	46	0	0	0	0	0	0	0	0	0	0	13	26	28	1
4	333	59	48	46	0	0	0	0	0	0	0	3	7	6	20	10	7	0
4	334	59	48	46	0	0	0	0	0	0	0	0	0	0	13	26	28	1
4	335	59	48	46	0	0	0	0	0	0	0	0	0	0	13	26	28	0
4	336	59	48	46	0	0	0	0	0	0	0	0	0	0	7	25	32	0
4	337	59	48	46	0	0	0	0	0	0	0	0	0	0	0	23	28	4
4	338	59	48	46	0	0	0	0	0	0	0	3	7	7	20	8	7	0
4	340	59	48	46	0	0	0	0	0	0	0	0	0	0	12	26	29	0
4	341	59	48	46	0	0	0	0	0	0	0	0	0	0	18	30	33	5
4	344	59	48	46	0	0	0	0	0	0	0	0	0	0	15	29	31	4
4	345	59	48	46	0	0	0	0	0	0	0	3	7	7	20	7	7	0
4	346	59	48	46	0	0	0	0	0	0	0	3	7	7	21	15	7	0
4	351	59	48	46	0	0	0	0	0	0	0	1	5	5	17	32	33	5
4	355	59	48	46	0	0	0	0	0	0	0	3	7	7	21	12	7	0
4	358	59	48	46	0	0	0	0	0	0	0	3	7	6	21	12	8	0
4	359	59	48	46	0	0	0	0	0	0	1	3	7	7	21	15	8	0
4	361	59	48	46	0	0	0	0	0	0	2	3	7	7	21	16	8	0
4	363	59	48	46	0	0	0	0	0	0	2	3	7	7	21	25	8	0
4	365	59	48	46	0	0	0	0	0	0	2	3	7	7	21	30	8	0
4	367	59	48	46	0	0	0	0	0	0	2	3	7	6	21	30	8	0
4	369	59	48	46	0	0	0	0	0	0	2	3	7	6	21	31	8	0
4	371	59	48	46	0	0	0	0	0	0	2	3	6	6	21	31	8	0
4	373	59	48	46	0	0	0	0	0	0	2	3	6	6	21	34	9	0
4	375	59	48	46	0	0	0	0	0	0	2	3	6	6	21	34	9	0
4	377	59	48	46	0	0	0	0	0	0	2	3	6	6	21	35	9	0
4	380	59	48	46	0	0	0	0	0	0	0	0	0	0	20	36	29	0
4	384	59	48	46	0	0	0	0	0	0	2	2	6	6	20	41	30	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
4	385	59	48	46	0	0	0	0	0	0	0	0	0	0	13	49	30	0
4	388	59	48	46	0	0	0	0	0	0	2	2	5	5	20	30	12	0
4	393	59	48	46	0	0	0	0	0	0	0	0	0	0	16	42	37	2
4	396	59	48	46	0	0	0	0	0	0	0	0	0	0	0	14	42	0
4	397	59	48	46	0	0	0	0	0	0	0	0	2	1	13	35	42	0
4	400	59	48	46	0	0	0	0	0	0	0	0	1	1	11	30	41	0
4	404	59	48	46	0	0	0	0	0	0	0	0	0	0	0	22	56	9
4	406	59	48	46	0	0	0	0	0	0	0	0	3	3	14	35	36	0
4	407	59	48	46	0	0	0	0	0	0	4	4	7	6	19	41	23	0
4	410	59	48	46	0	0	0	0	0	0	0	0	0	0	4	27	38	0
4	412	59	48	46	0	0	0	0	0	0	0	0	3	2	15	35	38	2
4	413	59	48	46	0	0	0	0	0	0	0	0	2	2	14	30	33	0
4	415	59	48	46	0	0	0	0	0	0	1	1	4	4	17	33	29	1
4	416	59	48	46	0	0	0	0	0	0	1	1	4	4	17	33	29	1
4	417	59	48	46	0	0	0	0	0	0	1	1	4	4	17	33	30	1
4	418	59	48	46	0	0	0	0	0	0	0	0	0	3	16	32	25	1
4	419	59	48	46	0	0	0	0	0	0	0	0	3	3	16	32	24	1
4	420	59	48	46	0	0	0	0	0	0	0	0	0	0	0	32	22	0
4	421	59	48	46	0	0	0	0	0	0	0	0	3	3	16	32	23	1
4	422	59	48	46	0	0	0	0	0	0	0	0	3	3	16	32	22	1
4	423	59	48	46	0	0	0	0	0	0	0	0	0	0	16	32	12	0
4	424	59	48	46	0	0	0	0	0	0	0	0	3	3	16	32	22	1
4	427	59	48	46	0	0	0	0	0	0	0	0	0	0	10	31	12	0
4	428	59	48	46	0	0	0	0	0	0	0	0	0	0	4	31	25	1
4	430	59	48	46	0	0	0	0	0	0	0	0	0	0	1	31	12	0
4	431	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	25	0
4	432	59	48	46	0	0	0	0	0	0	0	0	0	0	9	31	23	0
4	433	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	22	1
4	434	59	48	46	0	0	0	0	0	0	0	0	0	0	8	31	13	0
4	435	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	22	1
4	436	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	17	0
4	437	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	22	1
4	438	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	18	0
4	439	59	48	46	0	0	0	0	0	0	0	0	4	3	14	31	52	0
4	440	59	48	46	0	0	0	0	0	0	0	0	0	0	0	31	23	1
4	441	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	30	0

NCA	Receiver	NML		Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]														
				SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9	
4	443	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	15	0
4	445	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	24	1
4	446	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	16	0
4	447	59	48	46	0	0	0	0	0	0	0	0	0	0	7	27	43	4
4	448	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	29	1
4	449	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	17	0
4	450	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	24	0
4	451	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	26	1
4	452	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	15	0
4	453	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	30	1
4	454	59	48	46	0	0	0	0	0	0	0	0	0	0	0	30	26	1
4	455	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	22	0
4	456	59	48	46	0	0	0	0	0	0	0	0	0	0	1	29	23	0
4	458	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	27	1
4	459	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	21	0
4	461	59	48	46	0	0	0	0	0	0	0	0	0	0	0	15	11	0
4	462	59	48	46	0	0	0	0	0	0	0	0	1	0	12	22	34	0
4	463	59	48	46	0	0	0	0	0	0	0	0	0	0	0	15	21	0
4	464	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	29	1
4	465	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	19	0
4	467	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	17	0
4	468	59	48	46	0	0	0	0	0	0	0	0	1	1	12	25	44	4
4	469	59	48	46	0	0	0	0	0	0	0	0	0	0	0	29	28	1
4	470	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	14	0
4	471	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	19	0
4	472	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	14	0
4	473	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	30	1
4	474	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	15	0
4	475	59	48	46	0	0	0	0	0	0	0	0	0	0	0	17	11	0
4	476	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	31	1
4	477	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	16	0
4	478	59	48	46	0	0	0	0	0	0	0	0	0	0	0	16	16	0
4	479	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	14	0
4	480	59	48	46	0	0	0	0	0	0	0	0	0	0	0	27	14	0
4	481	59	48	46	0	0	0	0	0	0	0	0	0	0	0	19	12	0
4	482	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	15	0

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
4	483	59	48	46	0	0	0	0	0	0	0	0	0	0	0	28	32	1
4	485	59	48	46	0	0	0	0	0	0	0	0	3	3	13	27	48	7
4	486	59	48	46	0	0	0	0	0	0	0	0	0	0	0	23	54	5
4	500	59	48	46	0	0	0	0	0	0	0	0	0	0	11	20	37	3
5	548	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	549	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	550	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	551	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	552	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	554	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	556	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	557	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	558	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	559	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	560	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	561	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	562	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	563	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	564	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	565	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	566	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	567	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	568	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	569	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	570	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	571	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	572	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	573	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	574	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	575	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	576	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	577	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	578	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	579	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	580	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	581	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0



NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
5	582	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	583	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	584	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	586	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	587	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	588	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	589	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	590	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	591	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	592	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	593	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	595	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	596	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	597	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	598	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	599	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	600	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	601	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	602	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5	603	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	604	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	605	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	606	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	608	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	609	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	610	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	611	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	614	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	615	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	617	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	618	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	621	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	622	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	623	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	624	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	625	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
5	628	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	630	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	631	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	632	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	633	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	634	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	635	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	636	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	637	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	638	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	639	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	641	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	642	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	643	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5	645	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	646	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	648	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	650	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	651	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	652	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	653	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	654	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5	657	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	659	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	660	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5	661	50	46	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	392	44	37	38	0	0	0	0	0	0	0	0	0	0	0	17	40	8
6	398	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	39	9
6	402	44	37	38	0	0	0	0	0	0	0	0	0	0	9	22	50	6
6	403	44	37	38	0	0	0	0	0	0	0	0	0	0	4	13	30	16
6	405	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	37	10
6	408	44	37	38	0	0	0	0	0	0	0	0	0	0	10	21	33	0
6	409	44	37	38	0	0	0	0	0	0	0	0	0	0	2	19	33	8
6	411	44	37	38	0	0	0	0	0	0	0	0	0	0	0	9	26	20
6	414	44	37	38	0	0	0	0	0	0	0	0	0	0	6	16	37	0
6	425	44	37	38	0	0	0	0	0	0	0	0	0	0	8	19	38	7

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
		SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9			
6	426	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	14	17
6	429	44	37	38	0	0	0	0	0	0	0	0	0	0	5	17	41	9
6	442	44	37	38	0	0	0	0	0	0	0	0	0	0	6	16	39	0
6	444	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	17	12
6	460	44	37	38	0	0	0	0	0	0	0	0	0	0	8	19	37	7
6	466	44	37	38	0	0	0	0	0	0	0	0	0	0	3	14	23	11
6	484	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	10	11
6	487	44	37	38	0	0	0	0	0	0	0	0	0	0	4	15	32	13
6	488	44	37	38	0	0	0	0	0	0	0	0	0	0	4	15	35	11
6	489	44	37	38	0	0	0	0	0	0	0	0	0	0	6	16	41	10
6	490	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	29
6	491	44	37	38	0	0	0	0	0	0	0	0	0	0	6	16	44	0
6	492	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	16	23
6	493	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	12	14
6	495	44	37	38	0	0	0	0	0	0	0	0	0	0	1	9	25	33
6	496	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	14	18
6	497	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	15	15
6	498	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	499	44	37	38	0	0	0	0	0	0	0	0	0	0	7	17	46	0
6	501	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	15	20
6	502	44	37	38	0	0	0	0	0	0	0	0	0	0	6	19	44	13
6	503	44	37	38	0	0	0	0	0	0	0	0	0	0	0	5	23	30
6	504	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	12	26
6	505	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	506	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	30
6	507	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	25
6	508	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	25
6	509	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	23
6	510	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	4	22
6	511	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	23
6	512	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	22
6	513	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	20
6	514	44	37	38	0	0	0	0	0	0	0	0	0	0	0	5	23	6
6	515	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	19
6	516	44	37	38	0	0	0	0	0	0	0	0	0	0	0	5	23	0
6	517	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	20

NCA	Receiver	NML			Predicted maximum $L_{Aeq(15\text{ minute})}$ from compound [dB(A)]													
					SP1	SP2	SP3	AF1	SP4	SP5	AF2	SP6	AF3	SP7	SP8	AF4	AF5	SP9
6	518	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	11	12
6	519	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	7	18
6	520	44	37	38	0	0	0	0	0	0	0	0	0	0	0	5	23	0
6	521	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	20
6	522	44	37	38	0	0	0	0	0	0	0	0	0	0	0	5	23	0
6	523	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	5	17
6	524	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	13	5
6	525	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	19
6	526	44	37	38	0	0	0	0	0	0	0	0	0	0	0	8	26	0
6	527	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	15
6	528	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	1	19
6	529	44	37	38	0	0	0	0	0	0	0	0	0	0	1	9	27	0
6	530	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	18
6	531	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	14
6	532	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	1	18
6	533	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	14
6	534	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	9	16
6	535	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	0
6	536	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	17	14
6	537	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	3	13
6	538	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	1	13
6	539	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	11	2
6	540	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	1	3
6	541	44	37	38	0	0	0	0	0	0	0	0	0	0	1	9	27	11
6	542	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	11
6	543	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	2	11
6	544	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	1	0
6	545	44	37	38	0	0	0	0	0	0	0	0	0	0	0	3	21	12
6	546	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	547	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	553	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	555	44	37	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 7-9a Predicted noise levels at most impacted receiver from identified facilities (L<sub>Aeq</sub> 15min)**

Facility	Chainage	NCA	Affected Receiver	NML			Ancillary Activity	
				Day	Evening	Night	Compound as dominant noise source	Cumulative impact (Compound and earthworks)
Ancillary site facility 1	45200 - 46500	2	77	50	45	40	59	61
Ancillary site facility 2	48600 - 48700	3	194	50	41	39	45	55
Ancillary site facility 3	49350 - 49450	3	175	50	41	39	41	62
Ancillary site facility 4	52400 - 53000	4	384	59	48	46	41	54
Ancillary site facility 5	53200 - 54700	4	404	59	48	46	56	90
Stockpiling area 1	43400 - 43700	1	45	50	45	40	27	65
Stockpiling area 2	43900 - 44100	1	45	50	45	40	35	65
Stockpiling area 3	44500 - 44750	1	60	50	45	40	35	57
Stockpiling area 4	45250 - 45500	1	52	50	45	40	46	54
Stockpiling area 5	46200 - 46400	1	74	50	45	40	52	77
Stockpiling area 6	48700 - 49000	3	194	50	41	39	60	60
Stockpiling area 7	49350 - 49600	3	172	50	41	39	41	65
Stockpiling area 8	50900 - 51600	3	279	50	41	39	29	47
Stockpiling area 9	56500 - 56700	6	495	44	47	38	33	75

Appendix D presents noise contours for each ancillary facility.

Exceedances of the night time NMLs are predicted to occur at several properties where ancillary facilities may be operated outside standard hours. Table 7-10 summarises the number of properties exceeding the NMLs for each Ancillary facility.

Impacts at compound sites will be longer term than those at Stockpile locations, where work will occur for short periods only. Ancillary compounds 1 and 5 will likely contain concrete/asphalt batch plants. The AFJV acknowledges that approval will be required by the Director-General in accordance with the MCoA Condition C27 in order to operate a batch plant within 300m from a resident.

**Table 7-10 Predicted exceedances for operation of ancillary facilities**

Facility	Number of receivers exceeding the night NML by			Number of receivers >75dB(A)
	0-10 dB	10-20 dB	20 + dB	
Ancillary site facility 1	26	13	2	0
Ancillary site facility 2	1	0	0	0
Ancillary site facility 3	1	0	0	0
Ancillary site facility 4	1	0	0	0
Ancillary site facility 5	11	2	0	0
Stockpiling area 1	0	0	0	0
Stockpiling area 2	0	0	0	0
Stockpiling area 3	0	0	0	0
Stockpiling area 4	6	0	0	0
Stockpiling area 5	4	2	0	0
Stockpiling area 6	3	4	1	0
Stockpiling area 7	4	0	0	0
Stockpiling area 8	0	0	0	0
Stockpiling area 9	0	0	0	0

It can be seen that a moderate number of low level exceedances have been predicted for Ancillary location 5. A higher number of exceedances have been predicted to occur at Ancillary location 1.

Specific noise mitigation measures for Ancillary locations 1 and 5 are outlined in Section 8 of this plan.

Other locations are likely to have low levels of noise impact and levels will be managed in accordance with the general mitigation measures outlined in Section 8.

Vibration impacts from the operation of compound and ancillary facilities are not anticipated.

### **7.2.5 Construction traffic on the public road network**

Construction traffic will be required to utilise public roads for transport of personnel and materials throughout the construction phase of the Project. A likely figure for peak maximum truck movements through Macksville and across the Nambucca River bridge will be approximately 30 heavy vehicles per direction per hour whilst bulk earthworks is occurring. An assessment of likely traffic noise associated with Project heavy vehicles using the existing road network has been carried out for receivers at a nominal separation distance of 100m from the highway. The inputs and results of this calculation are presented in Table 7-11.

**Table 7-11 Existing and Predicted noise levels associated with additional heavy vehicles on Pacific Highway**

	Day				Night			
	Light Vehicles	Heavy vehicles	% Heavy vehicles	L <sub>Aeq</sub> (15hour)**	Light Vehicles	Heavy vehicles	% Heavy vehicles	L <sub>Aeq</sub> (9hour)**
<b>Existing traffic noise (no Project traffic)*</b>								
North	2729	792	23	56	216	914	62	65
South	2872	700	20	57	212	981	57	65
<b>Predicted traffic noise (including Project traffic)</b>								
North	2729	1242	31	57	216	1184	85	66
South	2872	1150	29	57	212	1251	86	66

\* from WC2NH Operational Noise Modelling and Assessment, 2012, Pacific Highway Donnellyville

\*\* Assumptions: 140° field of view, 90km/hr average speed, DGR road surface, soft ground, flat and neutral meteorological conditions

The calculations show that given the existing high traffic volumes and high presence of heavy vehicle traffic on the existing highway, a maximum increase in traffic noise of approximately 1dB(A) may be experienced at a typical receiver location. An increase of this magnitude would not be perceivable to most sensitive receivers.

### 7.2.6 Out of Hours Work

The majority of construction activities will take place within the approved standard construction hours as defined in CoA C3 and C4. However, CoA C5 allows for certain construction activities to occur outside the construction hours specified in CoA C3 with the prior approval (Out of Hours Works or OOHW). Requests for OOHW approval must be for technical or other justifiable reasons and will be considered on a case by case or activity-specific basis.

Chapters 7 and 14 of the EA detail circumstances where works may be required outside of the approved standard construction hours. Additionally, the ICNG outlines five categories of works that may be undertaken outside the recommended standard hours. These are:

1. The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads.
2. Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm.
3. Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours.
4. Public infrastructure works that shorten the length of the project and are supported by the affected community.
5. Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Consistent with points four and five above, the Project will require that certain activities take place outside of standard construction hours during the evening and night-time periods. Out of hours work may be required due to technical considerations (such as the need to meet particular concrete quality specifications), to facilitate an accelerated construction program (and minimise disruption to the community, local business, motorists, pedestrians and cyclists as work would be completed earlier), or to maintain the safety of road users or construction workers (undertaking certain works during cooler periods in summer, e.g. steel

fixing). For further justification for OOHW, please consult the OOHW procedure (refer Appendix C).

In order to manage these OOHW and to address CoA C5, an OOHW Procedure has been developed and is included as Appendix C to this CNVMP. The aim of the OOHW Procedure is to ensure that all OOHW follow a rigorous process to ensure the following outcomes:

- Potential OOHW are identified as early as possible;
- Justification is provided for each OOHW proposed;
- Appropriate levels of consultation are undertaken for all the OOHW activities; and
- Potential impacts from the OOHW are identified and feasible and reasonable noise mitigation measures implemented to minimise impact on the surrounding environment and community.

It is essential that effective community consultation occurs for OOHW. The OOHW Procedure outlines how the stakeholders will be informed and/or consulted prior to OOHW activities on the Project. It identifies the stakeholders, the approach and tools that will be used to communicate the key messages and impacts to stakeholders, including predicted exceedances of the noise management levels as indicated in Table 5-3. The OOHW Procedure also includes how complaints will be managed consistent with Section 6.3 of the CEMP.



**Table 7-12 Predicted exceedances for operation of ancillary facilities**

NCA	Number of receivers exceeding the sleep disturbance NML by		
	0-10 dB	10-20 dB	20 + dB
1	17	14	7
2	7	1	0
3	16	8	0
4	8	1	1
5	0	0	0
6	11	7	7

These results show that substantial exceedances of sleep disturbance NMLs may occur at properties in NCA 1, NCA 4 and NCA 6. No exceedances are predicted to occur in NCA 5.




Other NCAs are expected to experience minor and infrequent sleep disturbance impacts. Any OOHW will require approval from the Project Environmental Manager in accordance with the OOHW procedure in Appendix C of this Plan.

## 7.3 Construction vibration and blasting assessment

### 7.3.1 Vibration assessment

Table 7-13 lists vibration intensive plant likely to be used during construction and provides predicted ground vibration levels at various distances from the plant. The vibration levels are indicative only and will vary depending on the particular item of plant and geotechnical conditions.

Predictions are summarised with the following highlights for quick analysis:

	expected to comply with vibration criteria
	expected to exceed the recommended vibration criteria
	expected to exceed the maximum vibration criteria

**Table 7-13 Typical plant vibration levels**

Plant description	Building damage				
	Vibration level (mm/s) <sup>1</sup>				
	5 metres	10 metres	25 metres	50 metres	100m
Criterion	<i>5 (typical) / 3 (heritage)</i>				
Vibratory roller (3-8 tonne) <sup>2</sup>	7	3	0.7	0.3	0.1
Vibratory roller (8-13 tonne) <sup>2</sup>	19	9	2	1	0.4
Vibratory roller (13-18 tonne) <sup>2</sup>	22	10	3	1	0.4
Vibratory roller (>18 tonne) <sup>2</sup>	28	13	4	1	0.5
Hydraulic hammer	6	2	0.5	0.2	0.1
Impact Pile driver <sup>3</sup>	76	30	9	3.8	1.5

Building damage					
Plant description	Vibration level (mm/s) <sup>1</sup>				
	5 metres	10 metres	25 metres	50 metres	100m
Vibratory pile driver <sup>4</sup>	28	11	3	1	0.4
Drilling of blasting holes	6	2	0.5	0.2	0.1
Pile boring	6	2	0.5	0.2	0.1
Jackhammer (hand held)	2	0.8	0.2	<0.1	-

Human comfort					
Plant description	eVDV (mm/s <sup>1.75</sup> ) <sup>5</sup>				
	0.2 daytime / 0.13 night time				
Vibratory roller (3-8 tonne) <sup>2</sup>	5.9	2.3	0.6	0.2	0.1
Vibratory roller (8-13 tonne) <sup>2</sup>	16.2	7.3	2.2	0.8	0.3
Vibratory roller (13-18 tonne) <sup>2</sup>	18.2	8.2	2.5	0.9	0.3
Vibratory roller (>18 tonne) <sup>2</sup>	23.7	10.7	3.2	1.2	0.4
Hydraulic hammer	5	1.8	0.5	0.2	0.1
Impact Pile driver <sup>3</sup>	65	26	8	3.2	1.3
Vibratory pile driver <sup>4</sup>	23	9	2.5	0.9	0.4
Drilling of blasting holes	5	1.8	0.5	0.2	0.1
Pile boring	5	1.8	0.5	0.2	0.1
Jackhammer (hand held)	1.9	0.7	0.2	<0.1	-

1 - Calculated in accordance with BS5228 – Code of practice for noise and vibration control on construction and open sites (95% confidence) / FTA Guidance Manual for Transit Noise and Vibration Impact Assessment

2 - Mid amplitude setting

3 – Assumes soft ground, 380kJ per stroke (30T Ram, 1.3m stroke)

4 – Steady state operation (startup / shutdown may be higher)

5 – Calculated in accordance with Appendix B2 'Assessing vibration a technical guideline' and assumes 6hrs per day of intermittent vibration

Vibration impacts are unlikely at any properties located further than 50m from the centre alignment during small scale vibration inducing works. In addition to the information presented above, compliance with human comfort criteria during impact piling works is predicted to occur at a maximum distance of approximately 600m from the work site. However this distance shall be confirmed with monitoring at the commencement of works.

To minimise the likelihood of vibration impacts the mitigation measures outlined in Table 8-1 will be implemented along with the requirements of Roads and Maritime specification G36, Clause 6.8 – Ground Vibration and Air Blast.

Where piling activities are undertaken within 60m of a heritage item, mitigation measures should be observed in accordance with Section 8.

Where heavy vibratory compaction or piling (either impact or vibratory) are undertaken within the distances outlined in Table 7-12 of a residential property, potential exceedances of human comfort levels may be experienced and as such mitigation measures shall be observed.

### **7.3.2 Blasting assessment**

Blasting may be required to remove rock outcrops. Blast holes will be drilled and filled with an explosive charge and detonated with the aid of primers and detonators. Impacts associated with blasting normally relate to air blast overpressure and ground vibration.

Potential vibration and air blast overpressure impacts generated through blasting will be managed primarily through a site and blast-specific assessment in conjunction with preliminary small scale testing conducted at each proposed blast site prior to the commencement of full scale blasting. Further assessment of potential blasting impacts is discussed in the Blast Management Program contained in Appendix B.

## 8 Environmental control measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EA, Statement of Commitments, Conditions of Approval and Roads and Maritime documents. Specific measures and requirements to address impacts from noise and vibration are outlined in Table 8-1.

**Table 8-1 Noise and vibration management and mitigation measures**

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
<b>GENERAL</b>					
NV1	Training will be provided to all project personnel, including relevant sub-contractors on noise and vibration requirements from this plan through inductions, toolboxes and targeted awareness training. Noise and vibration training requirements will be as per Section 9.2 of this plan.		Pre-construction, construction	Environmental Manager	CoA G36, Section 9.2
NV2	Public address systems used at any construction site will not be used outside normal construction hours, except where prior consultation has been undertaken with affected residents. Public address systems would be designed to limit noise spillage off-site.		Construction	Superintendent	EA
NV3	Work compounds, parking areas, equipment and material stockpile sites will be positioned away from noise-sensitive locations in accordance with the criteria in Section 3.8.2, Section 3.8.3 and Appendix A4 of the CEMP, and Appendix I of the SWMP.		Construction	Environment Manager	CoA G36
NV4	Site entry and exit points will be located as far as possible from sensitive receivers, taking into account the importance of safe access.		Construction	Foreman	CoA C7
NV5	Compounds, refuelling areas and where possible sensitive works areas will be designed to promote one-way traffic so that vehicle reversing movements are minimised.		Construction	Foreman	CoA C7
NV6	Truck routes to and from the worksite will be via major		Construction	Superintendent	CoA C7

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	roads where possible, in accordance with the Construction Traffic Management Plan.				
NV7	Operational noise mitigation measures e.g. at property treatments, noise mounds, will be installed as early as possible during construction.		Construction	Roads and Maritime, Construction Manager	SoC N1, G36
NV7a	<p>At Ancillary compounds 1 and 5:</p> <ul style="list-style-type: none"> <li>• Direct noise sources such as vent outlets, generators, etc. will be located and orientated away from the residences</li> <li>• Stockpiles or noise mounds will be placed along the eastern boundary so as to interrupt a direct line of sight between the primary noise sources and the nearest affected receivers</li> <li>• Noisy items such as the hoppers and drives will be screened</li> <li>• When operation of the ancillary compounds commences, or following any substantial change in equipment or site layout, attended noise monitoring should be conducted to determine actual operating noise levels.</li> <li>• If exceedences are identified following the adoption of these measures, hoppers will be lined with heavy duty rubber mats to minimise noise during loading</li> <li>• Ongoing noise monitoring shall be carried out on a monthly basis at nearby receiver locations to confirm ongoing compliance with NMLs. Details from monitoring will be kept on a register for duration of project and submitted to Roads and Maritime following each event.</li> </ul>		Planning, Construction	Environment manager	CoA C7
<b>PLANT AND EQUIPMENT</b>					
NV8	Where feasible and reasonable noisy equipment and/or construction processes will be substituted by alternative low noise emitting equipment and/or construction process.		Construction	Foreman	G36

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
NV9	Place screening or enclosures around fixed plant under regular operation that may impact upon noise sensitive receivers.		Construction	Foreman	G36
NV10	Undertake saw-cutting operations during normal work hours wherever possible to minimise noise impacts		Construction	Foreman	G36
NV11	Plant or machinery will not be permitted to 'warm-up' before the nominated working hours.		Construction	Operators	CoA C4, C7
NV12	Switching off engines when equipment is not in use for extended periods (ie 30 minutes).		Construction	Operators	G36
NV13	Where possible, the occurrence of consecutive works within the same locality, and coincidence of noisy plant/equipment working close together and adjacent to sensitive receivers will be minimised.		Construction	Superintendent	CoA C7
NV14	Unless required for technical reasons, undertake high noise generating work (such as use of a concrete saw or hydraulic hammer) during the day, or early in the evening if required to be undertaken at night; avoiding short sharp sounds from impacts during night work to minimise sleep disturbance to neighbouring residents.		Construction	Foreman	G36
NV15	Manually adjustable or ambient noise sensitive or 'quacker' type reversing alarms on plant and/or flashing lights will be used at night.		Construction	Superintendent	G36
NV16	Where possible, maintenance work on construction plant will be undertaken away from noise sensitive receivers.		Construction	Foreman	G36
NV17	All construction plant and equipment used on the site will be, in addition to other relevant requirements: <ul style="list-style-type: none"> <li>Fitted with properly maintained noise suppression devices in accordance with the manufacturer's specifications.</li> <li>Maintained in an efficient condition.</li> <li>Operated in a proper and efficient manner</li> </ul>		Construction	Superintendent	G36, EA
NV18	Where noise impacts have been predicted, plant will be fitted with noise control devices (in addition to the		Construction	Superintendent	CoA C7

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	<p>requirements in NV17), where practicable, including:</p> <ul style="list-style-type: none"> <li>• Acoustic lining of engine bays.</li> <li>• Air intake / discharge silencers.</li> </ul>				
NV19	Loading and unloading will be carried out as far as practical away from sensitive receivers.		Construction	Foreman	CoA C7
NV20	Truck movements will be kept to a minimum, ie that trucks are sufficiently utilised for each trip.		Construction	Foreman	CoA C7
NV21	Trucks will not queue up outside residential properties. No trucks will arrive on site or be permitted to queue near sensitive receivers prior to the 7.00 am start time unless required by road safety considerations.		Construction	Foreman	CoA C7
NV22	Noisy plant working simultaneously close together will be avoided to the greatest extent practical adjacent to noise affected sensitive receivers.		Construction	Foreman	CoA C7
NV23	Whenever practical, at the end of shifts, excavation and/or ripping plant will be taken from their work areas and left overnight away from the immediate vicinity of sensitive receivers. Warming up of the plant will then be conducted away from such receivers where practical.		Construction	Foreman	CoA C4, C7
NV24	Truck drivers will limit compression braking as far as practicable.		Construction	Operators	CoA C7
NV25	Where possible, noise generating equipment will be strategically positioned to take advantage of natural screening from geographical features or other structures to reduce the transmission of noise between work sites and receiver locations.		Construction	Foreman	CoA C7
NV25a	Where possible, screw (auger) piles will be used instead of driven (hammered) piles.		Construction	Construction Manager	CoA C7
NV25b	Where possible, ripping or rock grinding techniques will be used instead of hammering at cut locations within 400m of residential properties. This is particularly relevant to cutting activities in the vicinity of Mattick road, Lattitia Close, Albert Drive and Kerr road.		Construction	Construction Manager	CoA C7

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
NV25c	Hydraulic hammering will be avoided where possible at crushing locations. Hydraulic jaws and rock splitters will be used where possible.		Construction	Construction Manager	CoA C7
NV25d	Consider the additional of reasonable and feasible mitigation and management measures including temporary noise screen where appropriate around concrete cutting activities. Testing of the effectiveness of this screen will be conducted prior to night works commencing.		Construction	Construction Manager	CoA C4, C7
<b>CONSTRUCTION HOURS</b>					
NV26	<p>Construction works associated with the Project, other than blasting, will only be undertaken during the following hours:</p> <ul style="list-style-type: none"> <li>• 7:00am to 6:00pm Mondays to Fridays, inclusive; and</li> <li>• 8:00am to 1:00pm Saturdays; and</li> <li>• at no time on Sundays or public holidays.</li> </ul> <p>Unless otherwise assessed and justified in the CEMP or this Plan.</p>		Construction	Construction Manager	CoA C3, C4, C5
NV27	<p>Works outside of the construction hours identified in NV26 will only be undertaken in the following circumstances:</p> <ul style="list-style-type: none"> <li>• works that generate noise that is not higher than 5dBA above the RBL at any sensitive receptor at any sensitive receptor;</li> <li>• for delivery of materials required outside these hours by the Police or other authorities for safety reasons; or</li> <li>• where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or</li> <li>• construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the</li> </ul>		Construction	Construction Manager	CoA C4, C5, SoC N4



ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	<p>project boundary. In this case construction is permissible during the following hours: 6.00am to 6.00pm Monday to Friday and 7.00am to 4.00pm Saturdays and at no time on Sundays or public holidays. These works hours may be reviewed and/or revoked by the Director General in consultation with the EPA in the case of excessive or unresolved noise complaints; or</p> <ul style="list-style-type: none"> <li>• in accordance with the Project EPL; or</li> <li>• during works where an EPL does not apply, and Out of Hours Works as agreed to by the Director-General in accordance with condition CoA C5.</li> <li>• See attached OOHW Procedure for details on the appropriate process for undertaking works outside of regular working hours.</li> </ul> <p>Works out of normal working hours shall be approved in accordance with Appendix C, OOH work procedure.</p>				
NV28	<p>Where high level noise impacts (&gt;75dBA) are predicted at sensitive receivers (refer Table 7-6), rock breaking, rock hammering, sheet piling, pile driving and any similar activity will be scheduled only between the hours of 9am to 12pm and 2pm to 5pm, Monday to Friday; and 9am to 12pm, Saturday except where works are to be undertaken outside proposed construction hours as outlined above.</p> <p>The above activities are also considered to be potentially annoying due to their tonality and impulsiveness. Tonality penalties should be considered when assessing compliance with the 75 dB(A) criterion.</p> <p>These activities, if undertaken in continuous blocks and where there is an impact on a sensitive receiver, must not exceed 3-hours in duration, particularly if work extends outside the standard construction hours. A minimum respite period of 1 hour shall be scheduled before activities recommence.</p> <p>An exception to the above is where negotiated agreements have been reached with all of the affected</p>		Construction	Construction Manager	CoA C8 EA

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	receivers.				
NV29	Where activities resulting in tonal or impulsive noise generation are undertaken, whether within or outside of standard working hours, for a continuous 3 hour period and impact on noise sensitive receivers, or activities result in high noise impacts at receivers greater than 75 dB(A), a minimum respite period of 1 hour shall be scheduled before activities recommence.  An exception to the above is where negotiated agreements have been reached with all of the affected receivers.		Construction	Foreman	CoA C4, C7
NV30	Any proposal to undertake works outside of the standard working hours identified in NV26 will be subject to the processes and assessment requirement contained in the out of hours works procedure (see Appendix C).		Construction	Environment Manager	CoA C4, C7
NV30a	Where possible, rock hammering will not be undertaken outside of normal working hours		Construction	Foreman	CoA C4, C7
NV30b	Where possible, driven (hammered) piling will not be undertaken outside of normal working hours.		Construction	Foreman	CoA C4, C7
<b>BLAST MANAGEMENT</b>					
NV31	Blasting shall only be undertaken during the following hours <ul style="list-style-type: none"> <li>• 9:00 am to 5:00 pm, Mondays to Fridays, inclusive;</li> <li>• 9:00 am to 1:00 pm on Saturdays; and</li> <li>• at no time on Sundays or public holidays.</li> </ul> Unless a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm is received.		Construction	Construction Manager	CoA C6
NV32	All blasting associated with the Project will be conducted within the air blast overpressure and Peak Particle Velocity Criteria outlined within Table 5-8 and Table 5-9. This requirement does not apply where written agreement from the affected landowners and/or Director-		Construction	Foreman / Specialist Sub-contractor	CoA C9, C10, C11

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	General is obtained, and subject to the additional requirements in Table 3-1 and condition C.11.				
NV33	Blasting shall be undertaken in accordance with the Blast Management Program contained in Appendix B of this document.		Construction	Foreman / Specialist Sub-contractor	CoA C6
NV34	Blasting trials would be undertaken with results from the trials used to determine site law and site-specific blast designs to satisfy relevant performance criteria.		Construction	Foreman / Specialist Sub-contractor	EA
NV34a	The timing for blasting will consider site-specific weather conditions, such as temperature inversions.		Construction	Foreman / Specialist Sub-contractor	CoA C6
NV34b	Blasts will be designed so that rock 'popping' is not required. Where rock fragments require further breaking down, manual rock breaking techniques such as hammering, splitting or rock jaws will be used.		Construction	Foreman / Specialist Sub-contractor	CoA C6
<b>CONSULTATION AND COMPLAINTS MANAGEMENT</b>					
NV35	Residents / sensitive receivers will be notified of construction activities that are likely to affect their noise and vibration amenity in accordance with the Community Communications Strategy. Information provided will include: <ul style="list-style-type: none"> <li>• The types of activities to be undertaken.</li> <li>• The timing of activities including expected start and finish.</li> <li>• The location of activities.</li> <li>• Details of the community information line and how to make a enquiry and/or complaint</li> </ul>		Pre- construction, Construction	Communications Manager	CoA C4
NV36	Consultation with affected education institutions during construction works in their vicinity will attempt to limit audible construction works during important events, such as examination periods.		Pre- construction, Construction	Communications Manager	SoC N2
NV37	The EPA must be notified 48 hours prior to any works outside of standard working hours commencing, including details of timing and duration, where the works are		Pre- construction, Construction	Environment Manager	SoC N4

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	conducted in accordance with NV27 and/or written agreement has been obtained from potentially affected noise sensitive receivers.				
NV38	All reasonable attempts will be made to contact sensitive receivers located within 500 metres of a blast location. The contact will be at least 48 hours before a blast and will include a schedule of blast time(s), and a telephone contact name and number.		Pre-construction, Construction	Communications Manager	SoC N5, EA
NV39	Where complaints relating to noise or vibration impacts as a result of extended workings cannot be satisfactorily resolved with the affected residents then works hours will revert back to standard working hours at that particular location for that particular activity. Resident(s) will be consulted before recommencing any works outside standard working hours. Any complaints received in relation to working hours will be made available to DoP and DECCW.		Construction	Superintendent, Communications Manager	SoC N6
NV40	Prior consultation and notification would be undertaken with nearby residents that may be affected by noise or vibration generating activities that exceed the relevant criteria.		Pre-construction, Construction	Communications Manager	EA
NV41	Circumstances may arise during construction where works outside of standard construction hours are essential and sensitive receivers are assessed to be highly noise affected (ie experience noise levels greater than 75 dBA). Where this is the case, opportunities to minimise impacts on highly noise effected receivers, including the provision of alternative accommodation, would be considered in consultation with those affected receiver(s).		Construction	Communications Manager	CoA C4
NV42	All complaints received will be managed in accordance with the Community Communications Strategy.		Construction	Communications Manager	B27

## **SURVEY, MONITORING AND REPORTING**

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
NV43	Initial noise monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this CNVMP are being met.		Pre-construction, Construction	Environmental Officer, Noise Specialist	CoA C4
NV44	Noise and vibration monitoring will be undertaken in accordance with Section 9.3. The program for construction noise and vibration monitoring indicates monitoring frequency, location, how the results of this monitoring are recorded and, procedures that are followed where significant exceedances of relevant noise and vibration goals are detected.		Construction	Environmental Officer, Noise Specialist	CoA B31 c) vii
NV45	Building Condition Inspections for each public utility, structure and building will be carried out where: <ul style="list-style-type: none"> <li>Blasting operations are within 500 metres or the distance at which the calculated 95th percentile Peak Velocity of ground vibration from the proposed blast is 2 mm/s, whichever is the greater.</li> <li>Pile driving activities are within 250 metres or the distance at which the calculated 95th percentile Peak Velocity of ground vibration from the proposed pile driving is 2 mm/s, whichever is the greater</li> <li>Other vibration causing activities where the distance at which the calculated 95th percentile Peak Velocity of ground vibration is 2 mm/s.</li> </ul>		Pre-construction, Construction	Engineer	G36/E
NV46	The Building Condition Inspection report will include as a minimum: <ul style="list-style-type: none"> <li>Floor plan of the subject building.</li> <li>Record site details - age, construction, site slope and provision for drainage, presence of trees.</li> <li>Type of defects and their positions and extents on the floor plan.</li> <li>Photograph of external view and photograph of all defects of significance (especially if of concern to the owner), or typical examples of say, hairline plaster cornice cracks.</li> <li>How doors sit in the jambs - out of line may indicate</li> </ul>		Pre-construction, Construction	Engineer	G36

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	<p>foundation settlement.</p> <ul style="list-style-type: none"> <li>External signs of reactive clay foundation soil, e.g. lifting of slabs, uneven kerbing.</li> </ul>				
NV47	All complaints, including those related to property damage, will be managed in accordance with the Roads and Maritime Complaints and Enquiries Procedure – see section 6.3.2 of the CEMP.		Construction	Communications Manager	CoA C4
NV47a	At the commencement of operations at Ancillary facility 1 and 5, noise monitoring will be conducted at the nearest affected properties to determine actual noise levels. Where these are found to exceed project NMLs, further mitigation measures will be investigated and employed (where reasonable and feasible).		Construction	Environmental Manager/Construction Manager	CoA C4
NV47b	Where heavy vibratory compaction or piling (either impact or vibratory) are undertaken within 100m of a residential property, potential exceedances of human comfort levels may be experienced. Where reasonable and feasible, preference will be given to the use of low vibration emitting plant and construction methods. These impacts will be managed in accordance with Section 7 of this plan.		Construction	Environmental Manager/Construction Manager	CoA C4

# 9 Compliance management

## 9.1 Roles and responsibilities

The AFJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 8 of this Plan.

## 9.2 Training

All employees, contractors and utility staff working on site will undergo site induction training that includes construction noise and vibration management issues. The induction training will address elements related to noise and vibration management including:

- Existence and requirements of this sub-plan.
- Relevant legislation.
- Normal construction hours.
- The process for seeking approval for out of hours works, including consultation.
- Location of noise sensitive areas.
- Complaints reporting.
- General noise and vibration management measures.
- Specific responsibilities to minimise impacts on the community and built environment from noise and vibration associated with the works.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

## 9.3 Inspections and monitoring

Weekly and other routine inspections by Environmental Officers, Roads and Maritime, ERG representatives and ER will occur throughout construction. Detail on the nature and frequency of these inspections are documented in Section 8.2 of the CEMP.

Noise and vibration monitoring will also occur routinely for the duration of the Project. Monitoring will be undertaken by an Acoustic Consultant or the Environmental Officer during the construction phase of the Project.

### 9.3.1 Noise monitoring

The following noise monitoring will be undertaken:

In accordance with the Community Involvement Plan, representative sensitive receiver locations will be selected for monthly noise monitoring throughout the project. One receiver in each of the following areas should be selected:

- Pacific Highway (southern extent of alignment)
- Donnellyville, Albert Drive, Main Street and / or O'Dells Road
- Donnellyville, Bald Hill Road and / or Kerr Drive
- Macksville, Wallace Street
- Macksville, Gumma Road
- Macksville, Nursery Road
- Macksville, Letitia Close
- Macksville, Mattick Road

- Monthly noise monitoring at nominated sensitive receiver locations should be carried out to determine the effectiveness of mitigation measures against predicted impacts, details of all monitoring undertaken will be kept on a register and provided to Roads and Maritime monthly;
- The frequency of monitoring may be reduced for certain locations if consistently compliant monitoring results are being obtained, any changes to frequency will be agreed with the Environmental Representative;
- Where complaints are received, additional noise monitoring may be undertaken at sensitive receivers to determine if the actual construction noise generated exceeds the predicted 'worst case' construction noise levels identified in Section 7.2 of this Plan.
- Noise monitoring may be carried out for the purpose of refining construction methods or techniques to minimise noise.
- Ongoing spot checks of noise intensive plant and equipment will be undertaken throughout construction to ensure compliance with manufactures specifications.

Where actual noise levels are found to exceed the predicted worst case levels, the source of excessive noise generations will be identified, and any additional feasible and reasonable measures available will be implemented to either reduce noise emissions or reduce the impacts on receivers.

Details of site activity and equipment usage will be noted during construction noise monitoring.

Acoustic instrumentation employed in the noise monitoring surveys will comply with the requirements of AS IEC 61672.1 (2004) *Electro Acoustics - Sound Level Meter Specifications*, AS1259.2-1990 *Acoustics – Sound Level Meters, Part 2: Integrating – Averaging* and carry appropriate NATA (or manufacturer) calibration certificates.

### **9.3.2 Vibration monitoring**

The following vibration monitoring will be undertaken:

- For the protection of buildings, monitoring will be carried out at the commencement of vibratory compaction work within 50 metres of buildings to ensure that safe vibration levels specified in Section 7.3.1 are not exceeded and to confirm safe working distances.
- When vibration intensive activities are required, vibration monitoring will be carried out within the established buffer zones, or where there is considered to be a risk that levels may exceed the relevant structural damage goals.
- Vibration monitoring may be carried out in response to complaints, exceedances, or for the purpose of refining construction methods or techniques to minimise vibrations.
- Vibration monitoring will continue throughout construction, where appropriate, at nominated sensitive receiver locations to determine the effectiveness of mitigation strategies.

Where vibration is found to exceed safe levels, impacts will be avoided by changing work methods and/or equipment, or through the provision of building protection measures where possible. In the event a complaint relating to property damage is received, an inspection of the property would be undertaken and an interim building condition survey prepared.

Vibration monitoring will be carried out in accordance with:

- For structural damage vibration – German Standard DIN 4150 and BS 7385: Part 2 – 1993.



- For human exposure to vibration – the evaluation criteria presented in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DECC 2006).

## **9.4 Non-conformances**

Non-conformances in general will be dealt with and documented in accordance with Section 8.6 of the CEMP.

## **9.5 Complaints**

Complaints will be recorded in accordance with the Community Communications Strategy (CCS). Information to be recorded will include location of complainant, time/s of occurrence of alleged noise or vibration impacts (including nature of impact particularly with respect to vibration), perceived source, prevailing weather conditions and similar details that could be utilised to assist in the investigation of the complaint. All resident complaints will be responded to in a timely manner and action taken recorded in accordance with the CCS.

## **9.6 Auditing**

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, MCoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.4 of the CEMP.

## **9.7 Reporting**

Reporting requirements and responsibilities are documented in Section 8.4 of the CEMP.

Specific reports prepared in response to noise and vibration monitoring will capture detail including, but not limited, to:

- The locations and description of monitoring undertaken.
- A tabulation of results (e.g. for noise including  $L_{MAX}$ ,  $L_{10}$ ,  $L_{90}$  and  $L_{Aeq}$  noise levels) together with notes identifying the principle sources and operations.
- Summary of any measurements exceeding the nominated criteria, and descriptions of the plant or operations causing these exceedances.
- Detail of any corrective actions and confirmation of their successful implementation.

# 10 Review and improvement

## 10.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

## 10.2 Update and amendment

The processes described in Section 8 and Section 9 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to this Plan will be in accordance with the process outlined in Section 1.6 of the CEMP and as required, be provided to relevant stakeholders for review and comment and forwarded to the Director General of DP&I for approval.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

## **Appendix A**

Plant and equipment sound power levels

Reference	Equipment Description	Typical SWL [L <sub>Aeq</sub> (15minute) dB(A)]	Reference	Equipment Description	Typical SWL [L <sub>Aeq</sub> (15minute) dB(A)]
1	Air Blower (Leaf Blower)	110	73	Hi rail excavator	107
2	Air Leg – SIG	100	74	Hial rail and trailer	95
3	Asphalt Milling Machine*	100	75	Hi-Rail Cherry Pickers	95
4	Auger (hand)	106	76	Hi-Rail Truck	90
5	Auger Drill Rig	100	77	Hydraulic Post Driver (Impact)	100
6	Back Hoe (7.5 tonne JCB)	96	78	Hydro-Demolition	100
7	Ballast Regulator	100	79	Hydromulching Equipment	100
8	Ballast Tamper	114	80	Impact Wrench (pneumatic)	100
9	Bitumen Spray Truck	100	81	Jackhammer*	111
10	Bobcat	107	82	Jumbo Drill Rig*	100
11	Bogies	100	83	Kanga Hammer (electric jackhammer)	114
12	Bolting Jumbo	100	84	Line Marking Plant	93
13	Bump Truck	100	85	Line Marking Removal Plant	100
14	Cable winch	107	86	Low Bed/Float	93
15	Chain saw	106	87	Low Loader	94
16	Chipper (mulcher)	106	88	Material Transport Vehicle	100
17	Chipper (large)	114	89	Milling Head ER2000	100
18	Circular Saw (Battery Operated)*	100	90	Mobile Crane (100 tonne)	100
19	Circular Saw*	104	91	Mobile Crane (25 tonne)	100
20	Compactor	100	92	Mobile Crane (300 tonne)	106
21	Compressor	93	93	Mobile Crane (50 tonne)	100
22	Compressor & Breaker (250 CFM)	100	94	Mobile Crane (all terrain) (20 tonne)	100
23	Concrete Pump	110	95	Mobile Jaw Crusher (50 tonne)*	100
24	Concrete Saw (Soft-Cut)*	99	96	Multi Tyred Roller	100
25	Concrete Saw (Std)*	114	97	Paving Machine	112
26	Concrete Truck / Agitator - discharging	103	98	Petrol Drill	100
27	Concrete Vibrator	100	99	Petrol Rail Tensor (generator)	100
28	Core drill	98	100	Petrol Spike Puller (1hp)	100
29	Cordless drill	93	101	Piling Rig mini (Bored)	104
30	Daymakers (4 Aspects)	93	102	Piling rig small (bored)	107
31	Diamond Saw*	100	103	Piling rig large (bored)	111
32	Diesel Bowser	117	104	Piling Rig (Impact)*	116
33	Dozer	100	105	Piling Rig (Vibratory)*	116
34	Drill rig - soil nailing	114	106	Plate compactor	100
35	Dump Truck (approx. 15 tonne)	100	107	Rail Saw	114
36	Dumper (5 tonne)	101	108	Rattle Gun (Hand held)	100
37	Elevated Working Platform	89	109	Road Header*	100
38	Erkat ER 2000 Twin Header	100	110	Road Profiler	110
39	Excavator (1.5 tonne)	90	111	Road Sweeper	100
40	Excavator (3 tonne)	90	112	Rock Anchor Drill*	102
41	Excavator (6 tonne)	96	113	Roller (non-vibratory)*	100
42	Excavator (10 tonne)	100	114	Saw Cutting Machine*	100
43	Excavator (12 tonne)	104	115	Scissor Lift	100
44	Excavator (15 tonne)	107	116	Semi Trailer	100
45	Excavator (20 tonne)	105	117	Shotcrete pump - truck mounted	106
46	Excavator (25 tonne)	105	118	Skidsteer Loaders (approx 1/2 tonne)	100
47	Excavator (30 tonne)	110	119	Slip Form Machine	100
48	Excavator (40 tonne)	115	120	Smooth Drum Roller*	100
49	Excavator 8 t (Breaker)*	112	121	Suction Truck	112
50	Excavator 20 t (Breaker)*	121	122	Super Sucker	112
51	Excavator 12 t (Breaker)*	118	123	Support Vehicle	100
52	Excavator with tamper head	114	124	Telehandler	100
53	Excavator (Diamond Rock Saw)*	100	125	Tipper Truck	98
54	Excavator (Ripper)	100	126	Tower Crane	100
55	Excavator (Shears)	100	127	Truck (10 tonne)	100
56	Flatbed Truck	93	128	Truck (12-15 tonne)	100
57	Forklift	100	129	Truck (25t)	107
58	Franna Crane	98	130	Truck, dump articulated	108
59	Front End Loader	110	131	Truck 30 t on access road	110
60	Generator	102	132	Truck (HIAB)	101
61	Generator (small and silent)	74	133	Tub Grinder	91
62	Generator (small)	94	134	Ute	85
63	Grader	100	135	Vacuum (Industrial)	100
64	Grinder 4 inch	93	136	Vehicle (Light coommercial e.g. 4WD)	85
65	Grinder 9 inch	101	137	Ventilation Scrubber	100
66	Hammer Drill (Concrete Drill for Cross-Stiching)	110	138	Vibratory Roller (10-12 tonne)*	109
67	Hammer Drill*	110	139	Vibratory Roller (Light)*	105
68	Hand tools	94	140	Wacker Rammer*	108
69	Hand Drill	93	141	Water Tanker (8000 litre)	100
70	Hand saw	93	142	Weed Eater	100
71	Hand Tools (electric)	94	143	Welding Equipment	100
72	Hi Rail Cable Drum	95			

**Appendix B**  
Blast management Program



# Pacific Highway Upgrade: Warrell Creek to Nambucca Heads

## APPENDIX B: Blast Management Program WC2NH-EN-PRO-0003 Blast Management Program Rev 0

Rev	Description	Originator	Reviewed	Approved	Date
A	Appendix B to the Noise and Vibration Management Sub Plan: WC2NH Blast Management Program	Jacobs / Claudio Senese	Noelene Rutherford		
0	Finalised and Approved	Noelene Rutherford	Roads and Maritime	DPE	10/12/14

## Details of Revision Amendments

### Procedure Control



The latest approved version of this Program will be available for all Project personnel on the Electronic Document Management System - TeamBinder. The functional manager will maintain, review and update this Procedure in accordance with the Revision requirements of the Construction Environmental Management Plan (Refer to section 1.6 of the CEMP).

### Amendments

Each new revision to the Program will be distributed to all required personnel for review and approval. The revision number is included at the end of the document number, which is noted in the footer of each page. The document will be allocated a new revision number each time a change is made to the document.

When a new revision to the document is available, a notification email will be distributed to all project personnel by the Document Control Team advising of the update.

The functional Manager is responsible for the implementation and review of the Program. The Project Director will approve new revisions of the Program via the review and approval process as detailed in the Document Control Procedure.

Functional Manager Authorisation	Distribution List	
Name: Noelene Rutherford Date: 10 Decemberr 2014 Position: Environment Manager Signature:  Comments:	Project Director	
	Design Manager	
	Quality Manager	
	Procurement Manager	
	Construction Manager	
	Safety Manager	
	Commercial Manager	
	Environmental Manager	
Project Director Authorisation	Finance Manager	
Name: L.G. RIPALDO Date: 10/12/14 Signature:  Comments:	Engineer Manager	
	Area Manager	
	Human Resources Manager	
	Site Superintendents	
	Roads and Maritime Services	
	IMS Manager	
	Other:	

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### Terms and Abbreviations

<b>AADJV</b>	Arup and Aurecon Design Joint Venture
<b>ACCIONA</b>	ACCIONA Infrastructure Australia Pty Ltd
<b>AFJV</b>	ACCIONA and Ferrovial Joint Venture
<b>AS/NZS</b>	Australian and New Zealand Standard
<b>BMP</b>	Blast Management Program
<b>CEMP</b>	Construction Environmental Management Plan
<b>CoA</b>	Minister's Conditions of Approval
<b>CRMP</b>	Community Relations Management Plan
<b>D&amp;C</b>	Design and Construction
<b>dBA</b>	Decibels using the A-weighted scale measured according to the frequency of the human ear.
<b>DECCW</b>	Department of Environment, Climate Change and Water (former NSW Department)
<b>DJV</b>	Design Joint Venture
<b>DoP</b>	Department of Planning (refer to DPE)
<b>DPE</b>	NSW Department of Planning and Environment
<b>EA</b>	Environmental Assessment – Warrell Creek to Urunga, Upgrading the Pacific Highway, Roads and Maritime Services, January 2010
<b>EC</b>	Environmental Coordinator
<b>EEC</b>	Endangered Ecological Communities
<b>EDMS</b>	Electronic Document Management System (TeamBinder)
<b>EPA</b>	Environment Protection Authority (part of OEH)
<b>EP&amp;A Act</b>	Environmental Planning and Assessment Act 1979
<b>EPL</b>	Environment Protection Licence
<b>ER</b>	Environmental Representative
<b>ERG</b>	Environmental Review Group (consists of EPA, DPI, Nambucca Shire Council, the Environmental Representative and the RMS)
<b>EWMS</b>	Environmental Works Method Statement
<b>Ferrovial</b>	Ferrovial Agroman (Australia) Pty Ltd
<b>FM Act</b>	Fisheries Management Act, 1994
<b>GHD</b>	GHD Australia Pty Ltd
<b>ID Planning</b>	ID Planning Pty Ltd
<b>IMS</b>	Integrated Management System
<b>ISO</b>	International Standards Organisation
<b>KPI</b>	Key Performance Indicator
<b>L<sub>Aeq</sub> (15min)</b>	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community.
<b>L<sub>A</sub> (max)</b>	The A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
<b>MCoA</b>	Minister's Conditions of Approval
<b>MNES</b>	Matters of National Environmental Significance
<b>NML</b>	Noise Management Level



<b>NSW</b>	New South Wales
<b>CNVMP</b>	Construction Noise and Vibration Management Plan
<b>O&amp;M</b>	Operations and Maintenance
<b>OEH</b>	Office of Environment and Heritage
<b>OOHW</b>	Out of hours works
<b>PMT</b>	Project Management Team
<b>PoEO Act</b>	Protection of the Environment Operations Act, 1997
<b>PV</b>	Project Verifier
<b>RBL</b>	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
<b>RMS</b>	Roads and Maritime Services
<b>SoC</b>	Revised Statement of Commitments included in the Submissions Report
<b>SWP</b>	Sound Power Level
<b>SPL</b>	Sound Pressure Level
<b>WC2NH</b>	Warrell Creek to Nambucca Heads (the Project)

### Definitions

<b>Client</b>	An organisation inviting and receiving tenders and letting contracts. For the purposes of this project - Roads and Maritime Services
<b>Contractor</b>	An organisation that contracts with a client to carry out construction and related services. For the purposes of this Project - ACCIONA Ferrovial Joint Venture.
<b>Davis Langdon</b>	Davis Langdon Australia Pty Ltd
<b>Deed</b>	D&C Project Deed, IC-DC-C91-1, Pacific Highway Warrell Creek to Nambucca Heads
<b>Design Joint Venture</b>	Joint Venture consisting of Arup and Aurecon
<b>Government Agency</b>	NSW government department, authority, corporation or entity established by an Act of the NSW Parliament
<b>Persons Conducting a Business or Undertaking</b>	Is an employer, corporation, partnership, unincorporated association that has the primary duty of care for workplace health and safety - (AFJV and Contractors are a PCBU)
<b>Principal Contractor</b>	A person conducting a business or undertaking that commissions a construction project. For the purposes of this project - AFJV
<b>Project</b>	The design and construction of the upgrade to the Pacific Highway between Warrell Creek and Nambucca Heads
<b>Project Verifier</b>	For the purpose of the Project, this is Davis Langdon Australia Pty Ltd
<b>Proof Engineer</b>	For the purpose of the Project, Cardno Pty Ltd
<b>Subcontractor</b>	Organisation that contracts with a principal contractor as the client to carry out construction and related services
<b>Supplier</b>	Organisation that contracts with a client to provide a product and / or service.
<b>TeamBinder</b>	The project Electronic Document Management System software
<b>Worker</b>	Is anyone who carries out work for a PCBU and includes: an employee, contractor or sub-contractor or an employee of, labour hire personnel, apprentice or trainee, work experience student

## 1. Introduction

The Warrell Creek to Nambucca Heads Pacific Highway Upgrade project (the WC2NH Project) is being designed and constructed in a joint venture consisting of ACCIONA Infrastructures Pty Ltd (ACCIONA) and Ferrovial Agroman (Australia) Pty Ltd (Ferrovial), in liaison with various other pre-qualified construction contractors, with overall project management and site supervision of the project by Roads and Maritime Services (RMS).

The *Warrell Creek to Urunga, Upgrading the Pacific Highway – Environmental Assessment* (Roads and Maritime Services, January 2010) assessed noise and vibration impacts on sensitive receivers and structure from the construction of the Project. The potential noise and vibration impacts from construction activities, plant and equipment is managed under the construction Noise and Vibration Management Sub Plan (NVMP). The NVMP prescribes the requirements for noise and vibration from construction activity, including plant and equipment and blasting. This Blast Management Program (BMP) forms part of the NVMP for the WC2NH Project.

### 1.1. Purpose

The purpose of this BMP is to describe how the ACCIONA Ferrovial Joint Venture (AFJV) proposes to manage the blasting activity required during earthworks to minimise the potential for ground-borne vibration and air-blast overpressure to impact on sensitive receptors and structures. This BMP addresses the requirements of the Minister’s Conditions of Approval (CoA) and the RMS Statement of Commitments (SoC), applicable legislation and relevant standards.

### 1.2. Scope

This document specifies blasting induced noise and vibration requirements for the project and includes methods for undertaking over-pressure and vibration monitoring during blasting activities and for maintaining airblast and ground borne vibration impacts at a minimum.

The requirements of this BMP must be complied with by AFJV personnel and the blasting subcontractor. Relevant management measures identified in this BMP will be incorporated into site or activity specific construction plans, procedures and Environmental Work Method Statements (EWMS) where applicable.

### 1.3. Objectives

The key objective of this BMP is to ensure that impacts to the local community and the built environment from blasting induced noise and vibration are minimised. To achieve this objective it is targeted that blasting activities are only undertaken at designated times and remain within established/agreed criteria.

### 1.4. References

The following Project documents are referenced in conjunction with this BMP:

- Project Approval (Minister’s Conditions of Approval (CoA) up to Modification 6) – refer to Section 2.2 of this BMP for detailed requirements;
- Construction Environmental Management Plan (CEMP); and
- Noise and Vibration Management Sub Plan (NVMP), which details the environmental control measures for blasting management (Refer to Section 8, Table 8-1 of the NVMP).

These documents are available in Teambinder. Enquiries in relation to the this BMP and all related CEMP Sub plans and procedures should be notified to the Environmental Manager.

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## 2. Legislative and other Requirements

### 2.1. Legislation

The key legislation relevant to construction noise and vibration management includes:

- *Protection of the Environment Operations Act 1997* (POEO Act);
- Protection of the Environment Operations (Noise Control) Regulation 2008.

### 2.2. Minister's Conditions of Approval

The CoA relevant to this BMP are listed Table 2-1 below.

**Table 2-1: CoA relevant to this Blast Management Program**

CoA	Condition / commitment requirements								
B31 (c)(iv) In part	<p>A Construction Noise and Vibration Management Plan to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall be developed in consultation with the EPA and include, but not necessarily be limited to:.....</p> <p>(v) procedures and mitigation measures to ensure relevant vibration and blasting criteria are achieved, including a suitable blast program supported by test blast results, applicable buffer distances for vibration intensive works, use of low vibration generating equipment vibration dampeners or alternative construction methodology, and pre- and post-construction dilapidation surveys of sensitive structures where blasting and/ or vibration is likely to result in building damage;</p>								
C6	<p>Blasting associated with the project shall only be undertaken during the following hours</p> <ol style="list-style-type: none"> <li>9:00 am to 5:00 pm, Mondays to Fridays, inclusive;</li> <li>9:00 am to 1:00 pm on Saturdays; and</li> <li>at no time on Sundays or public holidays.</li> </ol> <p>This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.</p>								
C9	<p>The Proponent shall ensure that airblast overpressure generated by blasting associated with the project does not exceed the criteria specified in Table 1 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the commencement of the project blasting program, with results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 1.</p> <table border="1"> <thead> <tr> <th colspan="2">Table 1 Airblast overpressure criteria</th> </tr> <tr> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td>115</td> <td>5% of total number of blasts over a 12 month period</td> </tr> <tr> <td>120</td> <td>0%</td> </tr> </tbody> </table>	Table 1 Airblast overpressure criteria		Airblast overpressure (dB(Lin Peak))	Allowable exceedance	115	5% of total number of blasts over a 12 month period	120	0%
Table 1 Airblast overpressure criteria									
Airblast overpressure (dB(Lin Peak))	Allowable exceedance								
115	5% of total number of blasts over a 12 month period								
120	0%								
C10	<p>The Proponent shall ensure that ground vibration generated by blasting associated with the project does not exceed the criteria specified in Table 2 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the</p>								

CoA	Condition / commitment requirements						
	<p>commencement of the project blasting program, with results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 2.</p> <p><b>Table 2 Peak particle velocity criteria</b></p> <table border="1"> <thead> <tr> <th>Peak particle velocity (mms-1)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>5% of total number of blasts over a 12 month period</td> </tr> <tr> <td>10</td> <td>0%</td> </tr> </tbody> </table>	Peak particle velocity (mms-1)	Allowable exceedance	5	5% of total number of blasts over a 12 month period	10	0%
Peak particle velocity (mms-1)	Allowable exceedance						
5	5% of total number of blasts over a 12 month period						
10	0%						
C11	<p>The blasting criteria identified in condition C9 and/ or C10 do not apply where the Proponent has a written agreement with the relevant landowner to exceed the criteria identified in condition C9 and/ or C10 and the Director General has approved the terms of the written agreement. In obtaining the Director General approval for any such agreement, the Proponent shall submit to the Director General:</p> <ol style="list-style-type: none"> <li>details of the proposed blasting program and justification for the proposed increase to blasting criteria including alternatives considered (where relevant);</li> <li>an assessment of the environmental impacts of the increased blast limits on the surrounding environment and most affected residences or other sensitive receivers including, but not limited to noise, vibration and air quality and any risk to surrounding utilities, services or other structures;</li> <li>details of the blast management, mitigation and monitoring procedures to be implemented; and</li> <li>details of consultation undertaken and agreement reached with the relevant landowners (including a copy of the agreement in relation to increased blasting limits).</li> </ol> <p>The following exclusions apply to the application of this condition:</p> <ol style="list-style-type: none"> <li>any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved;</li> <li>the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 25 mm/s or maximum Airblast Overpressure level of 125 dBL; and</li> <li>the provisions under condition C11 (to increase applicable blast criteria in agreement with the relevant landowners) do not apply where the property is a heritage property.</li> </ol>						

### 2.3. Statement of Commitments

Table 2-2 outlines the Statement of Commitments (SoC) related to the BMP including outcomes to be achieved and details of the commitment made.

**Table 2-2 SoC relevant to this Blast Management Program**

Ref number	Outcome	Commitment
N4	Minimise construction noise and vibration impacts	All reasonable attempts will be made to contact sensitive receivers located within 500 metres of a blast location. The contact will be at least 48 hours before a blast and will include a schedule of blast time(s), and a telephone contact name and number.

### 2.4. Environment Protection Licence

The project is subject to an Environment Protection Licence (EPL) as a scheduled activity - Road Construction. Noise and vibration from construction will be subject to EPL requirements. The requirements of this BMP will accord with any additional requirements of the EPL prior to implementation and commencement of construction earthworks requiring blasting.

## 2.5. Relevant Standards

The main guidelines, specifications and policy documents relevant to this BMP include:

- RMS QA Specification G36 – Environmental Protection (Management System);
- British Standard 7385: Part 2 “Evaluation and measurement of vibration in buildings”;
- German DIN 4150: Part 3 – 1999 Effects of Vibration on Structure (DIN 1999);
- Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990) Australian and New Zealand Environment and Conservation Council (ANZECC); and
- Australian Standard AS2187.2-2006: “Explosives – Storage, Transport and Use”.

Guidelines documented in the ANZECC *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* has been used to establish goals for assessing blast air-blast overpressure and ground vibration. The recommended criteria within the ANZECC guidelines for blasting assessment is consistent with the criteria specified in CoA C9 and C10 (refer to Table 2-1 of this BMP).

No known heritage buildings are located within the vicinity of the proposed blasting locations. If any are subsequently identified, the following ground vibration guidelines will apply. As the ANZECC guidelines do not contain criteria relevant to these property types, the adoption of relevant industry recognised ground vibration criteria would be considered appropriate. For this BMP, the German Standard DIN 4150-3 *Structural Vibration Part 3: Effects of Vibration on Structures* contains vibration guidelines for buildings of “great intrinsic value (eg listed buildings under a preservation order)”. The vibration criteria based on DN 4150 as stipulated in Table 2-3 will be applied at these locations.

**Table 2-3 DIN 4150: Structural damage limits for building vibration**

Group	Group- Type of Structure	Vibration Velocity in mm/s			
		At Foundation at a Frequency of			Plan of Floor of Uppermost Storey
		Less than 10Hz	10 – 50 Hz	50-100Hz	All Frequencies
1.	Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20-40	40-50	40
2.	Dwellings and buildings of similar design and/or use.	5	5-15	15-20	15
3.	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order).	3	3-8	8-10	8





*Note: For frequencies above 100 Hz, the higher values in the 50 Hz to 100 Hz column should be used.*

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### 3. Responsibilities and Accountabilities

The AFJV Project Team’s organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of this BMP and in the environmental controls are detailed in Chapter 8 of the CEMP. The responsibilities and accountabilities for key project staff in the implementation of this BMP include:

#### 3.1. Project Director

- Approve this BMP for implementation and all subsequent revisions.

#### 3.2. Project Manager

- Ensure the implementation of this BMP for all planned blasting activity;
- Ensure the blasting contractor is aware of this BMP and complies with the requirements of this BMP.

#### 3.3. Construction Manager

- Liaise with the blasting contractor to ensure the requirements of this BMP are implemented;
- Respond to identified potential or actual breaches and take appropriate corrective or preventative action.

#### 3.4. Blast Manager

- Ensure the requirements of this BMP are understood by all blasting personnel and implemented as part of planned blasting activity.

#### 3.5. Environmental Manager

- Ensure this BMP remains current and is reviewed and consulted with RMS and the Environmental Representative (ER) and liaise with relevant authorities and organisations as necessary;
- Provide project-wide awareness to ensure BMP requirements are achieved.

#### 3.6. Community Relations Manager

- Coordinate all community consultation requirements of the BMP.

### 4. Training and Awareness

Blasting contractors will be informed of their responsibilities of this BMP and provided with a copy of this document. All employees and subcontractors associated in blast planning will undergo site induction training that includes construction blast management. Training will address the relevant blast management aspects including:

- Existence and requirements of this BMP;
- Specific responsibilities to minimise impacts on the community and built environment from blasting;
- Relevant legislation;
- Permitted blasting hours;
- Location of noise sensitive areas;
- Complaints reporting;
- Monitoring requirements; and
- Blast management measures.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

## 5. Description of Blasting

### 5.1. Proposed blast locations

Blasting works have been identified as potentially required in seven of the larger cuts along the works corridor. Table 5-1 below summarises the location of cuts identified in the geotechnical investigation to be difficult to remove and the estimated volume of material that may require blasting.

**Table 5-1 Proposed blasting locations**

Chainage		Length
From	To	
45,840	46,340	500
46,540	46,880	340
47,180	47,500	320
47,560	47,900	340
48,520	49,000	480

### 5.2. Blasting times

Blasting operations will be confined to the following times:

- 9:00 am to 5:00 pm, Mondays to Fridays, inclusive;
- 9:00 am to 1:00 pm on Saturdays; and
- at no time on Sundays or public holidays.

This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.

### 5.3. Blast sensitive receivers

The nearest representative sensitive receivers to the proposed blast locations are summarised in Table 5-2. This includes properties from residential areas to a radius of 500m. No education institutions, hospitals or places of worship are located within 1 kilometre of the proposed blasting locations.

**Table 5-2 Nearest representative sensitive receivers**

Potential Blast Location	Receiver Address	Receiver Type	Approximate distance to Works (m)
CH 45,840 to 46,340	124 Albert Drive, Donnellyville	Residence	120
	Lot 1 Albert Drive, Donnellyville	Residence	100
	Lot 4 Albert Drive, Donnellyville	Residence	140
CH 46,540 to 46,880	18 Albert Drive, Donnellyville	Residence	50
	4723 Pacific Highway, Donnellyville	Residence	130

Potential Blast Location	Receiver Address	Receiver Type	Approximate distance to Works (m)
	31 Wesley Avenue, Donnellyville	Residence	130
CH 47,180 to 47,500	4723 Pacific Highway, Donnellyville	Residence	130
	Lot 2 Pacific Highway, Donnellyville	Residence	50
CH 47,560 to 47,900	Lot 2 Pacific Highway, Donnellyville	Residence	150
CH 48,520 to CH 49,000	51 Kerr Drive, Macksville	Residence	100
	38 Kerr Drive, Macksville	Residence	100
	58 Harrimans Lane, Macksville	Residence	200

#### 5.4. Blasting Aspects and Impacts

Potential blasting impacts can include the following:

##### 5.4.1. Flyrock risk

Flyrock is often a result of under-burden or over-charging, and is the projection of large rock pieces from the face of the blast. Flyrock from a face is most likely to be projected perpendicular to the face and least likely to be projected parallel to the face. The clearance distance design for blasts is relative to the maximum throw of flyrock. Safety factors are introduced for plant and personnel as follows:

- The clearance distance for plant and equipment is double the maximum throw
- The clearance distance for personnel is four times the maximum throw

With further evaluation of site specific conditions, additional measures can also be considered to reduce clearance distances required.

##### 5.4.2. Ground Vibration

Vibration is generated at the moment of the blast and is transmitted through the ground. The effects of vibration can be divided into three main categories:

- where occupants or users of the building are disturbed or inconvenienced;
- those in which the building contents may be affected;
- circumstances in which the integrity of the building or the structure itself may be prejudiced.

Vibration is measured by monitoring the movement of the ground through the three orthogonal axis, and producing a figure to represent the vector sum of this movements. The vibration levels at which human discomfort is perceived are well below the levels at which building damage may be caused. The main on site influences on ground vibration during a blast are as follows:

- Maximum Instantaneous Charge (MIC);
- delay interval;
- direction of initiation;
- charge confinement;
- blast hole deviation;
- geological conditions; and

- water saturation of ground.

In general terms, ground vibration increases with increased charge mass and reduces with distance.

#### 5.4.3. Airblast Overpressure

Air blast or overpressure is an air pressure wave that is generated by explosive movement of rock and gases at the triggering of a blast and is transmitted through the air. During a blasting event, the major influences on air blast levels include:

- delay interval;
- burden;
- spacing;
- the amount and type of stemming used;
- direction of initiation of the blast;
- the charge depth;
- covering of the detonation cord;
- charge confinement;
- blast hole deviation;
- geological conditions; and
- meteorological conditions.

## 6. Blasting Methodology

### 6.1. Blast Management Plan

All blasts will be planned foremost with consideration of the protection of people and property in the vicinity of the proposed blast. This will be achieved through the preparation of a blast management plan prior to each blast which will be prepared by the blast contractor and will address potential risks and control measures. This plan will be prepared in accordance with Section 4 of AS 2187.2-2006 *Australian Standard Explosives – Storage and Use, Part 2: Use of Explosives*.

### 6.2. Justification for blasting

In order to optimise the alignment of the Project, several 'cut' areas have been identified where the removal of soil and rock material is required. Soil at these sites will be excavated using dozers, scrapers or excavators, whilst soft rock material will generally be removed using ripping and / or hammering techniques.

Geotechnical surveys have however identified the presence of hard rock in the lower levels of some cut locations. Where this rock is identified as being too hard to be removed using typical extraction techniques, blasting may be required.

### 6.3. Blast assessment

Specific blasting and seismic details will need to be assessed on a site and blast specific basis. It is important that the actual buffer zone distances, associated specifically with this project, be identified and appropriate measures taken to limit overpressure and vibration to acceptable levels at critical locations. Blast charge and blast configurations must therefore be selected to ensure that criteria are not exceeded.

Estimated maximum instantaneous charges have been provided in Table 6-1 and Figure 1 to provide an indication of acceptable blast sizes; however under CoA C9, a series of trials will be required to be undertaken at a reduced

scale to determine site specific blast response characteristics, and ensure that the vibration and overpressure objectives can be met.

The distance limits relating to vibration and airblast overpressure set out Table 6-1 have been determined using formula as outlined in Australian Standard 2187.2-1993, applicable to free-face blasting in ‘average field conditions’ which states:

Vibration Formula: 
$$V = 1140 \left( \frac{R}{Q^{1/2}} \right)^{-1.6}$$

and

Overpressure Formula: 
$$P = 516 \left( \frac{R}{Q^{1/3}} \right)^{-1.45}$$

Where:

- P = Pressure (pascals)
- V = ground vibration as peak particle velocity in mm/s
- R = distance between charge and point of measurement in metres
- Q = effective charge mass per delay or maximum instantaneous charge in kilograms

The distance limits per nominated MIC may vary significantly depending on the geological conditions, local shielding and meteorological factors at the site.

In view of the proximity of some buildings to blasting, it is important that blasting be monitored at the initial stages at critical locations surrounding the site to confirm predicted over-pressure and vibration levels and to in turn modify the blast design and buffer zones accordingly around the site.

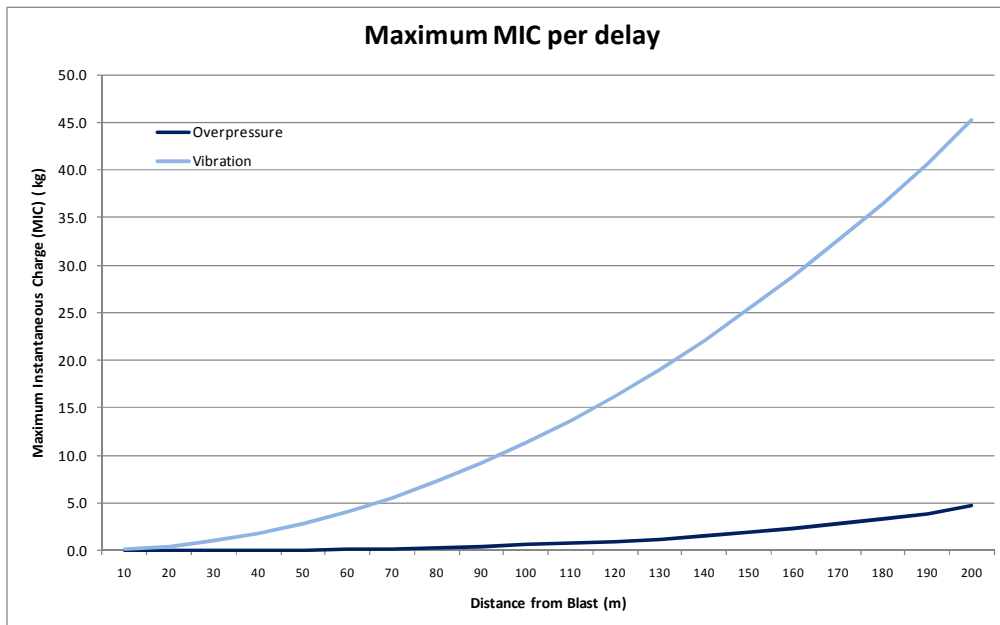


Figure 1 Estimated Effective Mass Charges to Minimise Annoyance

**Table 6-1 Estimated Effective Mass Charges to Meet Blast Criteria**

Cutting Location	Nearest Receiver	Distance 'D' (m)	Maximum instantaneous charge (MIC), kg	
			Air blast	Vibration
CH 45,840 to 46,340	Lot 1 Albert Drive, Donnellyville	100	0.6	11.3
CH 46,540 to 46,880	18 Albert Drive, Donnellyville	50	0.1	2.8
CH 47,180 to 47,500	Lot 2 Pacific Highway, Donnellyville	50	0.1	2.8
CH 47,560 to 47,900	Lot 2 Pacific Highway, Donnellyville	150	1.9	25.4
CH 48,520 to CH 49,000	51 Kerr Drive, Macksville	100	0.6	11.3

#### 6.4. Environmental control measures

Environmental control measures specific to Blast Management are detailed in Section 8 of the NVMP Table 8-1, in reference to control measure ID nos. NV31 to NV47.

Blast performance should be regularly reviewed and possible improvements implemented to ensure a good relationship is maintained with persons who may be affected by the blast and the regulatory authorities. In addition to the Blast Management measures specified in Table 8-1 of the NVMP, appropriate actions for the management of airblast overpressure and ground borne vibration impacts are summarised in Table 6-2.

**Table 6-2 Blast management actions**

Action	Responsibility	Timing/frequency
Reduce the maximum instantaneous charge (MIC) to the lowest possible level by use of delays, reduced hole diameter, and/or deck loading.	Blast manager	Ongoing
Ensure stemming is adequate and eliminate exposed detonating cord. (Cover with at least 300 mm of quarry dust or road base)	Blast manager	Ongoing
Eliminate secondary blasting. (Instead of popping, use rock breaker or drop hammer). Also make extra efforts to eliminate the need for toe shots, (e.g. better control of drill patterns).	Blast manager	As required
Assess weather conditions at the time of the blast. Avoid heavy cloud cover and avoid firing if a strong wind is blowing towards residences. In particular, avoid days of severe temperature inversion but if not possible blast between 11 am and 1 pm. Consider not loading a shot with explosives if the weather forecast is unfavourable.	Blast manager Environmental Manager	As required
Exercise strict control over the spacing and orientation of all blast drill holes. Ensure that the holes are spaced in such a manner that the explosive force is just sufficient to break the stone to the required size.	Blast manager	Ongoing
Establish times of blasting to suit the situation, e.g. fire all blasts at a set time acceptable to neighbours and preferably when background noise is highest. It is preferable to fire at times when neighbours are out or active, rather than when they are seated for meals.	Blast manager Environmental Manager	Pre-blast

#### 6.5. Inspections

Inspections by Environmental Officers, RMS, ERG representatives and ER may occur during blasts. Detail on the nature and frequency of these inspections are documented in Section 8.2 of the CEMP.

### 6.6. Monitoring procedures

For the purposes of checking compliance with the airblast overpressure and ground vibration conditions and for investigating complaints of noise and vibration annoyance, monitoring must be undertaken. Monitoring will be undertaken by a suitably qualified representative. This representative may be the blast contractor, an Acoustic Consultant or an experienced Environmental Officer.

Where access to a potential noise-affected property for monitoring purposes is not feasible, the measurement may be undertaken at the appropriate property boundary and the results extrapolated to reflect the impact at the receptor premises.

The proposed monitoring system for this project will include a portable near-field unit placed within close proximity to the blast area and up to three (3) additional blast monitoring units located at critical assessment locations.

The blast monitoring locations are to include areas within the surrounding community recognised as potentially sensitive or susceptible to blast impacts mostly because of their close proximity to the blasting. The monitoring locations to be considered shall be representative of the worst-affected premises surrounding the blast sites.

#### 6.6.1. Measurement of airblast overpressure

Blast monitoring equipment consists of a computer and display unit connected by cable to a geophone transducer which senses vibration, and to a microphone with low-frequency measurement characteristics which senses air blast overpressure. Vibration and overpressure levels are monitored concurrently upon detection of a trigger, and the data is processed and stored in the computer memory. The operator may either retrieve the data at the conclusion of each monitoring period either in person or via a telephone modem if the logger is fitted with a mobile phone option.

Noise from blasting shall be measured using noise measurement equipment with a lower limiting frequency of 2Hz (- 3dB response point of the measurement system) and a detector onset time of not greater than 100  $\mu$ s as assessed in accordance with AS -1259.1 clauses 8.5 and 10.4.

Measurement of airblast overpressure should be taken at an appropriate location that is exposed to the direction of blasting and at least 4 m from any noise-affected building or structure or within the boundary of a noise sensitive place, at a position between 1.2 m and 1.5 m above the ground.

Blast monitoring instrumentation will be installed and maintained in accordance with relevant Australian Standards (e.g. AS2187.2 - 1993) or as otherwise prescribed by the EPA. Monitoring units should be calibrated annually to standards that are traceable to Australian Physical Standards held by the National Measurement Laboratory (CSIRO Division of Applied Physics).

#### 6.6.2. Measurement of ground vibration

For assessment of air-blast overpressure the ANZECC guidelines recommend measurement at any sensitive receiver at least 3.5 metres from building or structure, and ground vibration measured at any point on the noise sensitive site at least the longest dimension of the foundations of a building or structure away from the building or structure (towards the blast site).

Vibration instrumentation must be capable of measurement over the range 0.1 mm/s to 300 mm/s with accuracy within 5 % and have a frequency response flat to within 5 % over the frequency range of 4.5 Hz to 250 Hz.

The ground-borne vibration transducer (or array) must be attached to a mass of at least 30 kg to ensure good coupling with the ground where the blast site and the measurement site cannot be shown to be on the same underlying strata. The mass shall be buried so that its uppermost surface is at the same level as the



ground surface.

### 6.6.3. Recording

Blast monitoring records provide the data for determining any improvements in blast outcomes, including the management and control of ground vibration and airblast. As a minimum, blast monitoring records should include the following. A copy of these records should be included in the site blast records.

- a) The size of the blast, i.e. number of blastholes and quantity of explosives in each blasthole (MIC);
- b) The method of initiation and the timing sequence to be used in the blast;
- c) The date and time of the blast;
- d) The location of the measurement transducers (geophones, accelerometers, microphones);
- e) Instrument trigger-levels;
- f) Measurement equipment and operator details;
- g) The location of the blast;
- h) The location of any structures and/or persons who may be affected by the blast;
- i) The measured ground vibration (PPV) and airblast values (dB(L) peak) including the peak particle velocity values for each of the triaxial components, a derived vector peak particle value;
- j) Weather conditions, especially temperature, wind speed and direction, cloud cover, relative humidity, and any other notable conditions such as rain;
- k) Any subjective information from the shotfirer and any persons who may be affected by the blast; and
- l) Location, date and time of recording.

### 6.6.4. Non-conformances

Non-conformances in general will be dealt with and documented in accordance with Section 8.6 of the CEMP.

### 6.6.5. Reporting

Reporting requirements and responsibilities are documented in Section 8.4 of the CEMP. Specific reports prepared in response to noise and vibration monitoring will capture detail including, but not limited, to:

- The locations and description of monitoring undertaken;
- A tabulation of results (eg for noise including  $L_{MAX}$ ,  $L_{10}$ ,  $L_{90}$  and  $L_{Aeq}$  noise levels) together with notes identifying the principle sources and operations;
- Summary of any measurements exceeding the nominated criteria, and descriptions of the plant or operations causing these exceedances;
- Detail of any corrective actions and confirmation of their successful implementation.

## 7. Community Consultation and Complaints Management

The Community Relations Manager will implement suitable consultation methods with sensitive receivers. In particular, the Community Relations manager in conjunction with the Environmental Manager will ensure the community consultation and complaints management control measures in detailed in Section 8 of the NVMP Table 8-1, ID nos. NV35 to NV42 are complied with.

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Refer to the Pacifco Community Regulations Management Plan, Section 4 Communication tools, for detailed information on the full range of communication tools established for community consultation.

AFJV has implemented a Construction Complaints and Enquiries Management System outlined in section 6.3 of the CEMP, consistent with Australian Standard 4269 (complaints handling) for the duration of the project. The Community Relations team is responsible to manage all enquiries and complaints and will implement the Enquiries and Complaints Procedures detailed in section 7 of the Community Relations Management Plan.

## 8. Stakeholder Consultation

Relevant stakeholders include the RMS, ER EPA, DPI (Fisheries), DPE and Nambucca Shire Council. These organisations will be consulted with throughout the project via the regular ERG meeting. This BMP will be modified if and where improvements are identified.

## 9. Procedure Review

The Environmental Manager will undertake an assessment of the effectiveness of the BMP and management measures and implications that the BMP may have for other projects.

The Environmental Manager, in consultation with the construction team and with RMS and the ER, will modify this Procedure where improvements are identified.



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## **Appendix C**

Out of hours works procedure



# Pacific Highway Upgrade: Warrell Creek to Nambucca Heads

## APPENDIX C: Out Of Hours Works Procedure WC2NH-EN-PRO-0004 Out Of Hours Works Procedure Rev 0

Rev	Description	Originator	Reviewed	Approved	Date
A	Appendix C to the Noise and Vibration Management Sub Plan: WC2NH Out Of Hours Works Procedure	Claudio Senese	Noelene Rutherford		
B	Amended with Roads and Maritime and ER comments	Nathan Hegerty	Noelene Rutherford		
0	Finalised and Approved	Noelene Rutherford	RMS	DPE	10/12/14

**Details of Revision Amendments**

**Procedure Control**


The latest approved version of this Procedure will be available for all Project personnel on the Electronic Document Management System - TeamBinder. The functional manager will maintain, review and update this Procedure in accordance with the Revision requirements of the Construction Environmental Management Plan (Refer to section 1.6 of the CEMP).

**Amendments**

Each new revision to the Procedure will be distributed to all required personnel for review and approval. The revision number is included at the end of the document number, which is noted in the footer of each page. The document will be allocated a new revision number each time a change is made to the document.

When a new revision to the document is available, a notification email will be distributed to all project personnel by the Document Control Team advising of the update.

The functional Manager is responsible for the implementation and review of the Procedure. The Project Director will approve new revisions of the Procedure via the review and approval process as detailed in the Document Control Procedure.

Functional Manager Authorisation	Distribution List	
Name: Noelene Rutherford Date: 10 December 2014 Position: Environment Manager Signature:  Comments: -	Project Director	
	Design Manager	
	Quality Manager	
	Procurement Manager	
	Construction Manager	
	Safety Manager	
	Commercial Manager	
	Environmental Manager	
Project Director Authorisation	Finance Manager	
Name:  Date: 10/12/14 Signature: Comments:	Engineer Manager	
	Area Manager	
	Human Resources Manager	
	Site Superintendents	
	Roads and Maritime Services	
	IMS Manager	
	Other:	



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### Terms and Abbreviations

<b>AADJV</b>	Arup and Aurecon Design Joint Venture
<b>ACCIONA</b>	ACCIONA Infrastructure Australia Pty Ltd
<b>AFJV</b>	ACCIONA and Ferrovial Joint Venture
<b>AS/NZS</b>	Australian and New Zealand Standard
<b>CEMP</b>	Construction Environmental Management Plan
<b>CoA</b>	Minister’s Conditions of Approval
<b>CNVMP</b>	Construction Noise and Vibration Management Plan
<b>CRMP</b>	Community Relations Management Plan
<b>D&amp;C</b>	Design and Construction
<b>dba</b>	Decibels using the A Weighted Scale measured according to the frequency of the human ear
<b>DECC</b>	Department of Environment, Climate Change and Water (now NSW Environment Protection Authority)
<b>DJV</b>	Design Joint Venture
<b>DoP</b>	Department of Planning (refer to DPE)
<b>DPE</b>	NSW Department of Planning and Environment
<b>EA</b>	Environmental Assessment – Warrell Creek to Urunga, Upgrading the Pacific Highway, Roads and Maritime Services, January 2010
<b>EC</b>	Environmental Coordinator
<b>EEC</b>	Endangered Ecological Communities
<b>EDMS</b>	Electronic Document Management System (TeamBinder)
<b>EPA</b>	Environment Protection Authority (part of OEH)
<b>EP&amp;A Act</b>	Environmental Planning and Assessment Act 1979
<b>EPL</b>	Environment Protection Licence
<b>ER</b>	Environmental Representative
<b>ERG</b>	Environmental Review Group (consists of EPA, DPI, Nambucca Shire Council, the Environmental Representative and the RMS)
<b>EWMS</b>	Environmental Works Method Statement
<b>Ferrovial</b>	Ferrovial Agroman (Australia) Pty Ltd
<b>Feasible and Reasonable</b>	Consideration of best practice taking into account the benefit of the proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build, Reasonable relates to the application of judgement in arriving at a decision, taking into account mitigation versus benefits provided, community views and the nature and extent of potential improvements.
<b>FM Act</b>	Fisheries Management Act, 1994
<b>GHD</b>	GHD Australia Pty Ltd
<b>ID Planning</b>	ID Planning Pty Ltd
<b>IMS</b>	Integrated Management System
<b>ISO</b>	International Standards Organisation
<b>KPI</b>	Key Performance Indicator

<b>L<sub>Aeq</sub> (15min)</b>	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community.
<b>L<sub>A</sub> (max)</b>	the A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
<b>MCoA</b>	Minister's Conditions of Approval
<b>MNES</b>	Matters of National Environmental Significance
<b>NML</b>	Noise Management Levels
<b>O&amp;M</b>	Operations and Maintenance
<b>OEH</b>	Office of Environment and Heritage
<b>OOHW</b>	Out of hours works
<b>PMT</b>	Project Management Team
<b>PoEO Act</b>	Protection of the Environment Operations Act, 1997
<b>PV</b>	Project Verifier
<b>RBL</b>	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
<b>RMS</b>	Roads and Maritime Services
<b>WC2NH</b>	Warrell Creek to Nambucca Heads (the Project)

### Definitions

<b>Client</b>	An organisation inviting and receiving tenders and letting contracts. For the purposes of this project - Roads and Maritime Services
<b>Contractor</b>	An organisation that contracts with a client to carry out construction and related services. For the purposes of this Project - ACCIONA Ferrovial Joint Venture.
<b>Davis Langdon</b>	Davis Langdon Australia Pty Ltd
<b>Deed</b>	D&C Project Deed, IC-DC-C91-1, Pacific Highway Warrell Creek to Nambucca Heads
<b>Design Joint Venture</b>	Joint Venture consisting of Arup and Aurecon
<b>Government Agency</b>	NSW government department, authority, corporation or entity established by an Act of the NSW Parliament
<b>Persons Conducting a Business or Undertaking</b>	Is an employer, corporation, partnership, unincorporated association that has the primary duty of care for workplace health and safety - (AFJV and Contractors are a PCBU)
<b>Principal Contractor</b>	A person conducting a business or undertaking that commissions a construction project. For the purposes of this project - AFJV
<b>Project</b>	The design and construction of the upgrade to the Pacific Highway between Warrell Creek and Nambucca Heads
<b>Project Verifier</b>	For the purpose of the Project, this is Davis Langdon Australia Pty Ltd
<b>Proof Engineer</b>	For the purpose of the Project, Cardno Pty Ltd
<b>Subcontractor</b>	Organisation that contracts with a principal contractor as the client to carry out construction and related services
<b>Supplier</b>	Organisation that contracts with a client to provide a product and / or service.
<b>TeamBinder</b>	The project Electronic Document Management System software
<b>Worker</b>	Is anyone who carries out work for a PCBU and includes: an employee, contractor or sub-contractor or an employee of, labour hire personnel, apprentice or trainee, work experience student



## 1. Introduction

The Warrell Creek to Nambucca Heads Pacific Highway Upgrade project (the WC2NH Project) is being designed and constructed in a joint venture consisting of ACCIONA Infrastructures Pty Ltd (ACCIONA) and Ferrovial Agroman (Australia) Pty Ltd (Ferrovial), in liaison with various other pre-qualified construction contractors, with overall project management and site supervision of the project by Roads and Maritime Services (RMS).

The *Warrell Creek to Urunga, Upgrading the Pacific Highway – Environmental Assessment* (Roads and Maritime Services, January 2010) assessed noise and vibration impacts on sensitive receivers and structure from the construction of the Project. The potential impacts from construction activities and plant and equipment is managed under the Noise and Vibration Management Sub Plan, prescribing the standard hours of construction activity prescribed by the Project approval requirements.

While the majority of construction activities take place within the approved standard construction hours, certain activities may be required under particular circumstances to extend beyond these hours and will be managed in accordance with this Out Of Hours Works Procedure (OOHW Procedure) to minimise impact on the surrounding environment and community.

### 1.1. Project Background

The WC2NH project consists of the detailed design and construction of 19.6 km of new dual carriageway road on the Pacific Highway between the northern end of the existing Allgomera Deviation south of Warrell Creek and the southern end of the Nambucca Heads to Urunga Pacific Highway upgrade project west of Nambucca Heads. The project includes:

- two grade separated interchanges at Warrell Creek and Bald Hill Road south of Macksville. Roads and Maritime is also investigating the provision of north facing ramps at North Macksville;
- longitudinal bridges across Upper Warrell Creek (including North Coast Railway Line), Williamson Creek, Warrell Creek, Nambucca River floodplain (2 of) and Nambucca River;
- overbridges on Rosewood Road, Albert Drive, Scotts Heads Quarry access road, Bald Hill Road, Old Coast Road South, Mattick Road and Old Coast Road North;
- an underpass at Cockburns Lane;
- local roads and drainage and fauna crossing structures; and
- associated infrastructure.

### 1.2. Purpose

The purpose of this OOHW Procedure is to describe how the ACCIONA Ferrovial Joint Venture (AFJV) proposes to manage potential noise and vibration impacts from construction activities that may need to extend outside of the approved standard hours of construction of the Project.

This OOHW Procedure addresses the requirements of the Minister’s Conditions of Approval (CoA) and the RMS Statement of Commitments (SoC), applicable legislation and relevant standards.

### 1.3. Scope

This Procedure is applicable to all construction activities conducted by personnel on the Project that involve construction works that are required to occur outside of the approved standard hours of construction. The procedure includes methods for assessing, approving and monitoring work outside the standard construction hours. The Procedure forms Appendix C of the Noise and Vibration Sub plan (NVMP) within the Construction Environmental Management Plan (CEMP) for the Project.

Relevant management measures identified in this OOHW Procedure will be incorporated into site or activity specific construction plans, procedures and Environmental Work Method Statements (EWMS) where applicable.

### 1.4. Objectives

The key objective of this OOHW Procedure is to ensure that all out of hours construction works follow a rigorous process to ensure the following outcomes:

- Potential out of hours construction works are identified as early as possible;
- Justification is provided for each proposed out of hours construction works;
- Appropriate levels of consultation are undertaken for all the out of hours construction works activities; and
- Potential impacts from the out of hours construction works are identified and feasible and reasonable noise mitigation measures implemented to minimise impact on the surrounding environment and community.

### 1.5. References

The following Project documents are referenced in conjunction with this OOHW Procedure:

- Project Approval (Minister's Conditions of Approval (CoA) up to Modification 6) – refer to Section 2.2 of this OOHW Procedure for detailed requirements;
- Construction Environmental Management Plan (CEMP); and
- Noise and Vibration Management Sub Plan (NVMP).
- Community Relations Management Plan (CRMP), Wc2NH-CR-MPL Rev 1.

These documents are available in Teambinder. Enquiries in relation to the this OOHW Procedure and all related CEMP Sub plans and procedures should be notified to the Environmental Manager.

## 2. Legislative and other Requirements

### 2.1. Legislation

The key legislation relevant to construction noise and vibration management includes:

- *Protection of the Environment Operations Act 1997 (POEO Act);*
- *Protection of the Environment Operations (Noise Control) Regulation 2008.*

### 2.2. Minister's Conditions of Approval, Statement of Commitments

The CoA relevant to this OOHW Procedure are listed Table 1 below.

**Table 1: CoA relevant to this OOHW Procedure**

CoA	Condition / commitment requirements
B31 (c)(iv) In part	<p>A Construction Noise and Vibration Management Plan to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall be developed in consultation with the EPA and include, but not necessarily be limited to:.....</p> <p>(iv) procedure for dealing with out-of-hour works in accordance with condition C4, including procedures for notifying the Director General concerning complaints received in relation to the extended hours approved under condition C4(d)</p>
C3	<p>The Proponent shall only undertake construction activities associated with the project during the following standard construction hours:</p> <ol style="list-style-type: none"> <li>7:00am to 6:00pm Mondays to Fridays, inclusive; and</li> <li>8:00am to 1:00pm Saturdays; and</li> <li>at no time on Sundays or public holidays.</li> </ol>
C4	<p>Works outside of the construction hours identified in conditions C3 may be undertaken in the following circumstances:</p> <ol style="list-style-type: none"> <li>works that generate noise that is not audible at any sensitive receptor;</li> <li>for delivery of materials required outside these hours by the Police or other authorities for safety reasons; or</li> <li>where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or</li> <li>construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the project boundary. In this case construction is permissible during the following hours: 6.00am to 6.00pm Monday to Friday and 7.00am to 4.00pm Saturdays and at no time on Sundays or public holidays. These works hours may be reviewed and/ or revoked by the Director General in consultation with the EPA in the case of excessive or unresolved noise complaints; or</li> <li>where an EPL applies to the construction of the project, construction hours which are approved in accordance with the conditions of an EPL for the project; or</li> <li>where an EPL does not apply to the construction of the project, Out of Hours Works as agreed to by the Director general in accordance with condition C5.</li> </ol>
C5	<p>For the purposes of condition C4 (f), certain construction activities (Out of Hours Works) may be allowed to occur outside the construction hours specified in conditions C3 with the prior written approval of the Director General. Requests for out of hours approval will be considered for construction activities which cannot be undertaken during the construction hours specified in conditions C3 for technical or other justifiable reasons and will be considered on a case by case or activity-specific basis. Any request for Out of Hours Works must be accompanied by:</p> <ol style="list-style-type: none"> <li>details of the nature and need for activities to be conducted during the varied construction hours;</li> <li>written evidence to the EPA and the Director General that activities undertaken during the varied construction hours are justified, appropriate consultation with potentially affected receivers and notification of Council has been undertaken, issues raised have been addressed, and all feasible and reasonable mitigation measures have been put in place; and</li> <li>evidence of consultation with the EPA on the proposed variation in standard construction hours. Despite the above, Out of Hours Works may also occur in accordance with an</li> </ol>

CoA	Condition / commitment requirements
	approved Construction Environment Management Plan or Construction Noise and Vibration Management Plan for this project, where that plan provides a process for considering the above on a case by case or activity specific basis by the Proponent, including factors a) to c) above.
C6	<p>Blasting associated with the project shall only be undertaken during the following hours</p> <ol style="list-style-type: none"> <li>9:00 am to 5:00 pm, Mondays to Fridays, inclusive;</li> <li>9:00 am to 1:00 pm on Saturdays; and</li> <li>at no time on Sundays or public holidays.</li> </ol> <p>This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.</p>

Table 2 outlines the Statement of Commitments (SoC) related to OOHW including outcomes to be achieved and details of the commitment made.

**Table 2 SoC relevant to this OOHW Procedure**

Ref number	Outcome	Commitment
N4	Minimise construction noise and vibration impacts	<p>Construction would normally be limited to the following hours:</p> <ul style="list-style-type: none"> <li>Between 6am and 6pm Monday to Friday.</li> <li>Between 7am and 4pm Saturday.</li> </ul> <p>There would be no works outside these hours or on Sundays or public holidays except:</p> <ol style="list-style-type: none"> <li>Works that do not cause construction noise to be audible at any sensitive receivers.</li> <li>For the delivery of materials required outside these hours by the Police or other authorities for safety reasons.</li> <li>Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.</li> <li>Any other work as agreed through negotiations between the RTA and potentially affected sensitive receivers. Any such agreement must be recorded in writing and a copy kept on site for the duration of the works.</li> <li>Where the work is identified in the CNVMP and approved as part of the Construction Environmental Management Plan.</li> <li>As agreed by Department of Planning and or Department of Environment, Climate Change and Water in an EPL for the construction of the Proposal.</li> </ol> <p>Local residents and the Department of Environment, Climate Change and Water must be informed of the timing and duration of work approved under items (d) and (e) at least 48 hours before that work commences.</p>
N6	Minimise construction noise and vibration impacts	Where complaints relating to noise or vibration impacts as a result of extended workings cannot be satisfactorily resolved with the affected residents then works hours will revert back to standard working hours at that



Ref number	Outcome	Commitment
		particular location for that particular activity. Resident(s) will be consulted before recommencing any works outside standard working hours. Any complaints received in relation to working hours will be made available to DoP and DECCW.

### 2.3. Environment Protection Licence

The project is subject to an Environment Protection Licence (EPL) as a scheduled activity - Road Construction. Noise and vibration from construction will be subject to EPL requirements in accordance with the CoA C4(e) (refer to Table 1 of this OOHW Procedure).

[Note: These Conditions are based on typical conditions for RMS Pacific Hwy Projects – need to be confirmed once EPL is received]

**Table 3 – Potential EPL Conditions (to be updated once the Project EPL is issued)**

EPL reference	Condition
L4.1	L4.1 Standard construction hours Unless otherwise specified by any other condition of this licence, all construction activities are: a) restricted to between the hours of 7:00am and 6:00pm Monday to Friday; b) restricted to between the hours of 8:00am and 1:00pm Saturday; and c) not to be undertaken on Sundays or Public Holidays.
L4.2	Exemptions to standard construction hours The four categories of works that may be undertaken outside the standard hours of operation permitted by Condition L4.1 are: a) the delivery of oversized plant or structures that police or other authorised authorities determine require special arrangements to transport along public roads; b) emergency work to avoid the loss of lives or property, or to prevent environmental harm; c) construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the project boundary. In this case construction (but not including blasting, pile driving, rock hammering and other high noise activities) is permissible during the following hours: 6:00am to 6:00pm Monday to Friday and 7:00am to 4:00pm Saturdays and at no time on Sundays or Public Holidays. All feasible and reasonable mitigation and management measures should be implemented prior to works commencing. These work hours may be revoked in the case of excessive or unresolved noise complaints d) works that are not more than 5 dB(A) over the rating background level at the nearest noise sensitive receiver as assessed by acoustic investigation. The licensee must notify the EPA via a quarterly forecast prior to the undertaking of any works referred to



EPL reference	Condition
	in Condition L4.2 a) and d) as well as providing the EPA with a copy of the results of any acoustic investigation made in relation to Condition L4.2 d) to be reported as per condition R1.9
L4.3	<p>Works agreed outside of standard construction hours</p> <p>The licensee may undertake works outside of standard construction hours if agreement between the licensee and representatives of potentially affected noise sensitive receivers has been reached. Any agreement(s) between the licensee and the potentially affected noise sensitive receivers must be recorded in writing and a copy of the agreement(s) kept on the premises by the licensee for the duration of this licence.</p>
L 4.4	<p>The licensee must notify, by letterbox drop and by detailing works on the project website, potentially affected noise sensitive receivers of the timing and duration of work agreed to under Condition L4.3 at least 48 hours prior to that work commencing. A copy of the notification must be kept by the licensee and made available to the EPA on request.</p> <p>Note: where no project website currently exists, a website for this purpose must be created.</p>

## 2.4. Relevant Standards

Guidelines and Standards relevant to this OOHW Procedure include:

- RMS QA Specification G36 – Environmental Protection (Management System);
- Environmental Criteria for Road Traffic Noise (ECRTN) (EPA 1999);
- NSW Industrial Noise Policy (EPA 2000);
- RTA Environmental Noise Management Manual (ENMM) (RTA 2001a);
- Interim Construction Noise Guideline (ICNG) (DECCW 2009);
- Assessing Vibration: A Technical Guideline (DEC 2006);
- Australian Standard 4269 – Complaints Handling;
- British Standard 7385: Part 2 “Evaluation and measurement of vibration in buildings”;
- German DIN 4150: Part 3 – 1999 Effects of Vibration on Structure (DIN 1999); and
- Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990) Australian and New Zealand Environment and Conservation Council (ANZECC).

## 3. Responsibilities and Accountabilities

### 3.1. Key Staff

The overall roles and responsibilities for environmental management are outlined in Section 4.2 of the CEMP. The responsibilities and accountabilities for key project staff in the implementation of this OOHW Procedure include:

### 3.1.1. Project Director

- Approve this Procedure for implementation and all subsequent revisions;
- Instruct all Project personnel on adherence to this Procedure.

### 3.1.2. Construction Manager

- Ensure all planned OOHW requirements are identified early and progressed through internal and external (DPE) approval;
- Liaise with the Environmental Manager and Community Relations Manager for each package of work in scheduling OOHW;
- Respond to identified potential or actual breaches, and take appropriate corrective or preventative actions in accordance with this Procedure.

### 3.1.3. Environmental Manager

- Ensure this Procedure remains current and is reviewed and consulted with RMS and the Environmental Representative (ER);
- Provide project-wide training and awareness to ensure OOHW requirements are achieved;
- Review planned OOHW activities and prepare applications for EPA/DPE approval;
- Liaise with relevant authorities and organisations as necessary.

### 3.1.4. Environmental Coordinators

- Provide assistance and advice to AFJV personnel to fulfil the requirements of this Procedure;
- Monitor and investigate compliance of OOHW in regards to approval requirements.

### 3.1.5. Community Relations Manager

- Review planned OOHW for internal endorsement;
- Coordinate all community consultation requirements of the Procedure in relation to OOHW;
- Assist the Construction Manager on information to be prepared for approval for OOHW activities.

### 3.1.6. Site Superintendents/Foremen

- Notify the Construction Manager and Environmental Coordinator of works scheduling requirements that would need to be considered for approval under OOHW requirements;
- Ensure approvals have been obtained prior to undertaking OOHW;
- Ensure OOHW keep within the bounds of approval.

### 3.1.7. All Other Managers and Workers

Be familiar with this Procedure and comply with the requirements incorporated within OOHW approvals and related requirements within construction management plans and procedures, including EWMS where applicable.

## 4. Training and Awareness

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All relevant staff, workers and contractors will be trained in this Procedure. This will be provided by Pre- Works Site Induction as well as on going toolbox training. The following issues will be addressed by training.

- Standard Construction hours and determination of OOHW
- Process of internal sign-off and ER/EPA approval for OOHW;
- Ensuring timely identification of works planned to be undertaken outside of the standard hours of work;
- Notification and reporting requirements of planned OOHW;
- Compliance of approved OOHW for each respective activity
- Consequences of not complying with this procedure
- Monitoring and complaints management; and
- Specific responsibilities of this procedure

## 5. Description of OOHW Aspects and Impacts

Noise sensitive receivers such as individual dwellings along the alignment may be subject to noise and vibration impacts, particularly if works are planned to be undertaken at quieter periods, such as evenings, nights and Sundays.

While the majority of construction activities will take place within the approved standard construction hours, the Project may require that certain activities take place outside of standard construction hours during the evening and night-time periods, such as:

- The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads, minimising disruption to road users (motorists, cyclists and pedestrians) and minimising safety risks;
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm;
- Maintenance and repair of infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours;
- Continuous concrete pours to maintain structural specifications and integrity and consequential need for extending concrete batch plant hours of operation;
- Concrete saw cutting to achieve quality standards and RMS requirements;
- Roadwork tie-ins and works within close proximity, involving interaction with live traffic on the Pacific Highway;
- Installation of bridge structures over live traffic;
- Utilities relocation within existing live traffic lanes on the Pacific Highway; and
- Installation of road furniture along the roadway including signage, etc.

In most cases, access to the existing Pacific Highway to undertake works during normal construction hours is not feasible due to traffic and safety restrictions.

In order to manage these type of activities that require out of hours operation, this OOHW Procedure has been developed to prescribe the process to approve these works in advance, and steps to minimise the impact to sensitive receivers.

## 6. Justification for Out of Hours Work

The need to undertake works outside of the standard construction hours are due to a number of factors, including the following:

1. A Road Occupancy Licence (ROL) is required for any works that occupies road space, delays traffic or reduces speed limits to less than 80km/hour on the Pacific Highway. The ROL's provide very specific details and restrictions on the construction activities in order to ensure that any impacts to the local community and road users (both local and regional road users) are minimised throughout the construction period. Within the ROL there are extensive restrictions on items such as, but not limited to, roadside lane closures, worksite length, queue length of impacted traffic, hours of works on the Pacific Highway, and consultation with the relevant traffic control coordinators across the region and state. It should be noted that the Roads and Maritime considers that road users are an important stakeholder from the community in regards to impacts from road construction projects. Whilst it is acknowledged that road users are not the only stakeholder impacted by our works, the high level of traffic experienced at WC2NH mean that they are a very important consideration in the planning of construction works as the traffic impacts if not properly managed will result in impacts that extend far beyond project boundaries with substantial flow-on effects both from a political, safety and local/regional economic perspective. One of the reasons for ensuring that queue lengths are minimised is to reduce the chance of end-to-end accidents within the changed traffic conditions. Apart from the reduced congestion and improved traffic flows through site, there are significant benefits in reducing the chance of injury (both minor and severe) to road users.
2. There are sections of the WC2NH project where there is limited space available to safely undertake the construction works. Hence WC2NH needs to increase the safety of the workforce by undertaking works at periods when traffic numbers are lower. The Australian Standards and the Roads and Maritime's Traffic Control Manual detail that workers cannot be any closer than 1.2m to the road for 60km/hour traffic. Furthermore, where works are within 3m from the fogline, traffic barriers, 60kph zones, a full Traffic Control Plan and an ROL apply.
3. Certain activities adjacent to the roads (e.g. clearing) are also considered a high risk to the safety of the road users and thus lane closures maybe required to minimise this risk.
4. External restrictions on work times prescribed by service providers or ARTC rail (further discussed below in Section 6.1).
5. Quality requirements for concrete works and saw cutting (further discussed below in Section 6.1).
6. Due to the scope requirements of the WC2NH project, there will be a need to mobilise and at times relocate oversize materials and equipment. Movement of oversize vehicles is regulated and will require relocation outside the nominated period by the controlling authority.

### 6.1. OOHW Required for Technical or Other Justifiable Reasons

Some work will be required to be undertaken outside of standard construction hours for technical or other justifiable reasons, as provided for in CoA C5, and include:

### Concrete Works (including delivery) and Saw Cutting

Concrete paving and large concrete pours will be carried out during the construction period. As hot weather affects the quality of concrete pavement, batching, concrete delivery along the alignment and paving/pours will be required in the early mornings, evenings and night as it takes advantage of cooler temperatures. Quality requirements specify concrete works should not occur when surface temperatures are forecast to exceed 35 degrees. Furthermore to ensure the highest quality of pavement is achieved, the timing of concrete cutting is governed by the hydration rate of the pavement, and may require cutting at any time within four and 24 hours after paving, with a 'cutting window' as short as 30 minutes. This period between paving and cutting can vary due to weather conditions. As the timing of cutting is critical to the quality of the pavement, concrete saw cutting will be needed at any time, including outside the daytime construction hours.

### Rail Possession Works

ARTC rail infrastructure that crosses the southern end of the proposed alignment has strict limitations on working adjacent to rail lines. As a result, works will be programmed within gazetted available track possession times. These times are determined by ARTC. Works adjacent to the lines cannot disrupt the normal service of trains. Allowable possession times are invariably completed OOH's through the night or during full shutdown weekends. To enable completion of the project works over and adjacent to ARTC lines works will be programmed according to the available ARTC possession programme.

### Service Relocation Works

Service providers will often require that some works, such as service cut-overs, are carried out in the evening or night to reduce network impact and impacts upon the local community. In these circumstances, AFJV will be required to undertake these works as prescribed by the service provider.

### Works Impacting Highway and Local Road Traffic

There are strict traffic and safety requirements for works on or near the highway given the high volumes of traffic on the Pacific Highway. OOHW will be required where any of the works listed in Appendix B are predicted to significantly impact road users or the safety of road users or where the following Roads and Maritime restrictions are unable to be met:

- *Scope of Works and Technical Criteria (SWTC) Appendix 27- 27.3 Traffic delays, states:*
  - (a) *The Contractor must minimise stoppages and co-ordinate activities to minimise impacts on motorists and must not delay the free flow of traffic in any direction:*
    - (i) *at any single road occupancy for longer than five (5.0) minutes, including the time taken to clear all stopped, slowed and queued traffic; and*
    - (ii) *cumulatively due to all road occupancies, including temporary speed zoning complying with clause 2.3 of RMS D&C G10, between Upper Warrell Creek Road and Point I as identified in Figure 9.1 of Appendix 9 of the Scope of Works and Technical Criteria for longer than eight (8.0) minutes including the time taken to clear all stopped, slowed and queued traffic.*
  - (b) *Traffic queues caused by road occupancies, measured along a single lane in any direction, must not exceed 250 metres in length for any period of traffic delay. If traffic queues reach 250 metres in length, the Contractor must remove the cause of the traffic delay until the flow of traffic returns to free flow conditions.*

Further restrictions and requirements in relation to the ROL's for NH2U are detailed in SWTC Appendix 27.

### Use of Ancillary Facility Sites during OOHW

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The operation of some ancillary facility sites such as the main compound, a satellite facility and/or a batch plant will be required during OOHW to service the work crews and facilitate the other OOHW. Some loading and unloading of materials associated with the other OOHW may be required at the ancillary facility sites.

### Refuelling and Security Patrolling

Refuelling will be required to ensure any machinery associated with OOHW can continue to operate throughout the out of hours period. Out of hours refuelling will however be minimised by having all machinery refuelled prior to commencing the OOHW or by refuelling within construction hours the following day. Security patrolling will also be required to ensure plant, equipment and personnel operating out of hours are not threatened or damaged. Security patrolling of the construction corridor will also be required at all other times outside of standard construction hours.

## 7. Standard Hours of Work and Exempt Works

Standard hours of work are exempt from these Procedures. Standard Construction working hours are:

- 7:00am to 6:00pm Mondays to Fridays, inclusive; and
- 8:00am to 1:00pm Saturdays; and
- At no time on Sundays or public holidays.

The following works outside of the standard construction hours may be undertaken in the following circumstances:

- Works that generate noise that is not audible at any sensitive receptor;
- The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads, minimising disruption to road users (motorists, cyclists and pedestrians) and minimising safety risks;
- Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
- Construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the project boundary. In this case construction is permissible during the following hours: 6.00am to 6.00pm Monday to Friday and 7.00am to 4.00pm Saturdays and at no time on Sundays or public holidays. These works hours may be reviewed and/or revoked by the Director General in consultation with the EPA in the case of excessive or unresolved noise complaints;
- Works that are justifiable and are not more than 5 dB(A) over the rating background level at the nearest noise sensitive receiver as assessed by acoustic investigation;
- A written agreement is obtained with affected sensitive receivers to undertake the works (copies of the written agreements are to be kept on site and provided to the EPA if requested).

Construction hours which are approved under the conditions of the Environment Protection Licence (EPL), are consistent with the above hours of work. (Refer to the EPL for the WC2NH Project for further information)

## 8. OOHW Approval Process

Five types of potential OOHW have been identified for the WC2NH Project. Where there is a justified need to conduct OOHW, or impacts can be demonstrated to be negligible, the following process will be followed for each type:

**Table 4 OOHW Approval Process**

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Work Description	Action(s)	Timing of notification
<b>Type One Works</b>		
<p>a) Delivery of materials or oversized plant or structures required outside approved hours by the Police or other relevant authorities for safety reasons</p>	<p>No further external approval or assessment required.</p> <p>Complete Out of Hours Request Form (Appendix A)</p> <p>Internal approval required from the Environmental Manager, the Community Manager and Roads and Maritime is required.</p> <p>The EPA is also to be notified within 24 hours of undertaking works.</p>	<p>At least 2 weeks if community notification is required (see Community Manager)</p> <p>Within 24 hours of undertaking works (EPA only).</p>
<p>b) Works required in an emergency to avoid the loss of lives, property and/ or to prevent environmental harm.</p>	<p>No further approval or assessment required. Notification to the Environmental Manager, the Community Manager and Roads and Maritime is required. The EPA is also to be notified.</p>	<p>Within 24 hours following undertaking works (EPA only).</p>
<p>c) Construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 meters away from the project boundary. In this case construction (but not including blasting, pile driving and rock hammering) is permissible during the following hours: 6.00am to 6.00pm Monday to Friday; 7.00am to 4.00pm Saturday; and at no time on Sundays or public holidays.</p>	<p>Prior to initial construction works in the vicinity of these areas, potentially affected receivers will be notified of approved construction hours, including the potential for Type 1c works in the approved extended hours.</p> <p>Following initial receiver notification, Type 1c works may proceed with no further assessment following approval from the Environmental Manager and Community Manager and notification to Roads and Maritime and the ER.</p> <p>The locations of Type 1 (c) works are shown in Appendix C.</p>	<p>At least 2 weeks prior to construction works commencing if community consultation required.</p> <p>Monthly updates to the EPA during the ERG</p>
<b>Type Two Works</b>		
<p>Works predicted to be less than 5dB (A) above background levels at relevant sensitive receivers.</p>	<p>Complete Out of Hours Request Form (Appendix A), which requires approval from the Environmental Manager. The Community Manager is also to be notified.</p> <p>A noise assessment tool (similar to SKM Sound Advice Assessment Tool) will be used to determine the predicted noise impacts from the OoH works.</p>	<p>At least 4 weeks prior to construction works commencing if community consultation required.</p>



Work Description	Action(s)	Timing of notification
	<p>Once approved by the Environmental Manager, the works may proceed with no further approval or external consultation other than notification to Roads and Maritime and the ER.</p> <p>Provide Roads and Maritime with the results of any acoustic investigations as part of monthly reporting.</p> <p>Provide EPA with a copy of acoustic results when requested.</p>	<p>At least one week Prior to construction works commencing.</p> <p>Monthly.</p> <p>As required and can be discussed during the monthly ERG.</p>
<b>Type Three Works</b>		
<p>Where works are predicted to be greater than 5dB (A) over background levels, Out of hours works may take place if an agreement between AFJV and representatives of potentially affected noise sensitive receivers has been reached.</p>	<p>Any agreement(s) between AFJV and the affected receivers must be recorded in writing and a copy of the agreement(s) kept on the premises by the licensee for the duration of this licence.</p> <p>An Out of Hours Request Form (Appendix A) to be completed and approved by the Environmental Manager.</p> <p>The EPA, Roads and Maritime and the ER will be notified.</p>	<p>At least 8 weeks prior to construction works commencing for community consultation requirements.</p> <p>At least one week prior to construction works commencing.</p> <p>48 hours prior to undertaking works, unless otherwise agreed</p>
<b>Type Four Work</b>		
<p>Works required to be undertaken outside of standard construction hours for technical or other justifiable reasons as provided for in CoA C5 and include:</p> <ul style="list-style-type: none"> <li>• Concrete works (including delivery) and saw cutting during paving works;</li> <li>• Rail Possession works;</li> <li>• Service relocation works;</li> <li>• Works impacting highway and local road traffic;</li> <li>• Use of ancillary facility sites during OOHW;</li> <li>• Refuelling during OOHW; and</li> </ul>	<p>An Out of Hours Request Form (Appendix A) is required to be completed and approved by the Environmental Manager.</p> <p>The Community Manager is also to be notified.</p> <p>Mitigation measures for these works will be in accordance with Section 8 of the NVMP and Sections 10 and 11 of this procedure.</p> <p>Further consultation/notification requirements for these works are</p>	<p>Prior to construction works commencing.</p> <p>Prior to construction works commencing.</p> <p>During construction.</p> <p>Prior to construction.</p>



Work Description	Action(s)	Timing of notification
<ul style="list-style-type: none"> <li>Security patrolling throughout the construction phase.</li> </ul> <p>The justification for the need to undertake these works outside of the standard construction hours is provided in Section 6.1.</p>	<p>detailed in Section 9.</p>	
<b>Type Five Work</b>		
<p>Any other works not covered above and are deemed as high risk (i.e. predictions above the relevant noise objectives at the nearest sensitive receivers), and where no negotiated agreement has been obtained.</p>	<p>These works will require OOHW submissions to the EPA and will fulfil the requirements of CoA C5. The Type 5 works are detailed in Section 6.1 above.</p> <p>The OOHW submissions to the EPA will include:</p> <ul style="list-style-type: none"> <li>a description of the works;</li> <li>justification of the works;</li> <li>details of noise mitigation to be implemented. In determining appropriate mitigation, a reasonable and feasible noise mitigation assessment will be completed as detailed in the Out of Hours Request Form (Appendix A);</li> <li>information relating to vibration impacts and management measures;</li> <li>Community consultation undertaken, key messages and a summary of feedback, issues and concerns. AFJV's responses to any concerns raised during consultation will also be provided to the EPA.</li> </ul> <p>Indicative dates and durations for the proposed OOHW will be provided in the submissions, however as the specific activity dates are finalised, AFJV will advise the EPA of the dates. AFJV will also notify the EPA of any changes to the nominated dates.</p> <p>The Nambucca Shire Council, the ER and Roads and Maritime will also be notified of these proposed OOHW.</p> <p>As stated in CoA C5, provided this OOHW procedure has been approved as</p>	<p>OOHW submissions will be consolidated quarterly (if the activities are ongoing) or as required, and submitted to the EPA at least 2 weeks prior to works commencing.</p> <p>Not less than 5 days and not more than 14 days prior to the works.</p> <p>Not less than 5 days and not more than 14 days prior to the works.</p> <p>Once the above consultation has been undertaken and any</p>

Work Description	Action(s)	Timing of notification
	part of this NVMP, the Environmental Manager will approve the works.	further issues addressed.

## 9. Community Consultation

The Community Relations Manager will implement suitable consultation methods with noise sensitive receivers and Council in regards to planned OOH activity. In general, methods may include one or a number of the following:

- Face to face contact (one on one meetings, and Community liaison group meetings);
- Telephone calls and 24-hour toll free contact line;
- Letter box drop;
- Community messaging on project website (advertisements and newsletters).

The Community Relations Manager (and their team) will also be responsible for obtaining agreements with residents for any Out of Hours works that are deemed to be audible.

Refer to the Pacifico Community Involvement Plan (CIP), Section 4 Communication tools, for detailed information on the full range of communication tools established for community consultation.

Information to be provided to Council and potential sensitive receivers will include:

- The types of activities to be undertaken;
- The timing of activities including expected start and finish;
- The location of activities;
- Results of consultation with sensitive receivers, including the methods to mitigate/alleviate any concerns expressed;
- Details of the community information line and how to make an enquiry and/or complaint.

Table 4 details the consultation approach for each 'type' of out-of-hours activity. It is important to note that a complaints management system will be implemented as detailed in the CIP.

**Table 4 Stakeholder Group and Approach**

Stakeholder	Approach	Tools
<b>Type One and Two Works</b>		
Roads and Maritime and ER	Notification prior to undertaking any works	Email notification or phone call
EPA	Notification within 24 hours of undertaking any works referred to in Type 1 a) or within 24 hours following undertaking works referred to in 1 b) above.  In addition, the EPA will be provided with a copy of the results of any acoustic investigation made in relation to	Email notification

Stakeholder	Approach	Tools
	Type 2 when requested.	
Potentially affected receivers (Type 1c works)	For Type 1c activities, prior to initial construction works in the vicinity of areas this condition applies (See Appendix C), potentially affected receivers will be notified of approved construction hours, including the potential for Type 1c works in the approved extended hours.	Written Notification
<b>Type Three Works</b>		
Affected receivers (including private properties, business and Education facilities) who are noise affected by greater than 5dba above background levels.	Written agreements will be sought from the affected receivers. A copy of the agreement(s) will be kept on the premises by the licensee for the duration of the project licence.  A community information line will be available.	Written agreement Notification.  1800 number.
EPA, Roads and Maritime and ER	The EPA and Roads and Maritime will be notified 48 hours prior to undertaking Type 3 activities unless otherwise agreed.	Email notification
<b>Type Four Works</b>		
Private properties/Business and education facilities who are noise affected by greater than 5dba above background levels.	Affected receivers will be notified on all Type 4 OOHW.  Notification will be provided not less than 5 days and not more than 14 days prior to work commencing. An exception is concrete work which is reliant on daily temperatures or circumstances and in some cases this notification may have to be provided daily as required. Information provided to the affected receivers will reflect requirements as outlined in the EPL conditions, including: <ul style="list-style-type: none"> <li>• Outline the reason for the work;</li> <li>• Include a diagram outlining the location of the works;</li> <li>• Outline time restrictions;</li> <li>• Outline the nature and location scope and duration of the works;</li> <li>• Identify expected noise impacts on receivers;</li> <li>• State how complaints can be made and additional information obtained; and</li> <li>• Include complaints enquiry line and an after hours contact number and on the project website.</li> </ul> A community information line will be available.  During the course of the project, if residents request not	Doorknock/Face to face meeting.  Written Notification.  1800 number.  Project website.

Stakeholder	Approach	Tools
	to be re-contacted regarding OOHW, AFJV will make a record of this request in the community database.	
EPA	<p>The EPA will be notified at least 48 hours prior to any Type 4 works occurring outside of standard working hours commencing. An exception is concrete work which is reliant on daily temperatures or circumstances and in some cases this notification may have to be provided daily as required.</p> <p>Details of any complaints received during these OOHW and the actions undertaken will also be forwarded to EPA within 48hrs of receiving the complaint. Information provided to residents as outlined above will also be provided</p>	<p>Email notification</p> <p>EPL compliance report</p>
Nambucca Shire Council, the Environmental Representative and Roads and Maritime	<p>Notification will occur 48 hours prior to any Type 4 works occurring outside of standard working hours commencing. An exception is concrete work which is reliant on daily temperatures or circumstances and in some cases this notification may have to be provided daily as required.</p> <p>Information provided to residents as outlined above will also be provided</p>	<p>Email notification</p> <p>1800 number.</p>
<b>Type Five Works</b>		
Private properties/Business and education facilities who are noise affected by greater than 5dba above background levels.	<p>Affected receivers will be doorknocked and consulted on any Type 5 OOHW submissions. The information provided to the affected receivers will reflect requirements as outlined in the EPL conditions, including:</p> <ul style="list-style-type: none"> <li>• Outline the reason for the work;</li> <li>• Include a diagram outlining the location of the works;</li> <li>• Outline time restrictions;</li> <li>• Outline the nature and location scope and duration of the works;</li> <li>• Identify expected noise impacts on receivers;</li> <li>• State how complaints can be made and additional information obtained; and</li> <li>• Include complaints enquiry line and an after hours contact number and on the project website.</li> </ul> <p>Residents will be given at least one week to comment on the work and will be provided with a feedback form to detail any concerns.</p> <p>The project team will investigate possible mitigation measures to counter the feedback received from residents and consult with the resident on these possible</p>	<p>Feedback form</p> <p>Doorknock/Face to face meeting.</p> <p>Notification.</p> <p>1800 number.</p> <p>Project website.</p>

Stakeholder	Approach	Tools
	<p>mitigation measures.</p> <p>A submission detailing the consultation process will be submitted to the EPA for consideration.</p> <p>If the works are agreed as per section 4.2 above, receivers will be notified of the activity to confirm out-of-hour's work location, time, agreed mitigations and requirements as per the EPL. This notification will be provided not less than 5 days and not more than 14 days prior to work commencing.</p> <p>A community information line will be available.</p> <p>During the course of the project, if residents request not to be re-contacted regarding out-of-hours works, AFJV will make a record of this request in the community database.</p>	
EPA	<p>Where Type 5 works are required to be undertaken outside of standard construction hours the proposal will be referred to the EPA for comment.</p> <p>The submission to EPA will include information detailed in Section 4.2 'Type 5'. The submissions will be provided to EPA for comment at least 2 weeks prior to works commencing.</p> <p>In addition, the EPA will be notified in writing not less than 5 days and not more than 14 days prior to the specific OOHW commencing.</p> <p>Details of any complaints received during these OOHW and the actions undertaken will also be forwarded to EPA within 48hrs of receiving the complaint.</p>	<p>OOH work Submission.</p> <p>EPL compliance report.</p> <p>Email notification.</p>
Nambucca Shire Council, the Environmental Representative and Roads and Maritime	<p>Inform of out of hour's work and locations not less than 5 days and not more than 14 days prior to work commencing.</p>	<p>Email notification.</p> <p>1800 number.</p>

**Table 5 Definition of Tools**

Stakeholder group	Tools
Notification	A notification detailing the out-of-hour's activities, location, timing, predicted noise levels and all requirements as detailed in the EPL.
Written agreement	A form detailing the activity proposed with a section for stakeholder feedback and written agreement for proposed work.

Stakeholder group	Tools
1800 number	A point of contact to request information or provide feedback and lodge complaints. A member of the project team will be contactable via the project 1800 phone number during out-of-hour's work. The team member will liaise with the site supervisor to investigate, stop work and implement measures to reduce noise impacts and address any community complaints as they arise.
Door knocking and face to face meeting	One-off and regular meetings to share information and consult with key stakeholders
Email	A point of contact to request information or provide feedback and lodge complaints
Feedback Form	A form providing affected receivers with the opportunity to provide detailed feedback on proposed work.
Out-of-hours work submission	Submission to EPA providing information on proposal as detailed in section 4.2.
Compliance Report	Requirement of EPL to demonstrate project compliance.

### 10. OOH Noise Management and Mitigation Measures

The following management measures will also be implemented for OOH works:

- Relevant noise and vibration management and mitigation measures outlined in Table 8-1 of the NVMP.
- Aim to complete any high noise generating activities (i.e. noise levels greater than 75 dB(A) at any sensitive receiver) before 10pm.
- Aim to program OOH works on a quarterly basis so that works are maximized in the OOH works period thereby minimizing the number of nights the community is subjected to OOH works. This pre-planning will also ensure the EPA, Roads and Maritime and the community are well informed of the works.
- Consideration of any cumulative impacts from any previous OOHW on the particular sensitive receivers will also be given as part of the OOH impact assessment.
- Where feasible, mobile noise barriers to separate work areas from sensitive receivers shall be trialled and installed.
- Utilisation of any new 'quiet machinery' shall be investigated and utilized where practical.
- Broadband reversing alarms or similar noise reduced reversing alarms are to be used for all OOHW.
- If complaints are received, the complainant will be provided the opportunity to discuss the works with the Environmental Representative. Details of complaints will also be forwarded to the EPA within 48hrs of receiving the complaint. DP&I will also be provided with the details of any complaints received and the steps taken to resolve the complaint in the EPL monthly report and six monthly compliance reports.
- Where noise levels continue to exceed LAeq 75 dB(A) during the evening period after all reasonable and

feasible physical mitigation measures have been implemented, AFJV will offer one on one briefings with the affected residents. Where this occurs during the night period AFJV will offer one on one briefings with the affected residents and may offer alternative accommodation or similar mitigation measure. Resident circumstances will also be considered on a case by case basis.

Any additional specific details on the physical noise control measures that will be implemented for the OOHW will be provided in the OOH forms and the OOHW submissions.

### 11. Unforeseen Out of Hours Activities

During the construction process, there may be the requirement for unforeseen out of hours works. Examples of unforeseen out of hours works may be:

- Late finishing concrete pours that have accidentally extended past the approved construction hours due to unforeseen circumstances. This will only be considered in circumstances where it is unavoidable and the quality of the finished product may be considerably compromised if the activity were to stop. In these circumstances, a critical item of plant such as a concrete pump may have malfunctioned, causing the pour to be delayed unforeseeably.

In this circumstance, the Project Director will be required to determine if the activity is reasonable and can continue beyond the approved construction hours. Roads and Maritime and the ER will also be notified. The Community Manager will be notified and will determine if nearby residents are to be contacted about the works.

Ongoing issues with plant will be rectified to avoid the requirement to work beyond the approved construction hours.

### 12. Monitoring

Noise and vibration monitoring will occur for OOHW activities in accordance with the NVMPs section 9.3 Inspections and Monitoring, to ensure compliance with approved OOHW requirements and any mitigation measures implemented as part of the approved activity. Monitoring will be undertaken by an Acoustic Consultant, or an experienced Environmental Officer.

Where complaints are received, additional noise monitoring may be undertaken at sensitive receivers to determine if the actual construction breached approval requirements for the OOHW activity or if noise generated exceeds the predicted 'worst case' construction noise levels identified in Section 7.2 of the NVMP.

### 13. Enquiry and Complaints Management

AFJV has implemented a Construction Complaints and Enquiries Management System outlined in section 6.3 of the CEMP, consistent with Australian Standard 4269 (complaints handling) for the duration of the project. The Community Relations team is responsible to manage all enquiries and complaints and will implement the Enquiries and Complaints Procedures detailed in section 7 of the Community Relations Management Plan (CRMP).

Where complaints relating to noise or vibration impacts as a result of approved extended workings cannot be satisfactorily resolved with the affected residents then works hours will revert back to standard working hours at that particular location for that particular activity. Resident(s) will be consulted before recommencing any works outside standard working hours.

Any complaints received in relation to working hours will be made available to DPE and EPA.



#### 14. Records

Records of all Out of Hours Works shall be maintained by the Environmental Manager or the Community Relations Manager and shall include:

- Notification to RMS and ER, and response/feedback provided;
- Communications and Approvals in relation to the DPE and EPA, including OOHW request letter;
- Noise monitoring data;
- Community Consultation including feedback and identified sensitive receivers, agreed mitigation measures and any written agreements on amelioration measures taken;
- Monitoring results and complaints made, and complaints management.

#### 15. Stakeholder Consultation

Relevant stakeholders include the RMS, ER EPA, DPI (Fisheries), DPE and Nambucca Shire Council. These organisations will be consulted with throughout the project via the regular ERG meeting. This Procedure will be modified if and where improvements are identified.

#### 16. Procedure Review

The Environmental Manager will undertake an assessment of the effectiveness of the OOHW Procedures and management measures and implications that these Procedures may have for other projects.

The Environmental Manager, in consultation with the construction team and with RMS and the ER, will modify this Procedure where improvements are identified.





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**APPENDICES**



**Appendix A – Out of Hours Works Request Form**

OUT OF HOURS REQUEST FORM			
<b>No:</b>	<b>Notification Date:</b>	<b>Approval date:</b>	<b>Project:</b>
<b>Section A to be completed by the Project Engineer:</b>			
<b>A. Contact details</b>	Name	Mobile number	Email
Project Engineer			
<b>B. Details of work</b>			
<input type="checkbox"/> <b>Map attached</b> (showing location / work extent / nearest sensitive receivers / landscape)	Location (Chainage)		
	Description of works		
	Machinery/Plant to be used		
	Proposed Mitigation Measures		
	Proposed dates		
	Justification (Why does work need to occur outside of standard construction hours?):		
	Proposed timings		
	Forecast Weather		
<b>Section B to be completed by the Environmental Manager</b>			
<b>C. What type of work does the OOHW fall within?</b>  (tick and provide comment as appropriate)	<input type="checkbox"/>	<b>Type 2 Works</b> – predicted to be less than 5dB(A) above background levels at relevant sensitive receivers Comments: _____ –	
	<input type="checkbox"/>	<b>Type 3 Works</b> – resident agreement works Comments: _____ –	
	<input type="checkbox"/>	<b>Type 4 Works</b> – works identified under Section 4.2(4) of the OOHW Procedure Comments: _____ –	



<b>OUT OF HOURS REQUEST FORM</b>	
	<input type="checkbox"/> <b>Type 5 Works</b> – works approved under Section 4.2 (5) of the OOHW Procedure Comments: _____ _____
<b>D. Environmental Manager Approval</b>	Are the works approved? <span style="float: right;">YES / NO</span>
	What are the agreed mitigation measures:
	Has the EPA been appropriately notified (monthly forecast):
	Date EPA notified:
	Name: <span style="margin-left: 100px;">Signature:</span> <span style="float: right;">Date:</span>
	<b>Comments:</b>
<b>E. Community Relation Team Approval</b>	Community Notified? <span style="float: right;">YES / NO</span>
	Name: <span style="margin-left: 100px;">Signature:</span> <span style="float: right;">Date:</span>
	<b>Comments:</b>
<b>Please return to Environmental Team by the next work day</b>	



**Appendix B – Indicative out of hours Schedule of Activities for the WC2NH Project**

Item no.	Activity	Activity Description	Approx. location (Chainages)	Justification for Out of Hours Work	Approximate Plant Requirements	Indicative Timing
1	Service Adjustments	Location and relocation and protection works electrical, water, sewer, telstra services and street lighting involving road sawing, rock hammering, directional drilling and excavation	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>unavailable off-peak utility shutdown period during normal hours</li> <li>restricted Pacific Highway Road (Road Occupancy Licence (ROL) restrictions)</li> </ul>	<ul style="list-style-type: none"> <li>Excavators</li> <li>Piling rig</li> <li>Drill rig</li> <li>Cranes</li> <li>Rock hammer attachment</li> <li>Road sawing attachment</li> <li>Road saw</li> <li>EWP</li> <li>Delivery truck</li> <li>Potholing and vacuum truck</li> <li>Small compaction equipment</li> <li>Lighting equipment</li> </ul>	16 weeks (Jan 15 – May 15)
2	Clearing and Grubbing	Felling & clearing of trees & removal of tree roots, grass etc from construction areas adjacent to the Pacific Highway Interface & Local Road Interface	41,500 – 43,100, 46,400 – 49,100,	<ul style="list-style-type: none"> <li>restricted Pacific Highway Road (ROL restrictions)</li> <li>unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>Chainsaw</li> <li>Mulcher</li> <li>Trucks</li> <li>Waste containers</li> <li>Excavator</li> <li>Sweeper trucks</li> <li>Water trucks</li> <li>Lighting equipment</li> </ul>	16 weeks (Jan 15 – May 15)

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3	Traffic management / Road furniture	Erect temporary barriers, temporary signs, temporary line marking, temporary roads / access, survey works, any required adjustments to existing barriers/wire rope.	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>restricted Pacific Highway &amp; local Road (ROL restrictions)</li> <li>unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>Mobile crane</li> <li>Crane truck</li> <li>Trucks</li> <li>Light vehicles</li> <li>Backhoe</li> <li>Line marking truck &amp; Equipment</li> <li>Light compaction equipment</li> <li>Small Tools</li> <li>Lighting equipment</li> </ul>	Full Duration of the project
4	Demolition	Pavement, barriers, kerb & gutter, culverts, guard rail involving road sawing, hammering, load & dispose	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>restricted Pacific Highway Road (ROL restrictions)</li> <li>unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>Excavators</li> <li>Rock Hammers</li> <li>Pulverisers</li> <li>Cranes</li> <li>Loader</li> <li>Road saw / hand saw</li> <li>Jack Hammers</li> <li>Dump trucks</li> <li>Backhoe</li> <li>Lighting equipment</li> </ul>	30 months (Jan 15 – July 17)
5	Earthworks	Topsoil stripping, road sawing, material excavation, road construction, survey works adjacent to the Pacific Highway	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>restricted Pacific Highway Road (ROL restrictions)</li> <li>unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>Excavators</li> <li>Rock Hammers</li> <li>Loader / backhoe</li> <li>Road saw / hand saw</li> </ul>	30 months (Jan 15 – July 17)

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		Interface & Local Road Interface		<ul style="list-style-type: none"> <li>• minimise local road traffic delays</li> </ul>	<ul style="list-style-type: none"> <li>• Jack Hammers</li> <li>• Vibratory Roller/ Compactors</li> <li>• Dump trucks/ Bogie</li> <li>• Water cart</li> <li>• Sweeper truck</li> <li>6• Lighting equipment</li> </ul>	
6	Drainage	Removal and/or installation of pipes, pits, headwalls, kerb & gutter, no fines concrete, open drains & channels, survey works, water diversions/pumping, micro tunnelling/pipe jacking adjacent to the Pacific Highway Interface & Local Road Interface	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>• Due restricted Pacific Highway &amp; local Road (ROL restrictions)</li> <li>• unsafe work zone to adjacent pedestrians, cyclists &amp; traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Excavators</li> <li>• Rock hammers</li> <li>• Loader / backhoe</li> <li>• Road saw / hand saw</li> <li>• Jack Hammers</li> <li>• Crane truck</li> <li>• Mobile crane</li> <li>• Tipper truck</li> <li>• Water cart</li> <li>• Micro-tunnel machine &amp; pipe jacking</li> <li>• Vibratory roller/ hand held compaction equipment</li> <li>• Water pumps</li> <li>• Lighting equipment</li> </ul>	30 months (Jan 15 – July 17)
7	Major Deliveries	Oversize Loads - Loading and unloading of equipment and plant;	54,000 46,000	<ul style="list-style-type: none"> <li>• Restricted Pacific Highway Road (ROL restrictions)</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile cranes</li> <li>• Semi-trailers</li> <li>• Tip/delivery trucks</li> </ul>	(Jan 15 – July 15)

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		Material deliveries required for OOH works.		<ul style="list-style-type: none"> <li>• Restricted site access</li> <li>• unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Loader / backhoe</li> <li>• Lighting equipment</li> </ul>	
8	Pavement works including mainline & local roads, mainline cross-over, emergency uturns & interface works	Batching, delivery and laying of concrete pavements, Sawcutting, Laying of asphalt, spray sealing, profiling, load & dispose of old asphalt, minor excavation, survey works.	Various locations across alignment as required	<ul style="list-style-type: none"> <li>• Ambient temperature requirements for placement of concrete,</li> <li>• Saw-cutting requirements for placed concrete</li> <li>• restricted Pacific Highway Road (ROL restrictions)</li> <li>• unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Compressor</li> <li>• Hand operated jack hammers</li> <li>• Bobcat mounted scabbler</li> <li>• Multi Rubber tyred roller</li> <li>• Drum Rollers</li> <li>• Skid steer or tractor mounted sweeper</li> <li>• Water truck</li> <li>• Hot bitumen equipment</li> <li>• Hot asphalt pavers</li> <li>• Semi-trailers &amp; bogie tippers</li> <li>• Line marking equipment</li> <li>• Mobile crane</li> <li>• Excavator</li> <li>• Backhoe</li> <li>• Lighting equipment</li> <li>• Concrete pavers</li> <li>• Concrete Agitator Trucks,</li> <li>• Profiler</li> </ul>	30 months (Jul 15 – Dec 17)

OUT OF HOURS WORKS PROCEDURE  
Pacific Highway Upgrade: Warrell Creek to Nambucca Heads



					<ul style="list-style-type: none"> <li>• Concrete vibrator</li> <li>• Concrete saw</li> <li>• Generator</li> </ul>	
9	Finishing works / Road furniture	Line marking, traffic signs, reflectors, guard rails, concrete barriers, fencing, landscape works, survey works	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>• restricted Pacific Highway Road (ROL restrictions)</li> <li>• unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Line marking equipment &amp; trucks</li> <li>• Mobile crane</li> <li>• Crane truck</li> <li>• Rattle gun</li> <li>• Compressor</li> <li>• Genset</li> <li>• Concrete truck</li> <li>• Backhoe</li> <li>• Auger</li> <li>• Slip-form machine</li> <li>• Formwork system</li> <li>• Light compaction equipment</li> <li>Trucks</li> <li>• Small Tools</li> </ul>	18 months (Jul 16 – Dec 17)
10	Traffic switches / Road furniture	Temporary closure Pacific Highway lanes to tie-in traffic switch barriers, line marking, signs, pavement	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>• restricted Pacific Highway Road (ROL restrictions)</li> <li>• unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Line marking equipment &amp; trucks</li> <li>• Mobile crane</li> <li>• Crane truck</li> <li>• Rattle gun</li> <li>• Compressor</li> <li>• Genset</li> </ul>	30 months (Jul 15 – Dec 17)



OUT OF HOURS WORKS PROCEDURE  
Pacific Highway Upgrade: Warrell Creek to Nambucca Heads



					<ul style="list-style-type: none"> <li>• Concrete truck</li> <li>• Backhoe</li> <li>• Auger</li> <li>• Pavement equipment</li> <li>• Light vehicles</li> <li>• Lighting equipment</li> <li>• Sweeper and vacuum truck</li> </ul>	
11	Ancillary Facility operation	Operation of main compound or satellite facility for use during OOHW. Some unloading of materials associated with the OOHW may be required. Operation of concrete and asphalt batch plants as required.	Refer to CEMP for locations of ancillary facilities/batch plant locations	<ul style="list-style-type: none"> <li>• Ambient temperature requirements for placement of concrete.</li> <li>• Use of amenities/facilities at main compound or satellite facility during OOHW.</li> <li>• Asphalt required for OOHW at tie-ins / traffic switches.</li> </ul>	<ul style="list-style-type: none"> <li>• Light vehicles</li> <li>• Lighting equipment</li> <li>• Delivery trucks</li> <li>• Mobile crane</li> <li>• Concrete and asphalt batch plants</li> <li>• Loader</li> <li>• Excavator</li> <li>• Truck and dogs</li> <li>• Grader</li> </ul>	As required throughout project
12	Bridge and retaining works	Delivery of precast girders including any final access preparation works	41, 500 – 43,500 45,500 – 50,000 52,400 – 55,500 60,000 – 61,200	<ul style="list-style-type: none"> <li>• Police escorted oversized deliveries.</li> <li>• May need to close lanes of Pacific Hwy to allow access. Closures only allowed outside peak hours.</li> </ul>	<ul style="list-style-type: none"> <li>• Light vehicles (traffic control)</li> <li>• Heavy vehicles</li> <li>• Cranes</li> <li>• Lighting equipment</li> </ul>	18 months (Jul 15 – Dec 16)

OUT OF HOURS WORKS PROCEDURE  
Pacific Highway Upgrade: Warrell Creek to Nambucca Heads



	Construction of bridge and deck furniture on ARTC Rail Bridge	42,800	<ul style="list-style-type: none"> <li>Track possessions required for erection of temporary works and girders, installation of deck furniture and removal of temporary works</li> </ul>	<ul style="list-style-type: none"> <li>Cranes</li> <li>EWP's</li> <li>Trucks</li> <li>Small powered equipment</li> <li>Saw-cutting / grinding</li> <li>Lighting equipment</li> </ul>	(Jul 15 – Jul 16)
	Mobilisation of cranes including any final access preparation works	42,000 45,300 46,100 47,500 48,200 49,300 52,000 – 52,900 53,400 54,500 60,900	May need to close lanes of Pacific Hwy to allow access of cranes. Closures only allowed outside peak hours.	<ul style="list-style-type: none"> <li>Cranes driving into site (but not working/lifting)</li> </ul>	24 Months (Jul 15 – Jul 17)
	Construction of retaining wall on ARTC Rail Bridge Abutment	42,800	Track possession required to work in ARTC corridor	<ul style="list-style-type: none"> <li>Excavator</li> <li>crane</li> <li>EWP</li> <li>Lighting tower</li> <li>Truck</li> <li>Roller/vibe plate</li> <li>Small hand tools</li> </ul>	12 Months
	Bridge Deck Pour	42,000	During hot weather it may be necessary to	<ul style="list-style-type: none"> <li>Crane</li> </ul>	24 Months

OUT OF HOURS WORKS PROCEDURE  
Pacific Highway Upgrade: Warrell Creek to Nambucca Heads

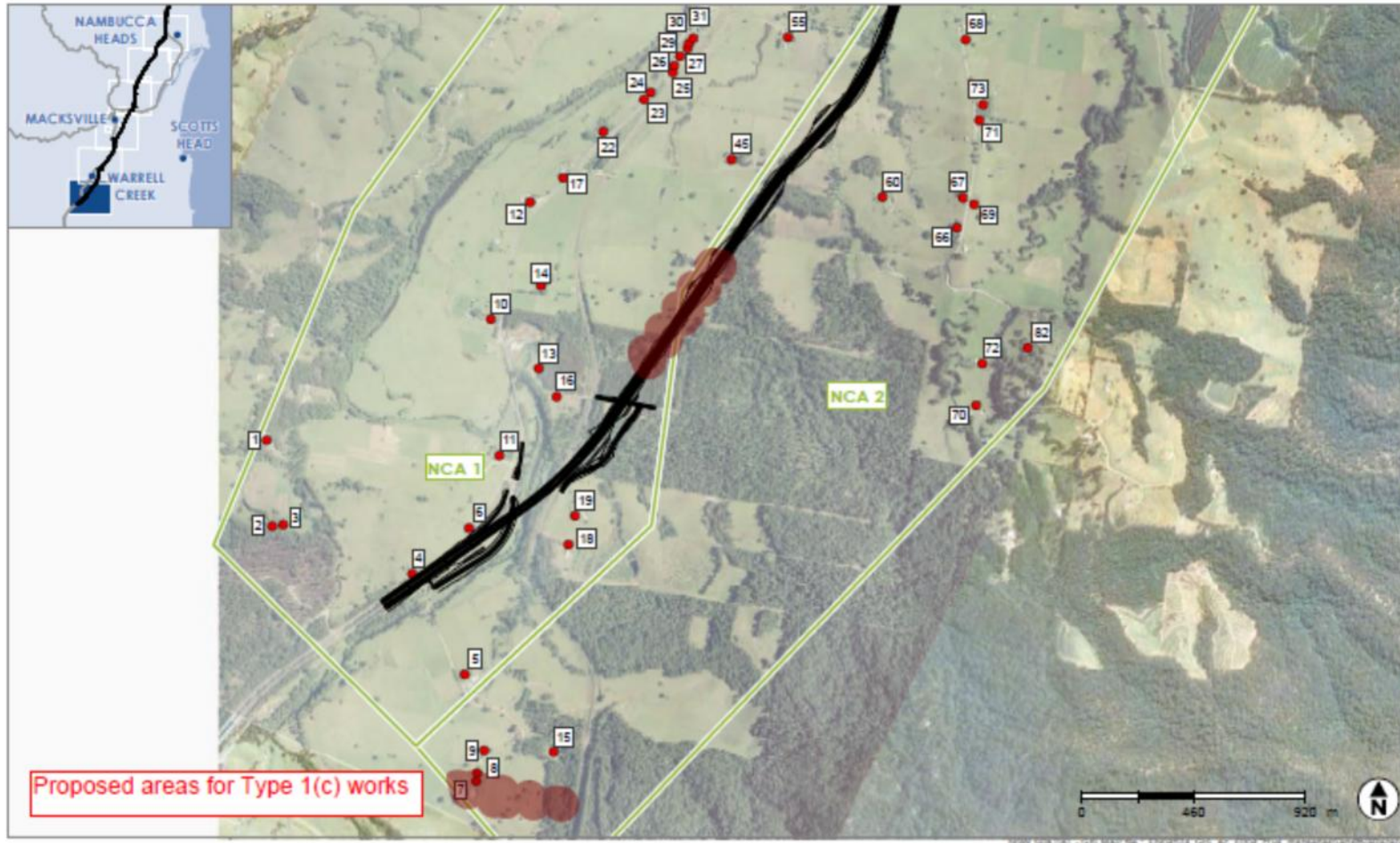


			45,300 46,100 47,500 48,200 49,300 52,000 – 52,900 53,400 54,500 60,900	start or finish bridge deck pours outside normal work hours to avoid excessive heat compromising concrete quality.	<ul style="list-style-type: none"> <li>• Concrete pump</li> <li>• Concrete vibrator</li> <li>• Welding equipment</li> <li>• Excavator</li> <li>• Pneumatic jackhammer</li> <li>• Delivery truck</li> <li>• Concrete truck</li> <li>• motor boat</li> <li>• generator</li> <li>• water pump</li> <li>• barge</li> <li>• lighting tower</li> </ul>	(Jul 15 – Jul 17)
13	Geotech Investigations or survey work	Ground investigations and survey set-out / pick up.	All of the project	<ul style="list-style-type: none"> <li>• restricted Pacific Highway Road (ROL restrictions)</li> <li>• unsafe work zone to adjacent traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Truck mounted drills</li> <li>• Piling rigs</li> <li>• Backhoe</li> <li>• Excavators</li> <li>• Trucks</li> <li>• Pumps</li> <li>• Generators</li> <li>• Light vehicle</li> <li>• lighting tower</li> </ul>	As required throughout project

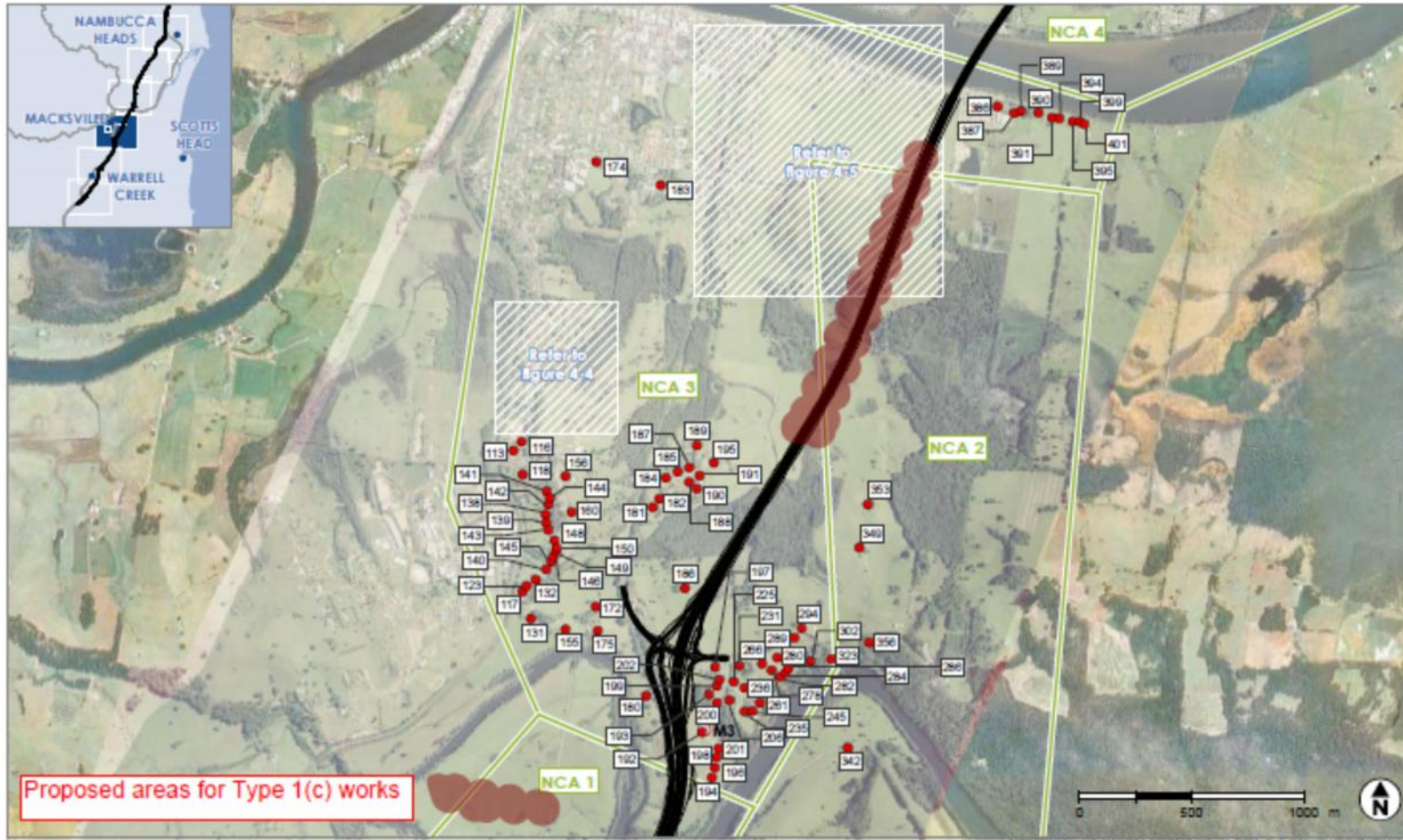


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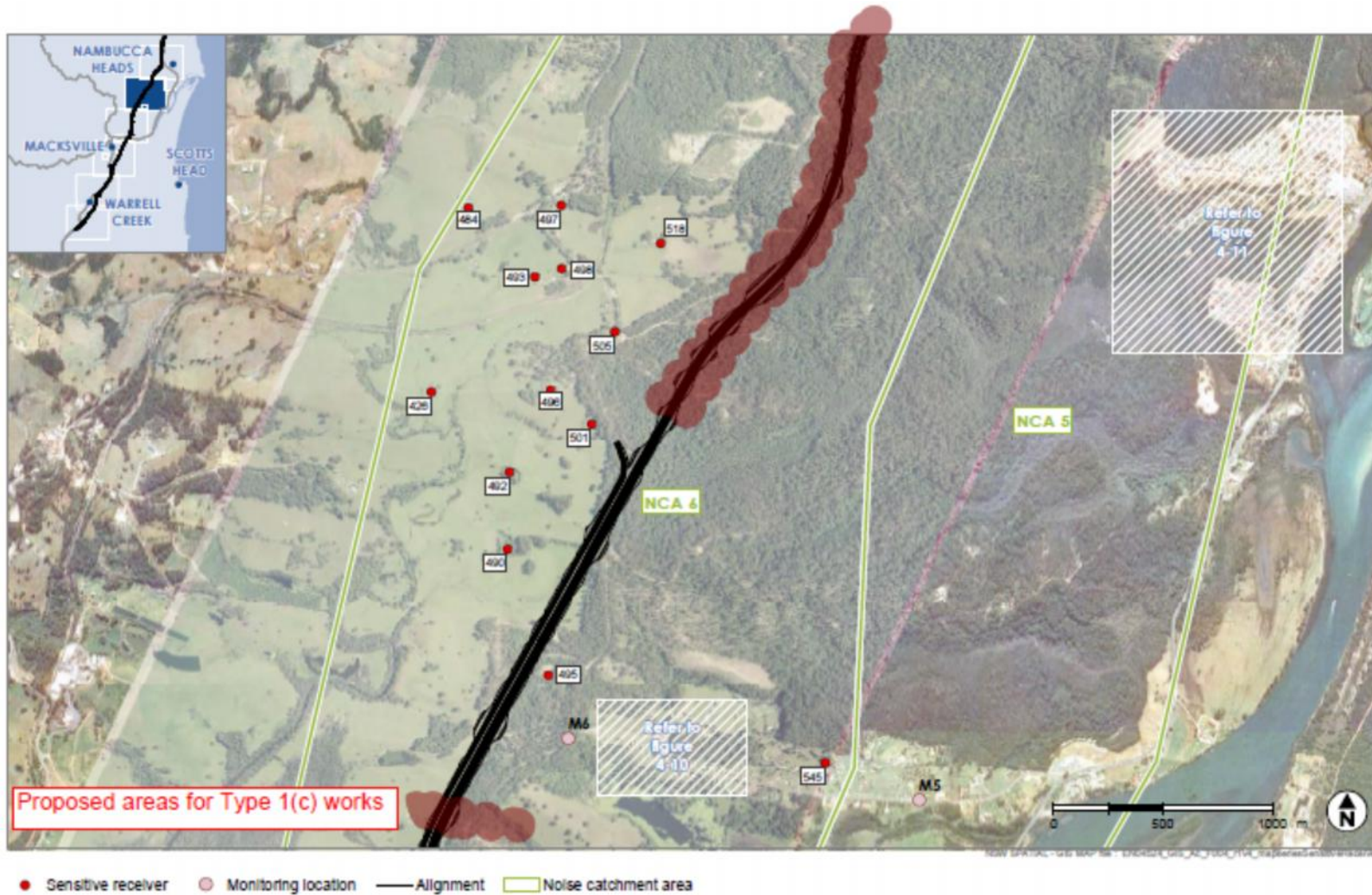
**Appendix C – Locations of potential Type 1 (c) works**



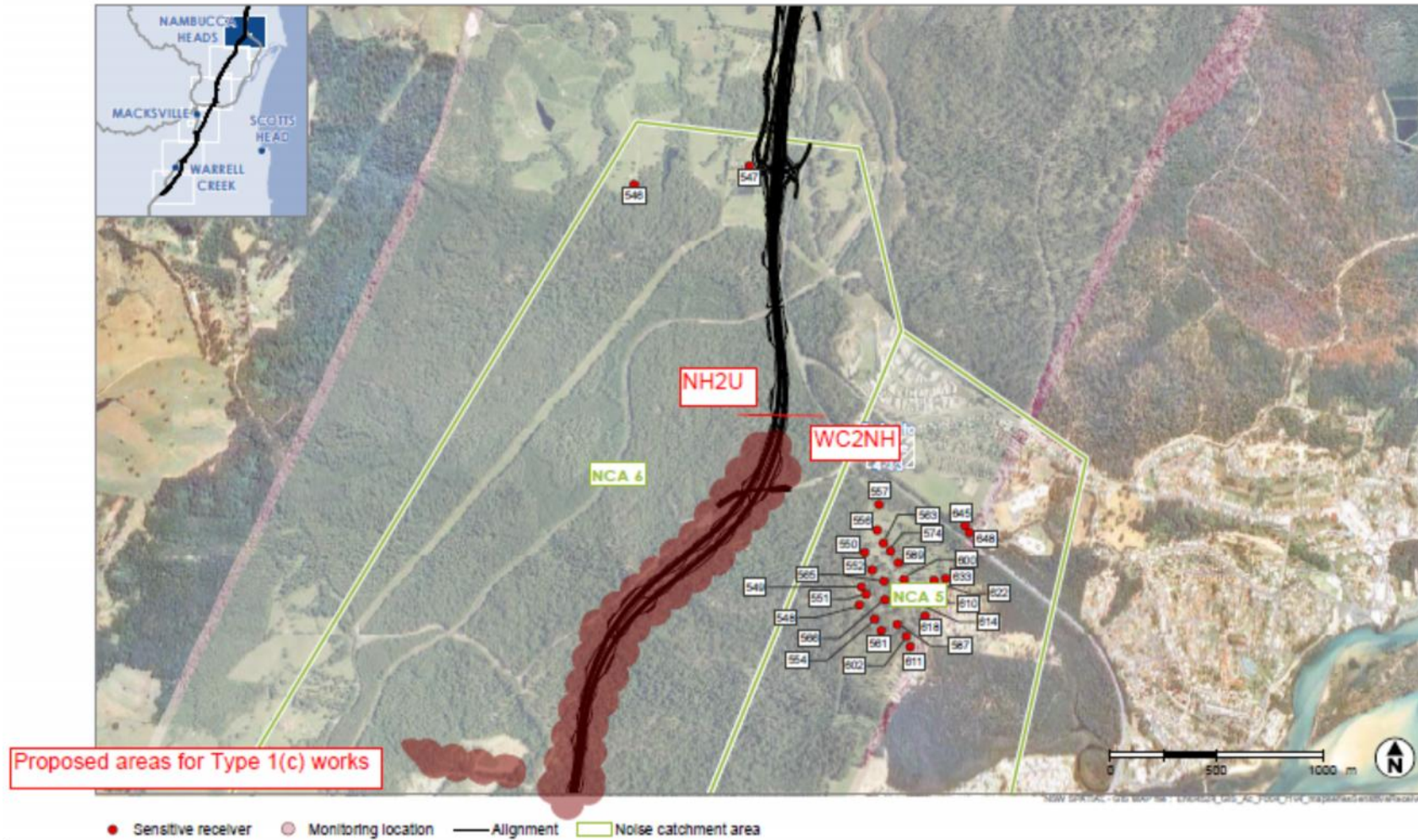




● Sensitive receiver   ● Monitoring location   — Alignment   □ Noise catchment area



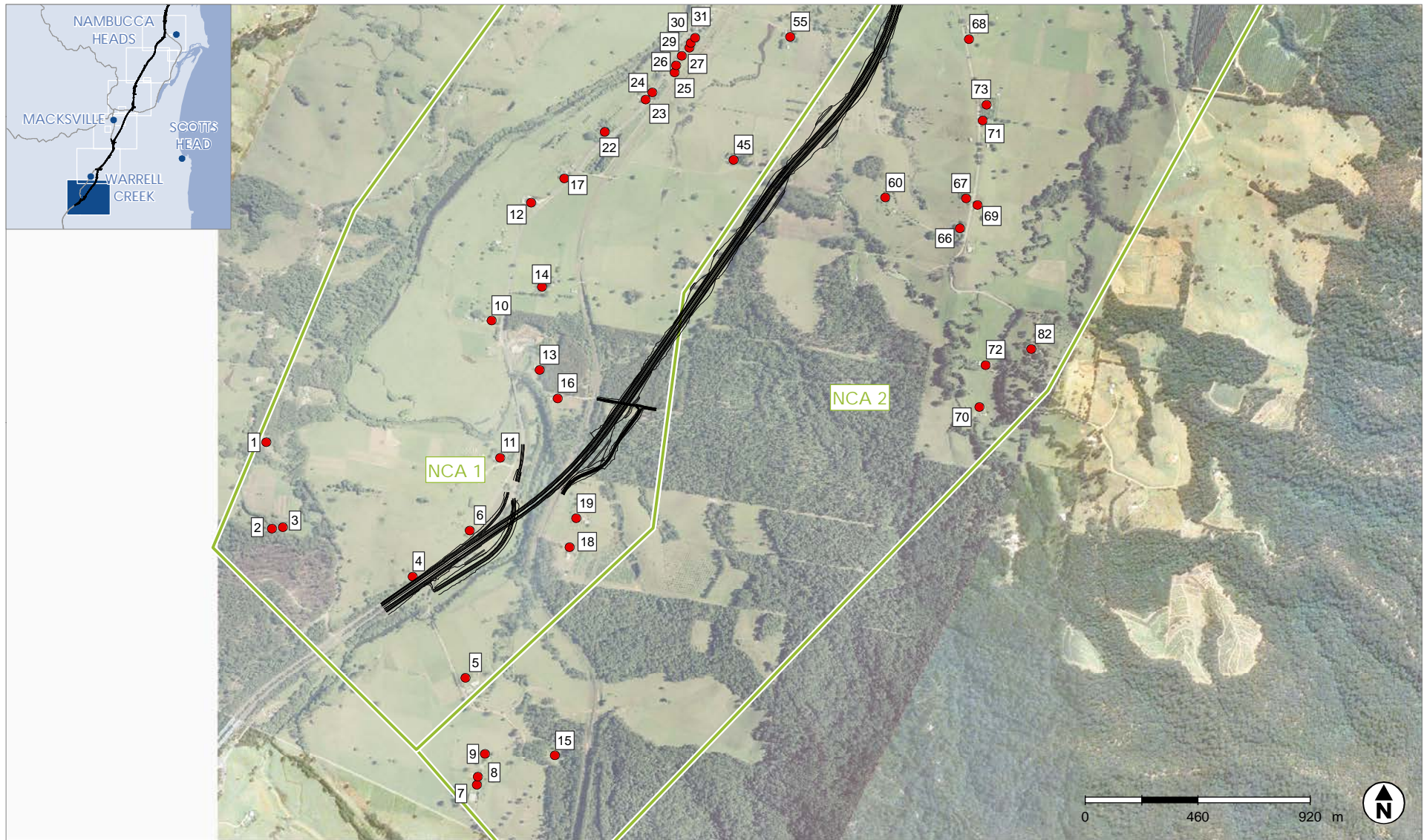






## **Appendix D**

### **Sensitive Receiver Locations**

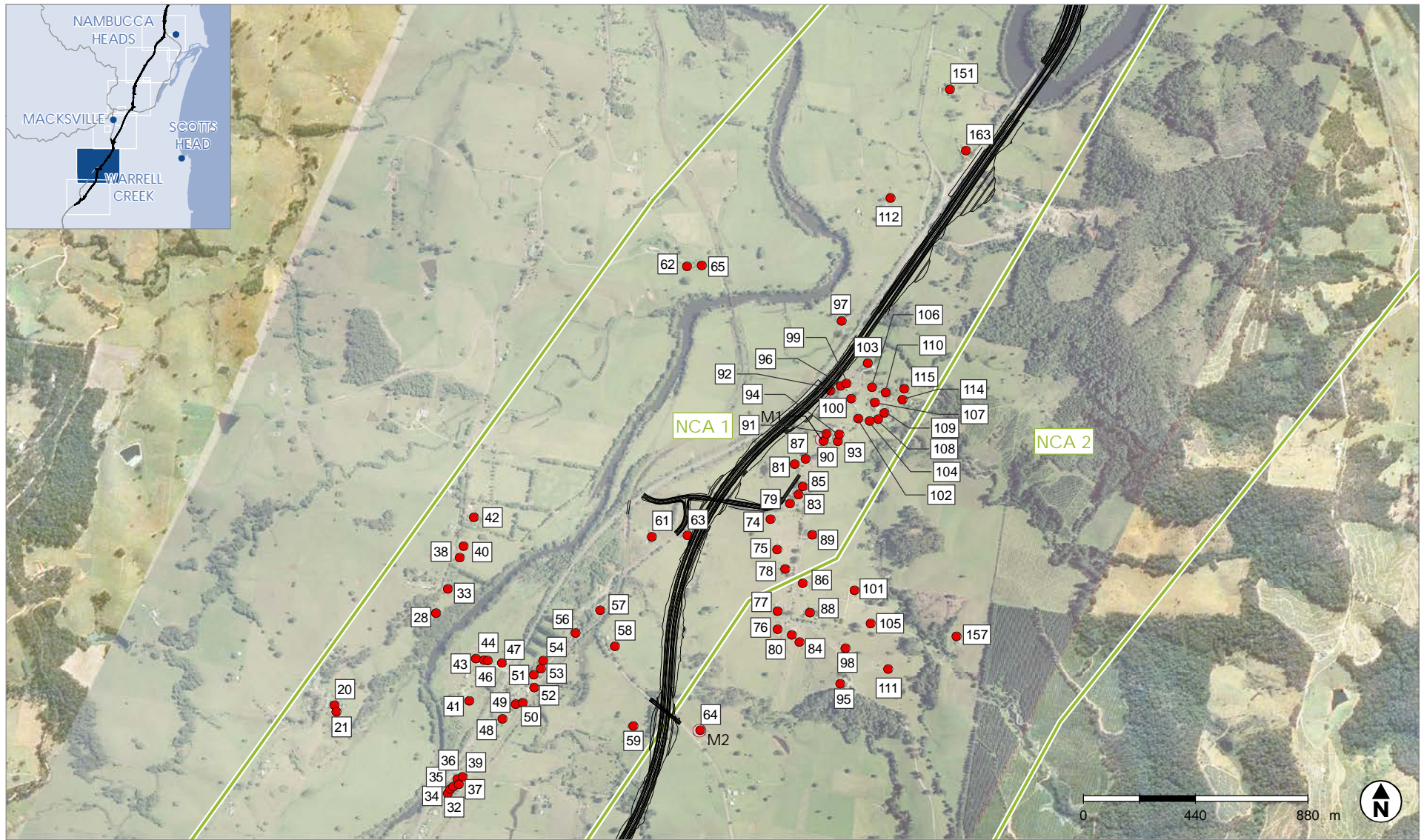


NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F004\_r1v4\_mapseriesSensitiveReceivers

- Sensitive receiver
- Monitoring location
- Alignment
- ▭ Noise catchment area

Figure 4-1 Sensitive receivers



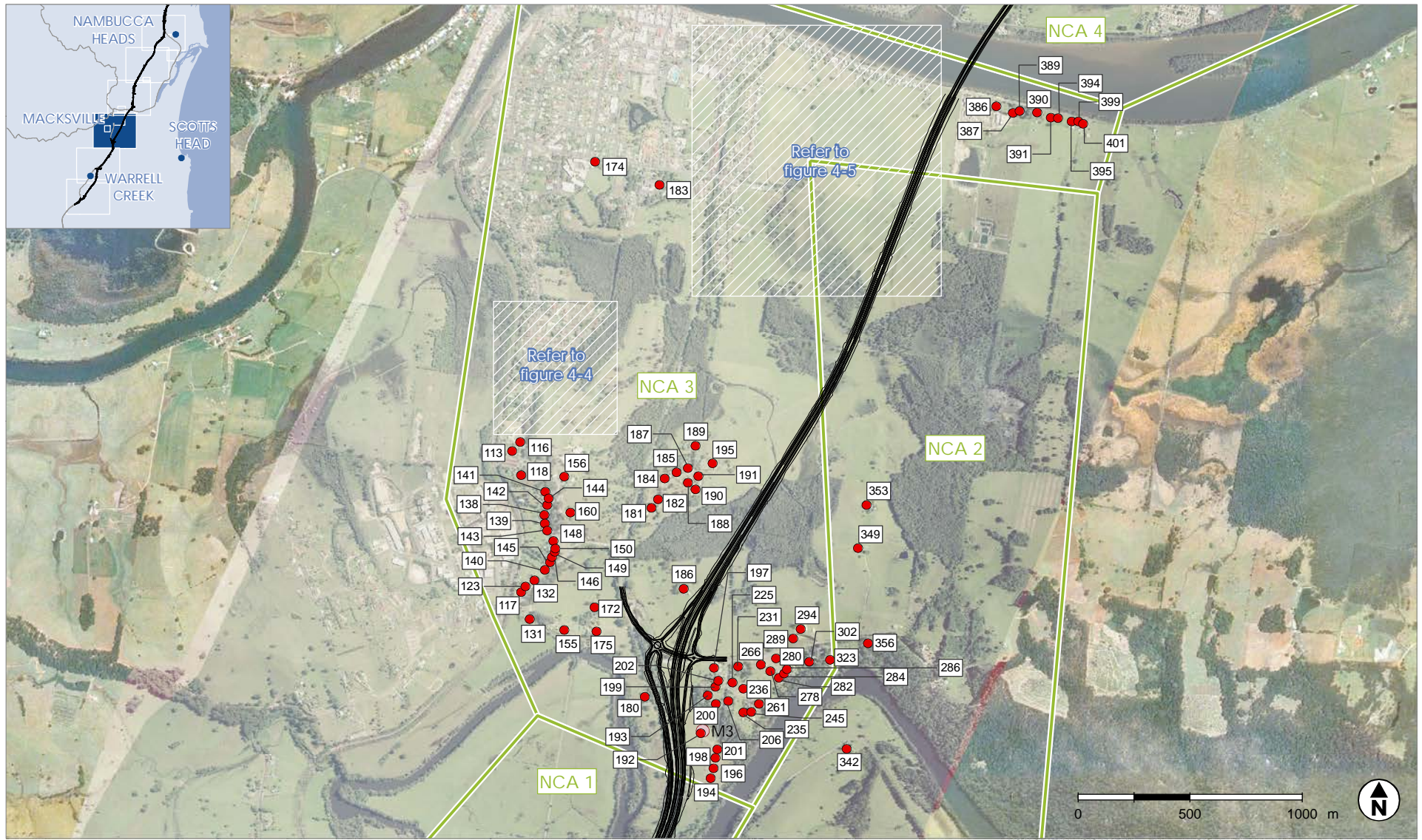


NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F004\_r1v4\_mapseriesSensitiveReceivers

- Sensitive receiver
- Monitoring location
- Alignment
- ▭ Noise catchment area

Figure 4-2 Sensitive receivers

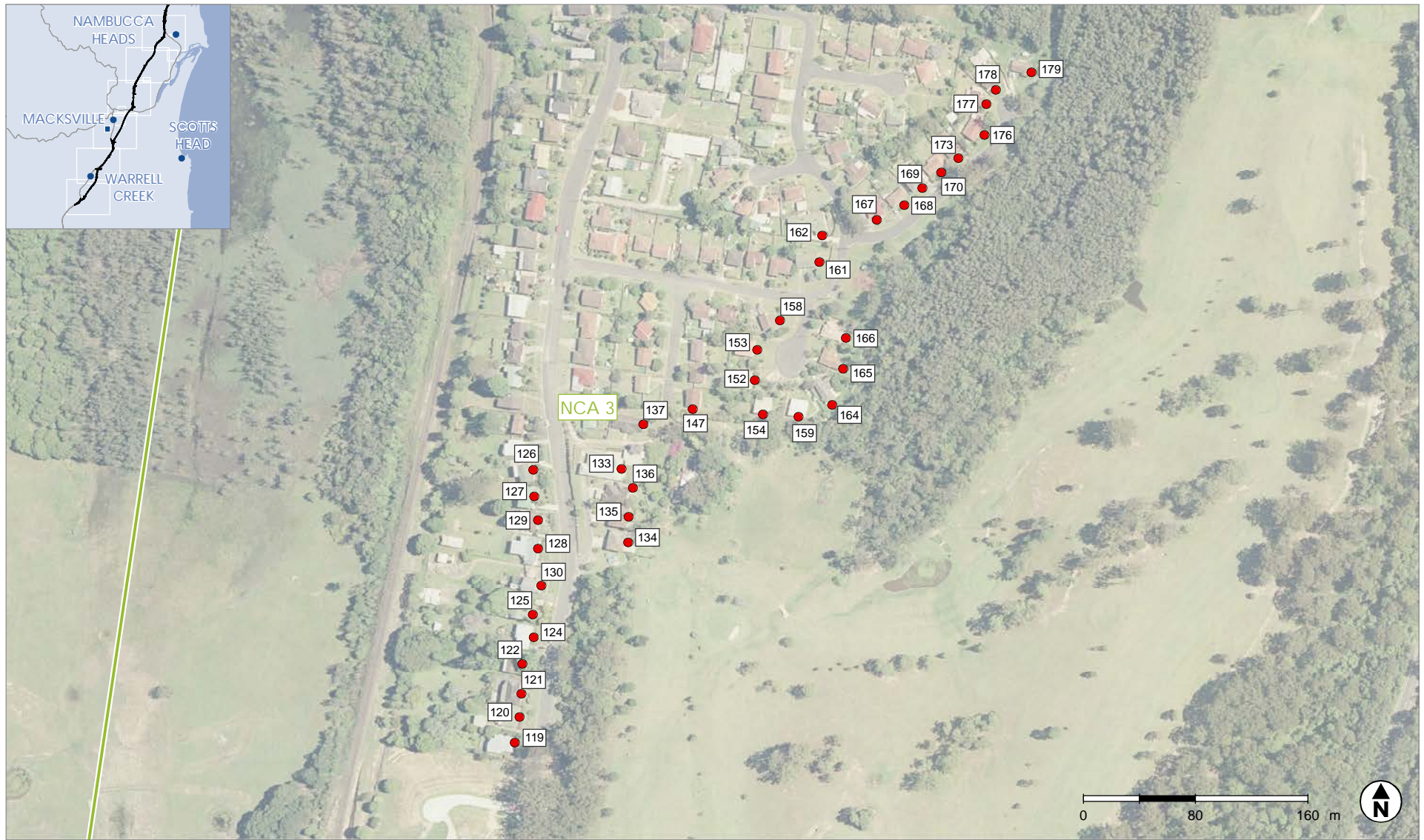




● Sensitive receiver   
 ● Monitoring location   
 — Alignment   
  Noise catchment area

Figure 4-3 Sensitive receivers





NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F004\_r1v4\_mapseriesSensitiveReceivers

- Sensitive receiver
- Monitoring location
- Alignment
- ▭ Noise catchment area

Figure 4-4 Sensitive receivers

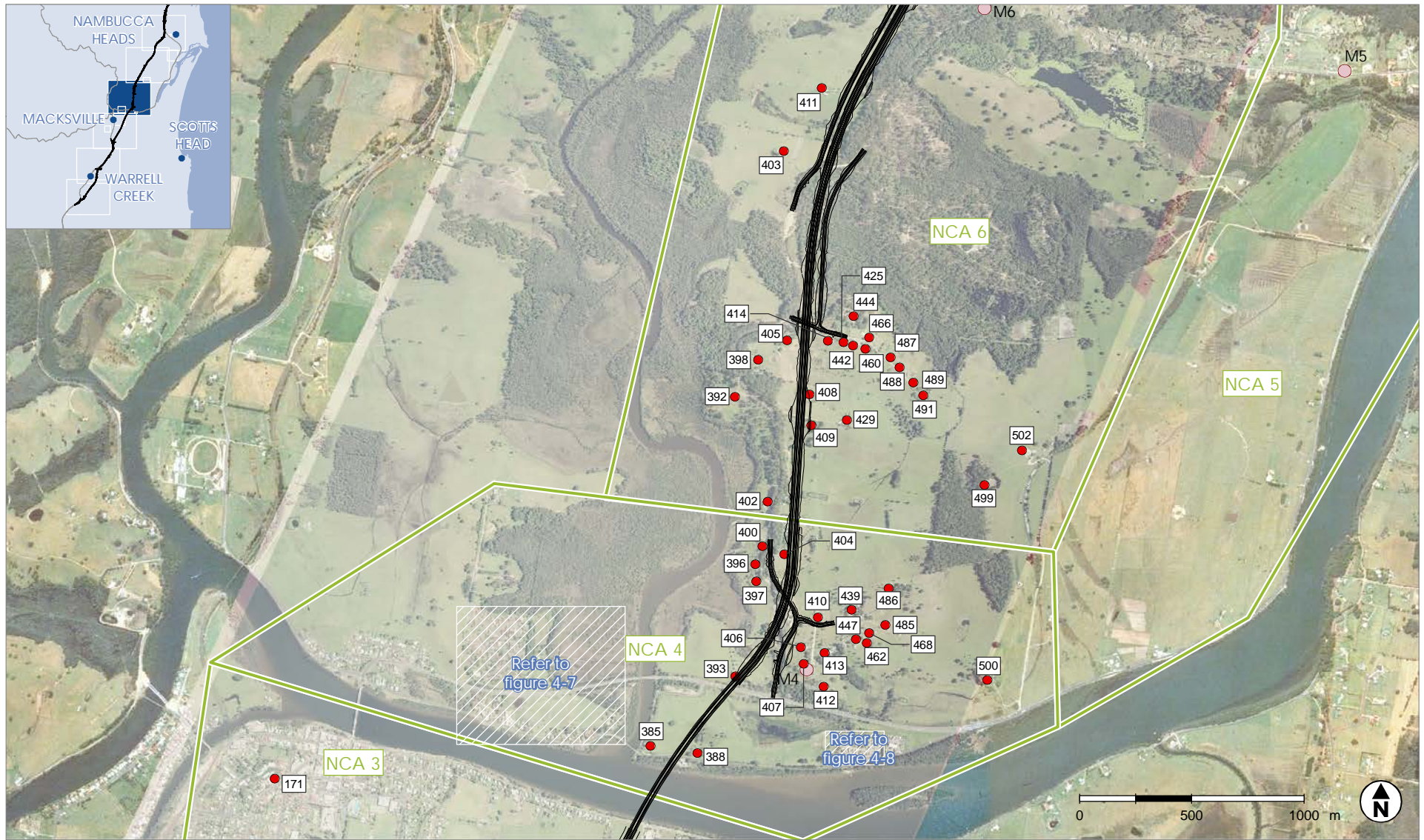




● Sensitive receiver    ● Monitoring location    — Alignment    □ Noise catchment area

Figure 4-5 Sensitive receivers





● Sensitive receiver   
 ● Monitoring location   
 — Alignment   
  Noise catchment area

Figure 4-6 Sensitive receivers



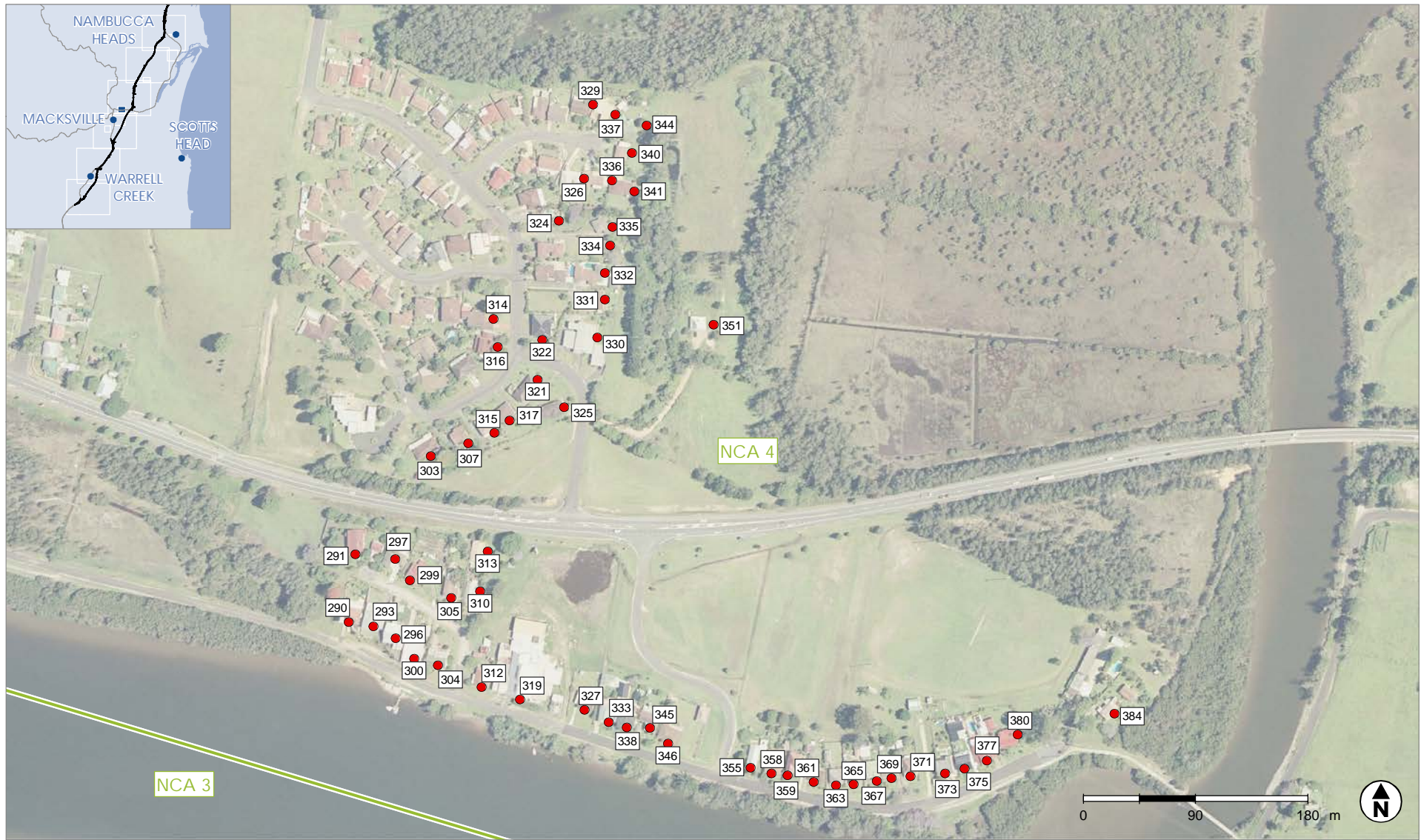


Figure 4-7 Sensitive receivers



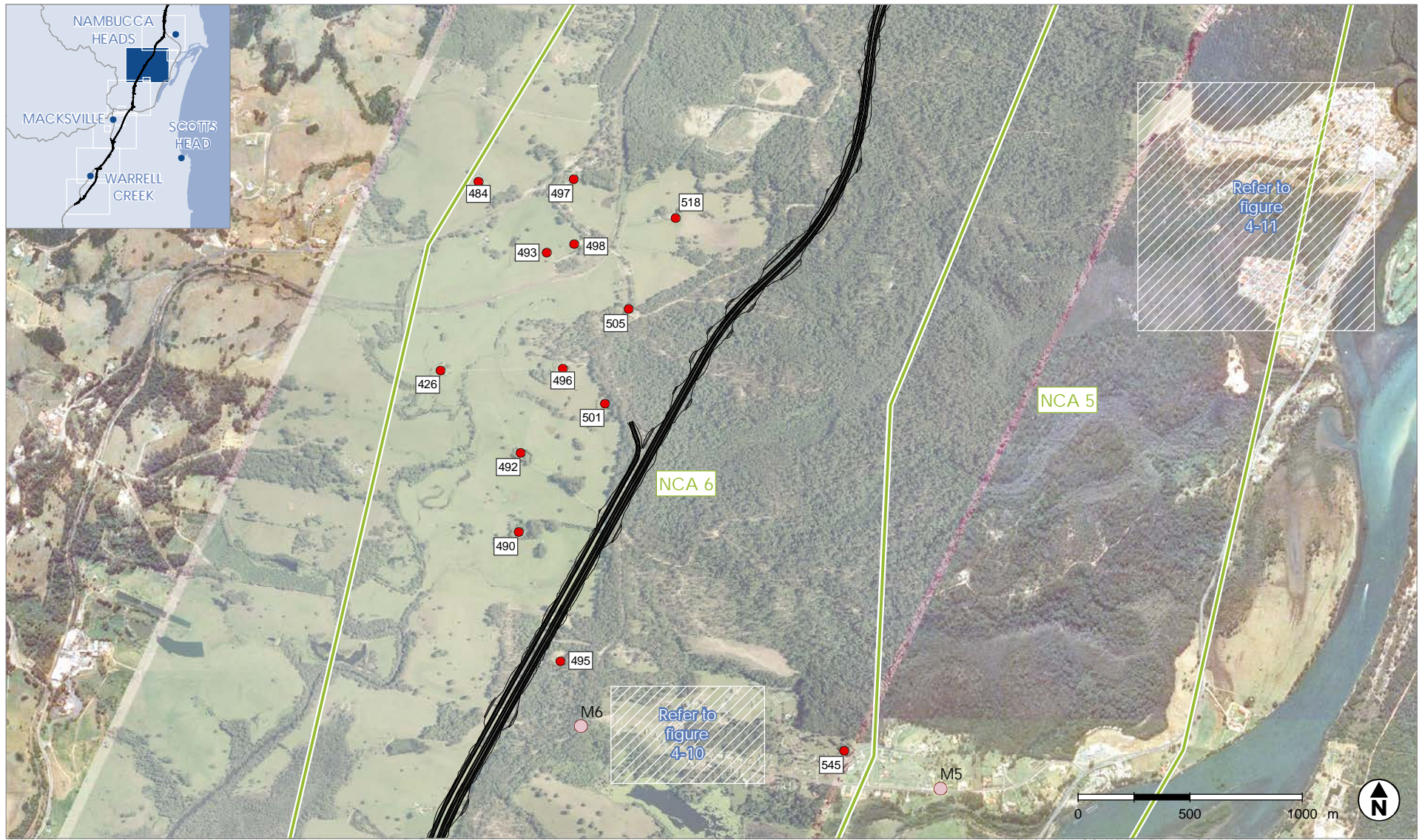


NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F004\_r1v4\_mapseriesSensitiveReceivers

● Sensitive receiver    ● Monitoring location    — Alignment    □ Noise catchment area

Figure 4-8 Sensitive receivers





● Sensitive receiver    ● Monitoring location    — Alignment    □ Noise catchment area

Figure 4-9 Sensitive receivers

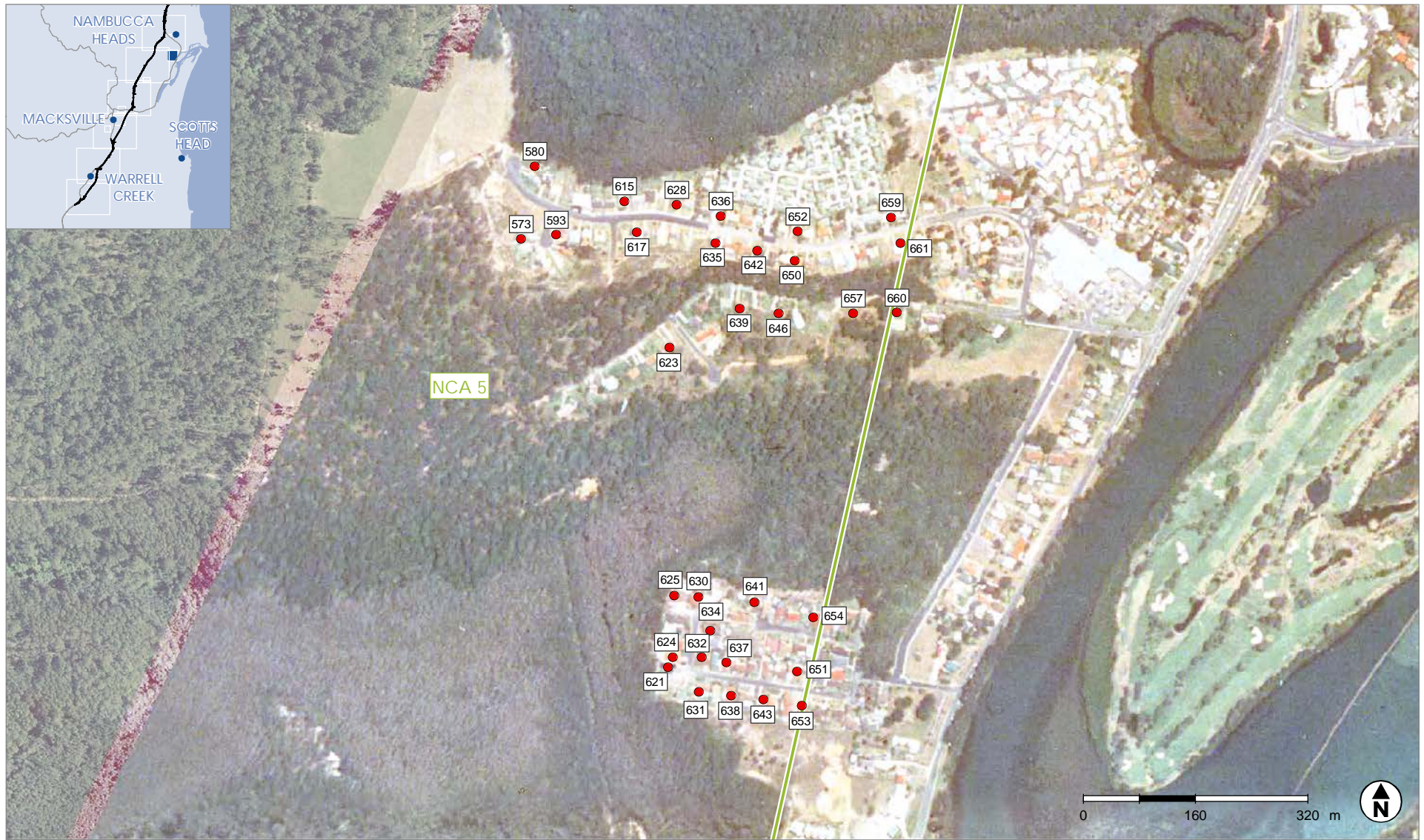




● Sensitive receiver    ● Monitoring location    — Alignment    □ Noise catchment area

Figure 4-10 Sensitive receivers

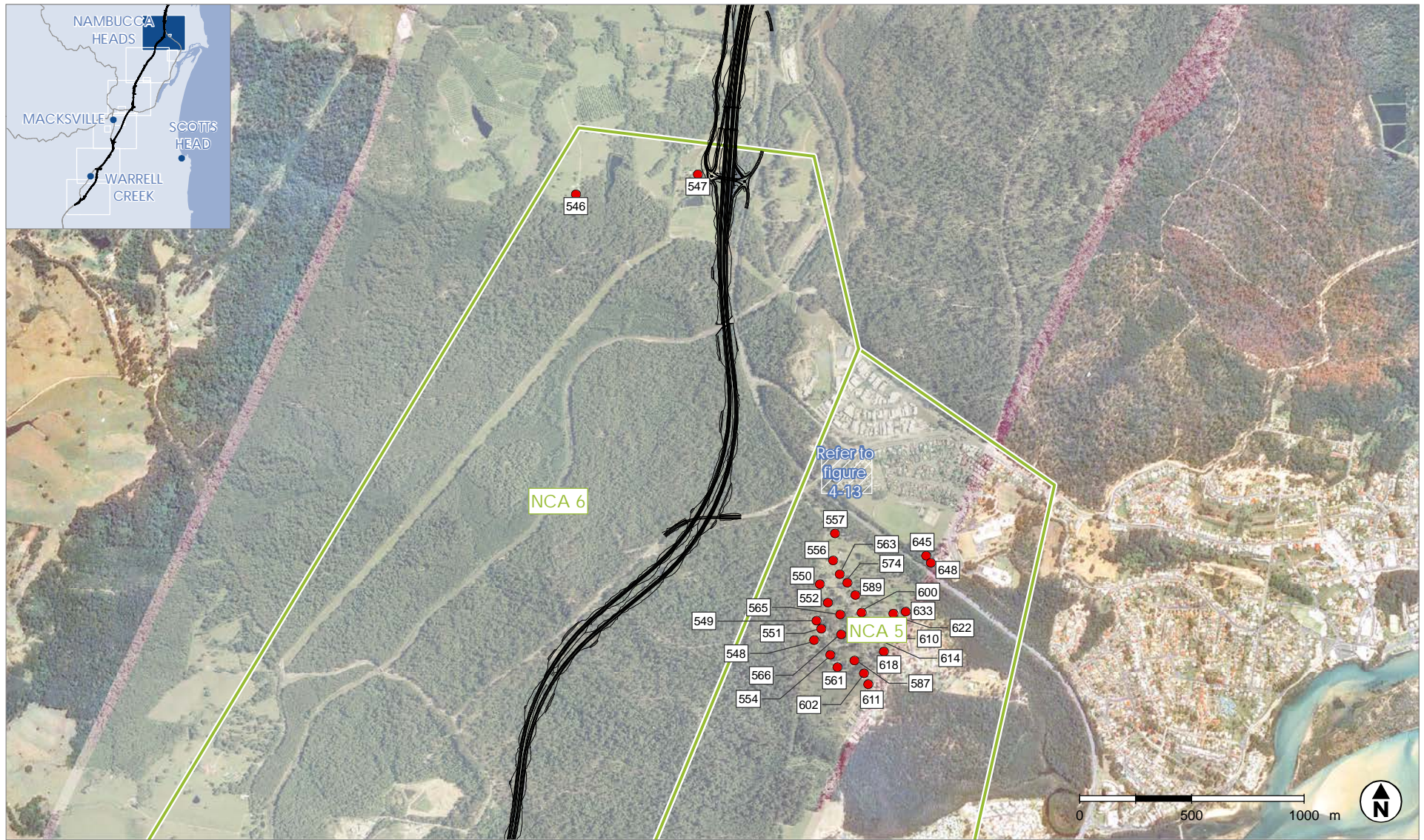




● Sensitive receiver    ● Monitoring location    — Alignment    □ Noise catchment area

Figure 4-11 Sensitive receivers





- Sensitive receiver
- Monitoring location
- Alignment
- ▭ Noise catchment area

Figure 4-12 Sensitive receivers





NSW SPATIAL - GIS MAP file : EN04524\_GIS\_Ac\_F004\_r1v4\_mapseriesSensitiveReceivers

● Sensitive receiver    ○ Monitoring location    — Alignment    □ Noise catchment area

Figure 4-13 Sensitive receivers