

APPENDIX H

Construction noise and vibration framework

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT





Specification

NSW Construction Noise and Vibration Framework



Document Control

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1	18/11/2021	Approved for Use Amendments include <ul style="list-style-type: none"> Document re-numbered from 0-9000-ENV-00-RP-0001 to 0-0000-902-EMN-00-SP-0001 in accordance with current IR Document Numbering Standard Document transferred to new IR-branded template Minor edits made to enable ongoing use on NSW projects Updated with SME Noise & Vibration comments to align with NSW Program requirements – ensure alignment with external NSW guidelines. Note: This document supersedes NSW Construction Noise and Vibration Framework 0-9000-ENV-00-RP-0001_3

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Glossary

TERM	ACRONYM	DEFINITION
Alternative Accommodation	AA	Alternate accommodation. Refer to additional mitigation measures
Communication	CO	Communication. Refer to additional mitigation measures
Communication Category 1	CO1	Communication to inform (newsletter, email, letterbox drop, advertisements, website and media). Refer to additional mitigation measures
Communication Category 2	CO2	Personalised communication (door knock, meeting, telephone call). Refer to additional mitigation measures
Conditions of Approval	CoA	Conditions of approval will be issued upon the approval of the EIS by DPE, or the REF approval by ARTC.
Construction Environmental Management Framework		Prepared by ARTC to direct the Contractor in environmental management requirements on the Inland Rail Program. This document will form the basis of the contractor's CNVMP.
Construction Noise and Vibration Impact Statement.	CNVIS	Informs the development of the CNVMP (see table 2)
Construction Noise and Vibration Management Plan.	CNVMP	Details how construction noise and vibration impacts will be minimised and managed. The CNVMP is based on the Project Environmental Management Plan.
Critical State Significant Infrastructure	CSSI	State significant infrastructure which has been declared by the Minister as being essential for the State for economic, environmental or social reasons. Refer to the <i>Environmental Planning and Assessment Act 1979</i> .
Department of Planning and Environment	DPE	
Department of Planning, Industry and the Environment	DPIE	
Draft guideline for construction noise		The NSW EPA has issued a Draft Guideline for Construction Noise (2020) to replace the ICNG. The public consultation on the new Draft construction noise guideline closed on 30 April 2021. The final guideline may replace the ICNG in force during the Inland Rail construction period.
Enhancement Works		Enhancement works involve bridge works, and/ or track lowering, and may also include ancillary works such as gantry works, signalling and communications.
Environmental impact assessment		A broad term that covers a range of assessments required under the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) and any related amendments to the Act.
Environmental Impact Statement	EIS	An Environmental Impact Statement is a document prepared to describe the effect of proposed activities on the environment. An EIS is determined by NSW Planning and Environment and is developed in response to the Secretary's Environmental Assessment Requirements (SEARs).
Environmental Protection License	EPL 3142	ARTC holds an Environmental Protection License (3142) for operation and maintenance of the existing ARTC network which defines requirements for maintenance and operational activities. Some minor works associated with the Inland Rail Proposals (for example amendments to grain hoppers, station canopies, etc within the existing rail corridor) maybe undertaken and governed in accordance

TERM	ACRONYM	DEFINITION
		with this Environmental Protection license rather than and REF or EIS approval. Where this is the case the Contractor will be required to undertake those works in accordance with ARTC's EPL 3142.
Feasible		Relates to engineering considerations, what can practically be built (e.g. safety, access, and site constraints).
Greenfield		This involves construction within an entirely new corridor.
Inland Rail Program (Inland Rail)		The Inland Rail program encompasses the design and construction of a new inland rail connection between Melbourne and Brisbane, via Wagga Wagga, Parkes, Moree, and Toowoomba. The route for Inland Rail is approximately 1,700 km in length. Inland Rail will involve a combination of track upgrades, enhancement of existing rail track and the provision of new track in greenfield areas.
Inland Rail Proposal		Specific works subject to an environmental impact assessment and confined to a particular geographic area within the Program alignment, for example Parkes to Narromine.
Interim Construction Noise Guideline	ICNG	Interim Construction Noise Guideline (DECC 2009)
Noise Management Levels	NML	Airborne noise levels that apply to works.
Out of hours work.	OOHW	Works conducted outside of the Standard ICNG, or otherwise updated guidelines as and when in force, Construction Hours.
Preconstruction Activities		This includes enabling or early works such as geotechnical investigations, the movement of machinery, and other activities that may be undertaken via an Ancillary Works Agreement prior to formal commencement of the Works
Reasonable		Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh adverse social, economic and environmental effects including the cost of the measure. Further advice on determining reasonable measures can be found in the Interim Construction Noise Guideline.
Receiver		<p>A premises that is subject to construction noise or vibration.</p> <ul style="list-style-type: none"> ▶ Noise sensitive receivers are properties where the occupants can be adversely impacted by noise or vibration including dwellings, hospitals, places of worship, childcare centres etc. ▶ Impacted receivers are those exposed to noise and vibration above the relevant management levels. <p>Residential receivers are properties where people reside on a permanent basis.</p>
Respite Offer	RO	Refer to additional mitigation measures.
Review of Environmental Factors	REF	Review of Environmental Factors is a document prepared to describe the effect of proposed activities on the environment. A REF will be prepared for Projects where an EIS is not triggered. The need for a REF shall be determined by ARTC.
Secretary's Environmental Assessment Requirements	SEARs	Secretary's Environmental Assessment Requirements are the requirements that must be addressed as part of the EIS.
Standard construction hours		<p>The standard hours for construction recommended under the ICNG:</p> <ul style="list-style-type: none"> ▶ 7:00am to 6:00pm Monday to Friday ▶ 8:00am to 1:00pm Saturday ▶ At no time on Sunday or Public Holidays
Standard Program Construction Hours		<p>Hours of work for Contractors on Site Contractor Activities undertaken as part of a Project on the Inland Rail Program shall comply with:</p> <ul style="list-style-type: none"> ▶ ICNG standard hours, unless otherwise amended by Environmental Approvals and conditions on the Proposal which will take precedents

TERM	ACRONYM	DEFINITION
Standard Project Blasting Hours		Hours of work for Contractors on Site Contractor Activities for blasting undertaken as part of a Project on the Inland Rail Program: <ul style="list-style-type: none"> ▶ Monday – Friday 9am – 5pm; ▶ Saturday 9am -1pm; and ▶ No blasting is to be undertaken on Sundays or public holidays.
State Significant Infrastructure	SSI	
The former Department of Environment and Climate Change	DECC	
Upgrade works		Can involve any or all of the following: upgrading the track, formation, culverts, curve easing, construction of passing loops and/ or ancillary works to level crossings, signalling and communications, signage, fencing, services and utilities.
Weekend work		Work occurring 1pm – 6pm on Saturday and 6am - 6pm on Sunday.

1 Introduction

1.1 Purpose

The Framework is applicable to all NSW Inland Rail proposals and fulfils the recommendations in the *Interim Construction Noise Guideline, DECC 2009* (ICNG) for organisations to detail best practice, project-specific approaches to minimise noise impacts from pre-construction activities and construction and provide the public with transparency. The Framework also establishes the requirements for the management of construction vibration.

This Framework applies to all Project stages, from the environmental impact assessment through to construction and is most relevant to:

- ▶ Project managers
- ▶ Acoustic consultants
- ▶ Environmental officers
- ▶ Contractors.

This Framework does not take precedence over proposal specific Approval or licence conditions. This Framework will be reviewed as ARTC progresses to incorporate learnings from Inland Rail activities and in response to release or update of relevant guidelines, Standards and policies.

Any reference to 'construction noise' in this Framework should also be taken to include noise generated by 'pre-construction activities'. Similarly, a reference to vibration also includes vibration generated as part of pre-construction activities. Within NSW there are seven Inland Rail Program Project areas, these are described in Table 1.

Table 1 NSW Inland Rail Proposals

PROPOSAL	DESCRIPTION	PROJECT TYPE	ASSESSMENT TYPE
ALBURY TO ILLABO	Providing double-stack capability for 185km of existing track.	Enhancement	SSI EIS
ILLABO TO STOCKINBINGAL	New 37km standard gauge rail line that eliminates a twisty section of track known as the Bethungra Spiral.	Greenfield	SSI EIS
STOCKINBINGAL TO PARKES	Providing double-stack capability and passing loops on 173km of existing track.	Enhancement	REF
PARKES TO NARROMINE	Upgrade of the existing 107km section of track, with passing loops, ancillary works and new 5.3km connection to the Broken Hill line.	Upgrade	SSI EIS
NARROMINE TO NARRABRI	307km of new track constructed between Narromine and Narrabri.	Greenfield	SSI EIS
NARRABRI TO NORTH STAR	188km of existing track upgraded to take heavier axle loads and double stacked trains	Upgrade	SSI EIS
NORTH STAR TO NSW/QLD BORDER	52 km of new track.	Greenfield	SSI EIS

1.2 Objectives

The objectives of this Framework are to:

- ▶ Ensure neighbours and people living in close proximity to where the Works are being undertaken are not unduly impacted and also address the requirements of relevant NSW guidelines, Standards and policies;
- ▶ Provide a consistent approach to the evaluation, selection and delivery of feasible and reasonable noise and vibration controls during construction; and
- ▶ Balance the needs of adjacent communities, rail commuters and train operators by facilitating efficient Project delivery.

2 Construction noise and vibration assessment

The level of detail available on the construction methodology and Project design increases as the planning and approval process progresses. Noise and vibration assessments are undertaken to quantify the impact of construction activities on receivers. The results of the assessment are then used to develop management measures to mitigate the impact of construction activities on receivers. Assessments should:

- ▶ Be based on the best information available at the time;
- ▶ Assess a realistic, worst-case scenario; and
- ▶ Provide sufficient detail to identify Project specific noise and vibration mitigation measures.

Assessments and plans incorporating different levels of detail shall be required pre and post project approval. Table 2 identifies the document and information required at each stage.

Each aspect of construction noise and vibration is to be assessed in accordance with NSW state guidelines, Australian or international standards (Table 3), and the SEARs and relevant conditions of approval. Assessments should be quantitative and where possible estimate the duration of impact on receivers, noting that works will move along the alignment and are unlikely to affect a single receiver for the entire project construction period. Note that the ICNG is scheduled for replacement, and the appropriate replacement guideline must be followed.

Table 2 Construction Noise and Vibration Assessment Documents

PROJECT STAGE	DOCUMENT	DESCRIPTION	CONTENT
Pre-approval	Environmental impact assessment (EIS or REF) – Noise and Vibration Study (and any subsequent revisions prepared during the approval phase)	Describes all noise and vibration effects of the Project on the environment and advises how best to manage the impacts.	<ul style="list-style-type: none"> ▶ Description of works, expected duration and proposed working hours and noise management levels ▶ Identification of noise sensitive receivers including impacted commercial receivers ▶ Identification of vibration sensitive structures including heritage buildings, and other vibration sensitive receivers (including sensitive scientific and medical equipment) ▶ Assessment of likely noise impacts, including sleep disturbance arising from proposed working hours ▶ Assessment of construction methods with the potential to cause discomfort, cosmetic or structural damage ▶ Conceptual description of feasible and reasonable work practices to minimise noise and vibration impacts ▶ Quantification of residual impacts following implementation of recommended mitigation measures ▶ Cumulative noise assessment taking account of adjacent IR Proposals and any other identified Major development in the vicinity of the Proposal

			<ul style="list-style-type: none"> ▶ Changes made to the proposal in response to submissions
Approval(s)	SSI or REF approval Environment Protection Licence (EPL)	Sets project CoA and reporting requirements	<ul style="list-style-type: none"> ▶ Sets working hours, noise management criteria ▶ Establishes reporting and complaint obligations
Post-approval	Construction Environmental Management Plan	Prepared by the Contractor to collate the environmental management requirements for each proposal and inform the development of the contractor's CNVMP. Based on detailed design incorporating a Construction Noise and Vibration Impact Statement (CNVIS).	<ul style="list-style-type: none"> ▶ Collates the CoA and licence conditions, the EIS commitments and mitigation measures ▶ Description of works, duration, working hours and noise management levels ▶ Detailed assessment of likely noise impacts, including sleep disturbance based on detailed design ▶ Assessment of construction methods with the potential to cause vibration generated discomfort, cosmetic or structural damage, based on detailed design ▶ Assessment and identification of all reasonable and feasible mitigation measures to minimise noise and vibration at impacted sensitive receivers ▶ Quantification of residual impacts following implementation of reasonable and feasible mitigation measures ▶ Identification of management measures to be implemented for residual impacts and general community management ▶ Defines the requirements for pre-construction dilapidation surveys ▶ Identification of monitoring, training and auditing requirements
	Construction Noise and Vibration Management Plan (CNVMP)	Details how construction noise and vibration impacts will be minimised and managed. Incorporates proposal specific approval or licence conditions. Prepared prior to the commencement of the Works by the Contractor.	<ul style="list-style-type: none"> ▶ Description of works, duration and working hours and noise management levels ▶ Identification of noise sensitive receivers including impacted commercial receivers ▶ Identification of vibration sensitive structures and receivers, and requirements for dilapidation surveys and/or monitoring during construction ▶ Details of construction including and indicative schedule for key construction scenarios ▶ Feasible and reasonable work practices to minimise noise and vibration impacts based on the CNVIS and updated with any changes in construction that may occur through the delivery of the Proposal ▶ Monitoring and auditing procedures ▶ Blast Management Plan (if applicable) considering methods contained in AS2187.2-2006

Table 3 Construction Noise and Vibration Guidelines and Standards

ASPECT	DESCRIPTION	FRAMEWORK
Airborne noise	Construction noise	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009)
	Construction traffic noise	NSW Road Noise Policy (NSW EPA, 2011)
	Sleep disturbance (for works extending over more than two consecutive nights)	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009) NSW Road Noise Policy (NSW EPA, 2011)
Ground-borne noise	Sound transmitted through the ground into a structure, for example by underground works such as tunnelling.	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009)
Vibration	Human responses to vibration.	Assessing Vibration: a technical guideline (Department of Environment and Conservation, NSW, 2006)
	Effect of vibration on structures (cosmetic and/ or structural damage)	German Standard DIN 4150-3: Structural Vibration – effects of vibration on structures.
Blasting	Overpressure and vibration from blasting, potential to cause annoyance/ discomfort, cosmetic or structural damage	Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZECC 1990) or other limit set by conditions of consent ¹ AS 2187: Part 2-2006 'Explosives - Storage and Use - Part 2: Use of Explosives'

2.1 Construction hours

2.1.1 Standard construction hours

Assessment of noise and vibration should be undertaken with reference to the Standard ICNG Construction Hours:

- ▶ 7:00am to 6:00pm Monday to Friday
- ▶ 8:00am to 1:00pm Saturday
- ▶ At no time on Sunday or Public Holidays

Construction works may only be undertaken outside of Standard Construction Hours:

- ▶ As defined in Section 2.3, or
- ▶ When Program Environmental Approvals and conditions for the Construction Works permit alternative hours.

2.1.2 Standard program blasting hours

The Standard Program Blasting Hours are below. These are consistent with the ICNG.

- ▶ Monday – Friday 9am – 5pm;
- ▶ Saturday 9am -1pm; and
- ▶ No blasting is to be undertaken on Sundays or public holidays.

¹ Recent NSW infrastructure project approvals have recognised that levels presented in Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration are restrictive and have applied these upper limits: vibration (PPV): 25mm/s, overpressure: 125dBL at the nearest receiver. More conservative limits apply to heritage structures and buildings.

2.2 Works outside of standard construction hours

Works may be conducted outside of the standard program construction hours if one or more of the following applies:

- ▶ The delivery of oversized plant or structures that police or other authorities have determined requires special arrangements to transport along public roads;
- ▶ Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm;
- ▶ Works that do not exceed the noise management level adopted in the Construction Noise and Vibration Management Plan (CNVMP) at the nearest receiver;
- ▶ Works that do not exceed the 'preferred' human exposure vibration level adopted in the Construction Noise and Vibration Management Plan (CNVMP) at the nearest receiver;
- ▶ Where agreement is reached between the Contractor and/or ARTC and potentially affected sensitive receivers. Agreements must be made in writing (refer to Section 7.2.2 of the ICNG for further guidance);
- ▶ Works to ensure construction personnel, road user or public safety;
- ▶ Works that cannot be undertaken during the day due to ambient daytime temperatures that may be carried out during the night;
- ▶ Rail tamping where the stress-free temperature of the rail cannot be achieved during the Standard Program Working Hours; and
- ▶ Works required to be conducted during a track possession.

2.3 Track possessions

Track possessions shall be required by the Contractor to undertake the Works on operational rail lines as part of the Inland Rail Program. Track possessions are undertaken when safety or construction requirements mean that construction cannot be completed during standard program construction hours.

Noise and vibration impacts from track possessions shall be assessed by the Contractor in the environmental impact assessment, noting that the number of possessions required by a proposal or the scale of the possession may not be defined. A further detailed assessment should be undertaken by the Contractor as part of the CNVIS to address Site specific mitigation measures.

3 Management measures

3.1 Standard management measures

The measures below shall be applied to all Works conducted by the Contractor during Standard Program Construction Hours to minimise potential noise and vibration impacts at surrounding noise sensitive receivers. ARTC considers that the measures in Table 4 are feasible and reasonable for all Inland Rail proposals in most circumstances.

Table 4 Standard Management Measures

STANDARD MANAGEMENT MEASURES
Site inductions for all employees and contractors will address: <ul style="list-style-type: none"> ▶ Environmental aspects and impacts; ▶ Proposal specific and standard noise management measures; ▶ Licence and approval conditions; ▶ Hours of work; ▶ Environmental incident reporting and management procedures; and ▶ Complaint management.
Daily site-specific briefings for all employees and contractors will include:

- ▶ Site specific noise management measures;
- ▶ Location of nearest noise sensitive receivers;
- ▶ Construction employee parking areas;
- ▶ Behavioural practices (e.g. avoid swearing, shouting, dropping materials from heights); and
- ▶ Designated loading/unloading areas and procedures.

Work compounds, storage areas, parking areas, unloading/loading areas and other semi-permanent construction sites should be located away from noise sensitive receivers. Where this is not possible, the orientation and layout of the work site shall consider noise impacts, and opportunities to shield receivers from noise through the use of site buildings and stockpiles should be considered.

Static plant should be located as far as possible from sensitive receivers, be located to take advantage of natural acoustic screening such as terrain, site buildings, etc and where necessary for reduction of noise impacts, provided with an acoustic enclosure.

When working adjacent to schools, medical centres, childcare centres or places of worship, particularly noisy activities will be scheduled outside of operating or service hours where possible.

Equipment that is used intermittently is to be shut down when not in use.

The offset distance between noisy plant and noise sensitive receivers will be maximised.

The number of vehicle trips to and from site will be optimised.

Regularly inspect and maintain equipment to ensure it is operating correctly.

Avoid the simultaneous operation of noisy plant within discernible range of noise sensitive receivers where possible.

Use of non-tonal reversing alarms for all permanent mobile plant².

Where available, equipment selection will favour the use of quieter and less vibration emitting construction methods.

A telephone, email and web-based community information service shall be established to allow the community to obtain additional information on construction activities, provide feedback or make a complaint.

Regular communications on the activities and progress of the proposal shall be provided to the community (e.g. via newsletter, email and/or website).

Noise or vibration monitoring in response to complaints shall be undertaken where the results or the process assist in resolving or understanding the receiver's issue.

Where possible, construction compounds should be located a minimum of 1km from the nearest resident or noise sensitive receiver.

Where vibration levels are predicted to approach the criteria for cosmetic building damage or limits for critical or sensitive areas, attended vibration measurements shall be undertaken at the commencement of vibration generating activities to confirm that vibration limits are within the acceptable range.

Where vibration and overpressure from blasting or construction activities are predicted to approach the relevant limits, dilapidation surveys on potentially affected buildings shall be undertaken.

A respite period shall be provided for receivers impacted by weekend work (see Definitions). The respite period will ensure that no single receiver is impacted for two consecutive periods of weekend work. Respite will be provided every second weekend commencing at 1pm on Saturday and concluding at 7am on Monday.

3.2 Additional management measures

Where Works are conducted outside of Standard Program Construction Hours and noise and vibration result are in exceedance of noise management levels, the Contractor shall implement the measures described above as well as additional measures dependent upon the impacts described below. Due to the number of proposals and the variety of locations that make up the Inland Rail Program in NSW, these measures may need to be adapted to suit individual proposals and community expectations.

² Excludes light vehicles

3.2.1 Communication (CO)

The level of noise and vibration impact and duration shall guide communication with receivers by the Contractor and/or ARTC. Accurate and timely communication is essential to manage and understand community expectations for out of hours works (OOHW).

Two categories of communication have been developed commensurate with the scale of the impact. The purpose of the communication is described below, but the method of communication will be at the discretion of the Contractor and detailed in the Contractor's Communications and Stakeholder Management Plan. It is intended that this Framework will compliment, and be referred to, in all relevant Communications and Stakeholder Management Plans to achieve the engagement outcomes described below.

- ▶ Category 1 CO1: Communication to provide information on the proposal via letter box drop, email, newsletter, media advertisements and/or website a minimum of 5 days prior to the works commencing.
- ▶ Category 2 CO2: Communication should be personalised (e.g. door knock, meeting, telephone call). Contact with these residents should commence early to enable feedback to be considered by the proposal.

At minimum the information provided to Stakeholders (CO1 or CO2) will include:

- ▶ The reason the Works are required to be undertaken outside of the standard program construction hours
- ▶ A diagram that identifies the location of the proposed works in relation to nearby cross streets and local landmarks
- ▶ The nature, scope and duration of the works, including start and finish times
- ▶ The expected noise impacts on receivers
- ▶ Information on how to obtain further information or make a complaint, including an after-hours number and Inland Rail Program website

3.2.2 Respite offer (RO)

Residential receivers subject to lengthy periods of noise or vibration may be eligible for a respite offer in accordance with tables 6, 7 and 8. The purpose of such an offer is to provide residents with respite from an ongoing impact and may comprise of pre-purchased movie tickets, dinner vouchers or similar.

Respite offers are not applicable to non-residential receivers.

Respite can also be provided by limiting high noise generating works and allowing at least a one-hour respite period between blocks of work. Where possible, the timing of this respite should be discussed with the impacted community.

3.2.3 Alternate accommodation (AA)

Alternate accommodation options (i.e. accommodation in motels away from the worksite) may be provided for residents living in close proximity to construction sites in accordance with Tables 6 – 8 below.

Acceptable accommodation measures shall be developed by the Contractor and ARTC for the affected community and be approved by the ARTC Representative prior to discussion with the resident.

3.2.4 Assigning additional management measures

Tables 5-7 identify appropriate additional management measures for noise sensitive receivers by matching the predicted exceedance of the relevant management level to the appropriate management measures which serve to counter or mitigate that exceedance. The management levels are derived from the assessment process outlined in the relevant guideline or Standard (see Table 3).

Out of Hours Work (OOHW) has been divided into two periods (rest and sleep) in Tables 5-7 to recognise the different impact Works can have at those times.

Management measures for works within the Standard Program Construction Hours are listed in Table 5, and therefore only Works outside of this period are considered in Tables 5-7.

Table 5 Additional Management Measures – Airborne Noise

TIME PERIOD		EXCEEDANCE OF NML	PERCEPTION	DURATION	COMMUNICATION CATEGORY/ MANAGEMENT MEASURE
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15-25	Moderately intrusive	Any	CO1, CO2
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive rest periods	CO1, CO2, RO
OOHW Sleep Period Night	Monday – Sunday 10pm – 6am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Table 6 relates to exceedances of ground-borne construction noise at noise sensitive receivers.

Table 6 Additional Management Measures – Ground- borne Noise

TIME PERIOD		EXCEEDANCE OF NML	PERCEPTION	DURATION	COMMUNICATION CATEGORY/ MANAGEMENT MEASURE
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15-25	Moderately intrusive	Any	CO1, CO2
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive rest periods	CO1, CO2, RO
OOHW Sleep Period	Monday – Sunday 10pm – 6am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1

TIME PERIOD		EXCEEDANCE OF NML	PERCEPTION	DURATION	COMMUNICATION CATEGORY/ MANAGEMENT MEASURE
Night		15	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO, AA
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Table 7 relates to exceedances of the human comfort vibration values for continuous, impulsive and intermittent vibration at noise sensitive receivers. Potential exceedances of the cosmetic or structural damage criteria are to be addressed via the Standard Management Measures in Table 4.

Table 7 Additional Management Measures – Vibration

TIME PERIOD		DURATION	EXCEEDENCE OF 'PREFERRED' VALUE	EXCEEDENCE OF 'MAXIMUM' VALUE
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	Any	CO1, CO2	CO1, CO2, RO
OOHW Sleep Period Night	Monday – Sunday 10pm-6am (including public holidays)	Any	CO1, CO2, RO	CO1, CO2, RO, AA

4 Complaint handling and community engagement

Complaints will be handled in accordance with ARTC's complaints management system and processes required under the CoA. Community engagement processes shall be developed in the Contractor Communications and Stakeholder Engagement Plan for each proposal incorporating the management measures set out within this Framework.

5 Monitoring and auditing

5.1 Noise and vibration monitoring

Compliance noise and vibration monitoring shall be undertaken by the Contractor in accordance this Framework. Noise measurements shall be undertaken by the Contractor consistent *AS1055.1-1997 Acoustics – Description and Measurement of Environmental Noise – General Procedures*. Vibration measurements shall be undertaken in accordance with *Assessing Vibration: a technical guideline* and *BS7385 Part 2-1993 Evaluation and measurement of vibration in buildings*, as recommended in *AS 2187: Part 2-2006 'Explosives - Storage and Use - Part 2: Use of Explosives'*.

5.1.1 Track possession monitoring program

If there is the potential to impact sensitive receivers, during a track possession, a monitoring program shall be initiated by the Contractor to confirm predicted noise and vibration levels and identify any additional feasible and reasonable measures to reduce impact on receivers. The monitoring program (for either noise, vibration

or both) shall be risk based, and shall not need to occur if there are no impacted receivers within the vicinity of the Works. Design of the monitoring program will be included in the Contractors CNVMP.

5.1.2 Dilapidation surveys

If construction activities by the Contractor have potential to cause cosmetic or structural damage through vibration or overpressure to public utilities, structures, buildings or their contents an existing condition report of buildings and structures shall be undertaken by the Contractor in accordance with *AS 4349.0 Inspection of buildings – General requirements*. Where a heritage structure is assessed as potentially susceptible to vibration damage, a more conservative cosmetic damage criterion shall be adopted by the Contractor.

5.2 Auditing

Periodic audits by the Contractor shall be undertaken of construction activities in relation to the content within this Framework along with the Contractor's appropriate implementation of the CNVMP to ensure that noise and vibration predictions are accurate and the required management measures are in place. ARTC may elect to join such audits. The Contractor's Construction Environmental Management Plan and CNVMP shall prescribe the auditing regime for each proposal.