

# Construction Noise and Vibration Management Sub Plan (CNVMSP)

Kingscliff Public School Redevelopment  
SSD-8378620

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REV 8

RICHARD CROOKES  
  
CONSTRUCTIONS

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# Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Project Overview	5
1.1	Site Description	5
<b>2</b>	<b>Purpose and Objectives</b>	<b>6</b>
2.1	Purpose	6
2.2	Objectives	6
2.3	Targets	6
<b>3</b>	<b>Environmental Requirements</b>	<b>7</b>
3.1	Relevant Legislation	7
<b>4</b>	<b>Existing Environment</b>	<b>8</b>
4.1	Potential Receivers	8
4.2	Ambient Noise	9
<b>5</b>	<b>Noise and Vibration Criteria for NSW</b>	<b>10</b>
5.1	Construction Noise and Assessment Objectives	10
5.2	Quantitative Noise Assessment Criteria	10
5.3	Adopted Project Noise Management Levels	10
5.4	Vibration Criteria	12
<b>6</b>	<b>Environmental Aspects and Impacts</b>	<b>15</b>
6.1	Environmental Aspects	15
6.2	Environmental Impacts	15
6.3	Hours of Work	16
<b>7</b>	<b>Environmental Mitigation and Management Measures</b>	<b>18</b>
<b>8</b>	<b>Compliance Management</b>	<b>31</b>
8.1	Roles and Responsibilities	31
8.2	Training	31
8.3	Inspection and Monitoring	31
8.4	Complaints	32
8.5	Auditing	32
8.6	Reporting	32
<b>9</b>	<b>Review and Improvement</b>	<b>33</b>
9.1	Continuous Improvement	33
9.2	Update and Amendment	33

## Tables

Table 1: Condition B24 - C5-C9 Compliance Table	4
Table 5-1 Project Specific Noise Criteria	11
Table 5-3 Preferred Weighted RMS Vibration Acceleration Values	14
Table 6-1 Predicted Noise Levels at Sensitive Receivers	15
Table 7-1 Noise and vibration management and mitigation measures	19

## Figures

Figure 1-1 Proposed Design	5
Figure 4-1 Location of Proposed Redevelopment and surrounds	8
Figure 4-2 Proposed Redevelopment and Receivers	9

## Glossary/ Abbreviations

Abbreviations	Expanded Text
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Attenuation	The reduction in the level of sound or vibration.
CEMP	Construction Environmental Management Plan
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DoE	NSW Department of Education
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management System
Environmental Aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental Impact	Defined by AS/NZS ISO 14001:2015 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 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental Target	Defined by AS/NZS ISO 14001:2015 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	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
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.
LAeq (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.
LA (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

Abbreviations	Expanded Text
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)
SINSW	School Infrastructure NSW
SEARs	Secretary's Environmental Assessment Requirements
SWP	Sound Power Level
SPL	Sound Pressure Level

# 1 Introduction

This Construction Noise and Vibration Management Sub-Plan (CNVMSP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Kingscliff Public School (KPS) Upgrade (the Project).

This CNVMSP has been prepared to address the requirements of the Kingscliff Public School Upgrade State Significant Development Conditions of Consent SSD-8378620, DECCW Interim Construction Noise Guideline (DECCW 2009), NSW Industrial Noise Policy (EPA 2000), and Assessing Vibration: A Technical Guideline (DEC 2006) and all applicable legislation.

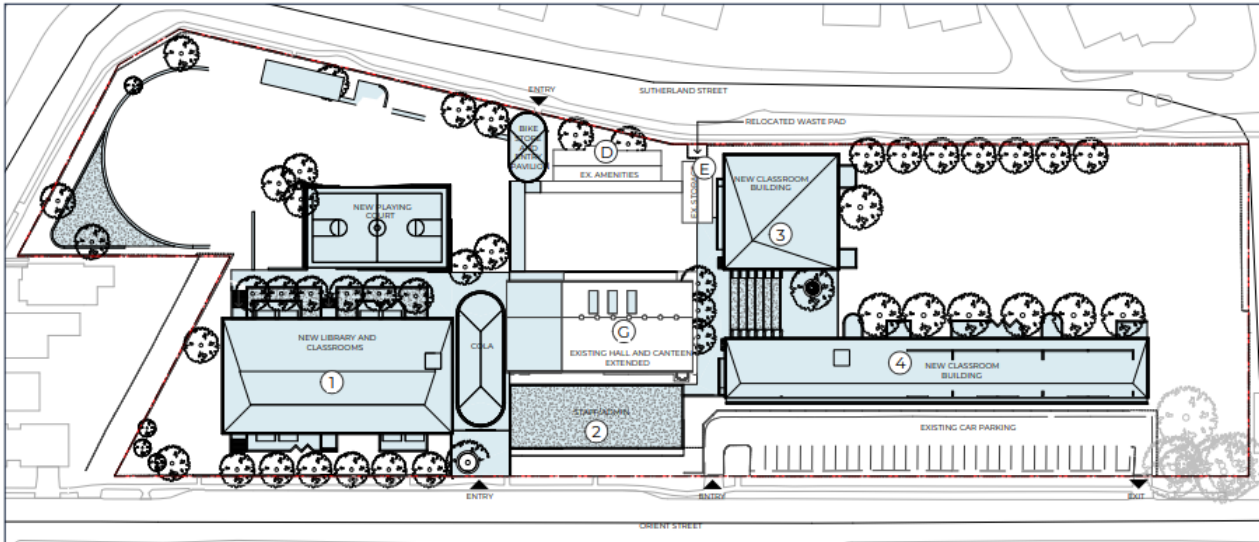
This plan has been prepared to meet condition B24 and C5-C8 of the SSD Conditions application number SSD-8378620. The compliance matrix is set out in Table 1.

**Table 1: Condition B17 – C4-C8 Compliance Table**

Condition	Condition Requirements	Document Reference (Page Number)
B17	The Construction Noise and Vibration Management Sub – Plan must address, but not limited to the following:	
	Be prepared by a suitably qualified and experienced noise expert; <b>Note:</b> This plan has been drawn from the information presented in the EIS and the Noise and Vibration Impact Assessment which has been submitted to Council.	Appendix A
	Address the recommendations of the Noise and Vibration Impact Assessment dated 6 May 2021 and prepared by Acoustic Works;	17-27
	Describe procedures for achieving the noise management levels in EPA's <i>Interim Construction Noise Guideline</i> (DECC,2009);	17-27
	Describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	17-27
	Include strategies that have been developed with the community for managing high noise generating works;	17-27
	Describe the community consultation undertaken to develop the strategies in condition B17(e);	NA
	Include a complaints management system that would be implemented for the duration of the construction; and	27
	Include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implementation management measures in accordance with the requirements of condition B14.	NA
C4-C7	Hours of Work	15

## 1.1 Project Overview

As part of the NSW Governments \$7 billion School Infrastructure Package, the proposed KPS upgrade will include the construction of 32 permanent innovative learning spaces with upgrades to the core facilities to cater for future enrolment growth in the area. A new library will also be constructed and will feature a variety of study, teaching and learning spaces that have the potential to open onto an outdoor terrace and garden. The design (Figure 1-1) of the new areas will incorporate future focused learning strategies that support the needs of the community and provide a learning-centred approach to education.



**Figure 1-1 Proposed Design**

To accommodate the proposed upgrade to the school, the following construction methodology shall be adopted:

- Demolition (removal) of 11 demountable buildings, as well as the library and administration building, multiple classrooms, maintenance store and program room.
- Construction of the following new buildings and structures:
  - New main entry off Orient Street and covered outdoor learning area (COLA)
  - New secondary entry and bike store off Sutherland Street to the west
  - New two (2) storey building to the north, with ground floor library, 12 homebases, one (1) special programs room
  - Two (2) x new two (2) storey buildings to the south, with 20 homebases and two (2) special programs rooms
  - New play court
- Tree removal, tree replacement and landscape embellishment to school playgrounds and site;
- Offsite works to the public domain and on Sutherland and Orient Streets, including:
  - Additional pedestrian crossing;
  - Relocation of bus zones and kiss n drop areas; and
  - New pedestrian pathways.

A noise and vibration assessment prepared by Acoustic Works for the Department of Education (DoE) in 2021 assessed noise and vibration impacts on sensitive receivers during the proposed redevelopment of the KPS. This assessment identified the potential for direct and indirect noise impacts on sensitive receivers but concluded that provided the proposed mitigation and management measures are implemented, no significant long-term impacts would be expected.

## 1.1 Site Description

Kingscliff Public School (the site) is located at 12 Orient Street, Kingscliff (Lot 1, DP384194). The site is situated approximately 200m from the central business district and is surrounded by residential properties.

## 2 Purpose and Objectives

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### 2.1 Purpose

The purpose of this Plan is to describe how Richard Crookes Constructions (RCC) proposes to manage potential noise and vibration impacts during construction of the Project.

### 2.2 Objectives

The key objective of the NVMP is to ensure all measures derived from the Noise and Vibration Assessment, Development Conditions of Consent and licence/permit requirements relevant to noise and vibration are described, scheduled and assigned responsibility as required by:

- State Significant Development Conditions of Consent B17; and,
- DECCW Interim Construction Noise Guideline (DECCW 2009).

### 2.3 Targets

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

- Full compliance with the relevant legislative requirements and the Conditions of Consent;
- Implementation of 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);
- That demolition activities are only undertaken at designated times and remain within established/agreed criteria; and,
- Complaints from the community and stakeholders are minimised.



# 3 Environmental Requirements

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## 3.1 Relevant Legislation

### 3.1.1 Legislation

All legislation relevant to this CNVMSP is included in the CEMP.

### 3.1.2 Guidelines

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

- NSW Interim Construction Noise Guideline (ICNG), Department of Environment and Climate Change 2009
- NSW Noise Policy for Industry, Environment Protection Authority 2017
- NSW Assessing Vibration – a technical guideline (AVTG), Department of Environment and Conservation 2006
- Development Near Rail Corridors and Busy Roads – Interim Guideline, Department of Planning, 2008
- Australian Standard AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors
- Australian Standard AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites

## 4 Existing Environment

KPS is located in the town of Kingscliff, situated on the north coast of New South Wales (NSW). The primary use of the site is for the education of children between the ages of 5 – 12 which correspond to Prep through to grade 6. The proposed redevelopment of the site will include the progressive removal/demolition of the existing demountable classrooms and subsequent construction of several buildings and play areas.



**Figure 4-1 Location of Proposed Redevelopment and surrounds**

Surrounding land uses and local businesses include:

- Low (R2) to medium (R3) density residential allotments;
- Commercial Premises (B4 – Mixed Use): Central Business District 200m to the north and northwest;
- Kingscliff tennis courts (RE1 – Public Recreation): 200m to the southwest, and;
- Kingscliff foreshore and parkland (RE1 – Public Recreation): 200m to the north and east.

### 4.1 Potential Receivers

A review of the area surrounding the works identified the occurrence of low to medium density residential dwellings immediate to the site, with commercial premises associated with the Kingscliff Business District located approximately 200m to the north and northwest. The noise and vibration assessment conducted by Acoustic Works for the site has grouped the residential allotments located marginal to the site into four separate sensitive receivers. The receivers identified in the Acoustic Works Report are set out as follows:

- Receiver 1: A two storey residential dwelling is located at 30 Orient Street;
- Receivers 2: Single and two storey residential dwellings located on the western side of Orient Street;
- Receivers 3: School Lane separates the development from residential dwellings located at 5,7,9, and 11 Sutherland Street; and
- Receivers 4: Single and two storey residential dwellings are located on the eastern side of Sutherland Street.

The location and groupings of these receivers are illustrated in Figure 4-2.



**Figure 4-2 Proposed Redevelopment and Receivers**

## 4.2 Ambient Noise

The DECC Interim Construction Noise Guidelines (ICNG) 2009 specify that a quantitative assessment for major projects and/or projects of state significance is required to assess and predict airborne noise levels from the proposed works, and subsequently provide an assessment against set criteria.

Noise monitoring of the ambient environment was conducted at two sites representative of the local noise environ by Acoustic Works in 2021. The two sites were positioned at the closest sensitive receiver to the north (Receiver 1: 38 Orient Street) and south (Receiver 3: 5 Sutherland Street) of the proposed works. Monitoring was conducted for a period of 7 days to measure background noise levels and subsequently calculate the Rating Background Level (RBL) in accordance with the NSW Noise Policy for Industry. The calculated RBL was then utilised in the assessment of deriving a Noise Management Level (NML) for construction activities.

## 5 Noise and Vibration Criteria for NSW

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

- The Interim Construction Noise Guideline (ICNG),
- NSW Assessing Vibration – a technical guideline (AVTG),

Relevant elements of these documents are summaries 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, and;
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

### 5.2 Quantitative Noise Assessment Criteria

A quantitative noise assessment was carried out by Acoustic Works in 2021 (Ref: 2020400-2 R01F Kingscliff Public School ENV CNVMP.docx) to ascertain the Rating Background Level (RBL dB(A)) in response to requirements of the DECC ICNG (2009) and the Planning Secretary's Environmental Assessment Requirements (SEARs).

Subsequently Noise Management Levels (Laeq 15 minutes) for sensitive receivers (Residential and Non-Residential) during Construction were determined by assessment against relevant criteria specified within Section 7.3.5 (Intrusiveness noise criteria) and Section 7.3.6 (Amenity Criteria) of the EIS Noise and Vibration Impact Assessment prepared by Acoustic Works (2021) as well as the Noise Policy for Industry, and which are listed in Section 5.3 below.

### 5.3 Adopted Project Noise Management Levels

The ICNG, sets out the criteria utilised in determining the noise management levels and how they are to be applied for residential receivers. These adopted values during standard construction hours for residential receivers is the Rating Background Level +10dB. Whereby, the noise level set represents the point above which there may be some community reaction to noise. Noise limits are set out and recommended in S7.4.3 of the EIS Noise Vibration Impact Assessment prepared by Acoustic Works 2021.

Between the 7<sup>th</sup> – 27<sup>th</sup> November ENV solutions undertook noise monitoring in accordance with AS-1055-2018 – Acoustics – Description and Measurement of Environmental Noise.

As noise levels are predicted to exceed the adopted NML's at all receivers, compliance with the NML's is not practically feasible. Compliance for the construction works at the KPS has been adjusted post the site investigation to be assessed against the highly noise affected threshold of 75dBA.

Throughout the reporting period (Nov-22), the highly noise affected threshold of 75dBA was not exceeded.

RCC will continue to monitor project noise levels on a regular basis and/ or on the commencement of new works (ie Building 1) that will have the potential to impact new sensitive receivers along Orient Street.

**Table 5-1 Project Specific Noise Criteria**

Time Period	Receiver 1 (R1)		Receiver 2 to 4 (R2 – R4)	
	Criteria $L_{eq (15min)}$ dBA		Criteria $L_{eq (15min)}$ dBA	
	Noise Affected	Highly Noise Affected	Noise Affected	Highly Noise Affected
<b>Standard Construction Hours</b>	75	90	75	90
<b>Outside Standard Construction Hours (Daytime Only)</b>	49		47	

Therefore, based on the assessment criteria R1 (residential) has an adopted NML value of 75dBA , whereas receivers R2 – R4 have a Noise Management Level of 75dB(A) during the specified construction hours of 7am – 6pm Monday to Friday and 7am – 1pm Saturday.

Specific NMLs for residential receivers are presented below which is extracted from Table 8-Section 7.4.2.1 of EIS Noise and Vibration Assessment prepared by Acoustic Works (2020).

Table 8: Noise criteria for quantitative assessment - Residential

Time of day	Criterion LAeq(15min) *	How to apply
Recommended standard hours	Noise affected RBL + 10dB	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <p>Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>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.</p>
	Highly noise affected	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>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:</p> <ol style="list-style-type: none"> <li>1. 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>2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ol>
Outside recommended hours	Noise affected RBL + 5dB	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>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.</p> <p>For guidance on negotiating agreements see section 7.2.2.</p>

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

Specific NMLs for non-residential receivers are presented in Table 8 which was extracted from Section 7.4.2.2 of EIS Noise and Vibration Assessment prepared by Acoustic Works (2021).

Table 9: Noise criteria for quantitative assessment - Other uses

Land use	Management level LAeq(15min)	Assessment location
Classrooms at schools and other educational institutions	45dBA	Internal
Hospital wards and operating theatres	45dBA	Internal
Places of worship	45dBA	Internal

## 5.4 Vibration Criteria

There are three types of vibration as classified in the Assessing Vibration Technical Guideline 2006 which include:

- Continuous – vibration continues uninterrupted for a defined period (usually throughout daytime and/or night-time). This type of vibration is assessed on the basis of weighted RMS (root mean squared) acceleration values.

- Impulsive – rapid build up to a peak followed by a damped decay that may or may not involve several cycles. The duration is short, typically less than 2 seconds. Impulsive vibration (no more than three occurrences in an assessment period) is assessed on the basis of acceleration values.
- Intermittent – interrupted periods of continuous (e.g. a drill) or repeated periods of impulsive vibration (e.g. a pile driver), or continuous vibration that varies significantly in magnitude. Assessed on the basis of vibration dose values.

#### 5.4.1 Acceptable values for continuous and impulsive vibration (1-80Hz)

The relevant criteria for continuous and impulsive vibration are set out in Table 5-3.

**Table 5-2 Preferred Weighted RMS Vibration Acceleration Values**

Type	Location	Assessment Period	Preferred values m/s <sup>2</sup>		Maximum values m/s <sup>2</sup>	
			z-axis	x & y axis	z-axes	x & y axes
<b>Continuous Vibration</b>	Critical Areas	Day or Night-time	0.005	0.0036	0.01	0.0072
	Residences	Day time	0.01	0.0071	0.02	0.014
		Night-time	0.007	0.005	0.014	0.01
	Offices, Schools & Places of Worship	Day or Night-time	0.02	0.014	0.04	0.028
Workshops	Day or Night-time	0.04	0.029	0.08	0.058	
<b>Impulsive Vibration</b>	Critical Areas	Day or Night-time	0.005	0.0036	0.01	0.0072
	Residences	Day time	0.3	0.21	0.6	0.42
		Night-time	0.1	0.071	0.2	0.14
	Offices, Schools & 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	

#### 5.4.2 Acceptable values for intermittent vibration

Intermittent vibration is assessed using the vibration dose value (VDV) root-mean-quad method. VDV accumulates the vibration energy received over the daytime and night-time periods. The vibration dose methodology is as per standard BS 6472–1992.



## 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 within the grounds of the existing School envelop. 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.

Major activities involved in construction of the Project include the following works:

- Site Establishment;
- Demolition and Removal of Existing Buildings
- Construction and Renovation of New and Existing Buildings concrete hardstand;
- Site disestablishment.

High noise activities will include demolition of existing infrastructure which may include rock breaking attachments on excavators, jackhammers and concrete saws.

### 6.2 Environmental Impacts

The subject works, as described in Section 6.1, will commence with demolition works of existing infrastructure, followed by the construction and renovation of some of the existing buildings. The predicted noise levels derived from the noise assessment compiled by Acoustic Works (2021) and summarised in Table 6-1, for demolition and construction activities. The modelled values are representative of noise levels expected at the sensitive receiver.

**Table 6-1 Predicted Noise Levels at Sensitive Receivers**

Receiver	Address	Activity	LAeq (adjusted) at Receivers	Compliance with INCG	
				Noise Affected	High Noise Affected
R1	30 Orient St	Demolition	71	No	Yes
		Construction	61	No	Yes
R2	19 Orient St	Demolition	83	No	No
		Construction	72	No	Yes
R3	5 Sutherland St	Demolition	77	No	No
		Construction	76	No	No
R4	42 Sutherland St	Demolition	82	No	No
		Construction	72	No	Yes

#### 6.2.1 Predicted Noise Levels

Predicted noise associated with the demolition and construction of the proposed works has been assessed based on the source noise levels and procedures contained in AS2436-2010, as well as the results of previous noise measurements and assessments conducted by Acoustic Works.

Calculations are performed based on the demolition and construction works being at the closest relevant distance to each existing receiver.

Noise assessment calculations assume that all noise sources are operating simultaneously, at the closest point to the receiver in each case. In practice, this will generally not occur as process will

be either spread over the site or occur on different days or times. The predicted noise levels represent the expected worst-case noise emissions due to site demolition and construction works.

### 6.2.2 Predicted Vibration Levels

The nearest buildings in the area would be Building Block G. This location contains a school building, giving a recommended vibration limit of 20 mm/s.

At 3m distance from excavating, the maximum vector sum peak particle velocity is usually expected to be approximately between 8.5 mm/s to 13.5 mm/s.

Due to proximity of neighbouring residential buildings, vibration levels in some cases may need to be monitored during demolition and earthworks depending on the ground substrate and equipment used. If complaints are received vibration control would be implemented as outlined in Table 7.1 Noise and vibration management and mitigation measures.

## 6.3 Hours of Work

The proposed hours of work (Standard Construction Hours) for the project are in accordance Condition C4 of SSD-8378620 and are as follows:

Monday – Friday: 7 am – 6 pm;

Saturday: 8 am – 1 pm; and,

Sunday: No work on Sundays or Public Holidays

In accordance with Condition C5, notwithstanding condition C4, provided noise levels do not exceed the existing background noise level plus 5dB, works may also be undertaken during the following hours:

- Between 6 pm and 7 pm, Mondays to Fridays inclusive; and
- Between 1 pm and 4 pm, Saturdays.

In accordance with Condition C8 of SSD-8378620, All intrusive noise activities such as rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

- 9 am to 12 pm, Monday to Friday;
- 2 pm to 5 pm Monday to Friday; and
- 9 am to 12 pm, Saturday.

In accordance with Condition C6 of SSD-8378620, work outside of hours (OOHW) may be done under one of the following four categories;

- By the Police or a public authority for the delivery of vehicles, plant or materials; or
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm;
- Where the works are inaudible at the nearest sensitive receivers; or
- Where a variation is approved in advance in writing by the Planning Secretary or her nominee if appropriate justification is provided for the works.

For all works that meet the criteria listed above, community consultation will be required based on the level of impact received at the residence and duration of the event. Notification of such construction activities as referenced in condition C6 above must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

For work outside the recommended hours, the criteria set in Table 7 of Section 7.4.2.1 Noise affected RBL +5dB) of the EIS Noise and Vibration Impact Assessment prepared by Acoustic Works 2021 is to be applied.

## 7 Environmental Mitigation and Management Measures

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A range of environmental requirements and control measures are identified in the various environmental documents, including the Conditions of Consent, and the Noise and Vibration Assessment compiled by Acoustic Works as part of the EIS process. Specific actions and processes which will be implemented to comply and address these requirements and measures are outlined in Table 7-1.

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

Predicted noise impacts associated with demolition and construction of the proposed works has been assessed based on the source noise levels and procedures contained in AS2436-2010, as well as the results of previous noise measurements and assessments conducted by Acoustic Works. Calculations were performed based on the demolition and construction works being at the closest relevant distance to each of the existing receiver.

Predicted vibration levels at the nearest buildings in the area would be Building Block G. This location contains a school building, giving a vibration of 20 mm/s. At 3 m distance from excavating, the maximum vector sum peak particle velocity is usually expected to be approximately between 8.5 mm/s to 13.5 mm/s.

Section 10.1 of the EIS assessment prepared by Acoustic Works (2021) states that noise impacts at the residential receiver locations are predicted to comply with the assessment criteria on the condition the following acoustic treatments are implemented.

- Acoustic barriers shall be constructed to the height and extent shown in Section 10.1 of the report. The acoustic barriers should be constructed using either 16 mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 9 kg/m<sup>2</sup> and shall be free of gaps and holes.
- Outdoor activities shall be limited to the day and evening time periods only (7 am-10 pm Mondays to Saturdays and 8 am -10 pm Sundays) in accordance with Section 7.3.2.

Due to the proximity of neighbouring buildings, vibration levels may need to be continually monitored during demolition works.

**Table 7-1 Noise and vibration management and mitigation measures**

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV1	<p>No later than 48 hours before the commencement of construction, a Community Communication Strategy must be submitted to the Planning Secretary for information. The Community Communication Strategy must provide mechanisms to facilitate communication between the Applicant, the relevant Council and the community (including adjoining affected landowners and businesses, and others directly impacted by the development), during the design and construction of the development and for a minimum of 12 months following the completion of construction. The Community Communication Strategy must:</p> <ul style="list-style-type: none"> <li>• identify people to be consulted during the design and construction phases;</li> <li>• set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development;</li> <li>• provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development;</li> <li>• set out procedures and mechanisms:               <ul style="list-style-type: none"> <li>○ through which the community can discuss or provide feedback to the Applicant;</li> <li>○ through which the Applicant will respond to enquiries or feedback from the community; and</li> <li>○ to resolve any issues and mediate any disputes that may arise in relation to construction and operation of the development, including disputes regarding rectification or compensation.</li> </ul> </li> </ul>	Development of a Community Communication Strategy	Prior to commencement of construction activities	Project Manager or their delegate (SINSW)	B9 Conditions of Consent

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV2	In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and, if prevention is not reasonable and feasible, minimise any material harm to the environment that may result from the construction and operation of the development.	Development of CEMP and relevant sub-plans	Ongoing	Project Manager or their delegate	A1 Conditions of Consent,
NV3	<p>Prior to the commencement of construction, the Applicant must:</p> <ul style="list-style-type: none"> <li>(a) consult with the relevant owner and provider of services and Infrastructure that are likely to be affected by the development to make suitable arrangements for access to, diversion, protection and support of the affected infrastructure;</li> <li>(b) prepare a Pre-Construction Dilapidation Report identifying the condition of all public (non-residential) infrastructure and assets in the vicinity of the site (including roads, gutters and footpaths) that have potential to be affected.</li> <li>(c) submit a copy of the Pre-Construction Dilapidation Report to the asset owner, Certifier and Council; and</li> <li>(d) provide a copy of the Pre-Construction Dilapidation Report to the Planning Secretary when requested.</li> </ul>	Suitably Qualified Person – Structural Engineer	Prior to finalisation of construction activities	Project Manager or their delegate	B5 Conditions of Consent

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV4	<p>Prior to the installation of the acoustic barrier recommended in the Noise and Vibration Impact Assessment dated 6 May 2021 and prepared by Acoustic Works, the following must be submitted to the certifier:</p> <ul style="list-style-type: none"> <li>(a) plans and specifications of the proposed barrier;</li> <li>(b) details of how the design of the barrier has taken into consideration the existing water main and Development Design Specification D15 Work in Proximity (Tweed Shire Council); and</li> <li>(c) written approval for the works from the water authority.</li> </ul>	Suitably qualified person with experience in acoustic assessments	Prior to commencement of construction activities	Project Manager or their delegate	B26 Conditions of Consent
NV5 Section 10.2 of EIS	<p>Prior to installation of mechanical plant and equipment:</p> <ul style="list-style-type: none"> <li>• a detailed assessment of mechanical plant and equipment with compliance with the relevant specific noise criteria as recommended in the Noise and Vibration Impact Assessment, dated 6 May 2021 and prepared by Acoustic Works must be undertaken by a suitably qualified person; and,</li> <li>• evidence must be submitted to the Certifier that noise mitigation recommendations identified in the assessment carried out under (a) have been incorporated into the design to ensure the development will not exceed the project specific noise criteria identified in the Noise and Vibration Impact Assessment, dated 6 May 2021 prepared by Acoustic Works.</li> </ul> <p>If a complaint is raised regarding a particular piece of plant, the plant shall be inspected for working condition, with particular attention given to the condition of engine covers or enclosures, and exhaust system. If machinery is in good condition, a high-performance silencer should be installed.</p>	Suitably qualified person with experience in acoustic assessments	Prior to commencement of construction activities	Project Manager or their delegate	B27 Conditions of Consent

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV6	All construction plant and equipment used on site must be maintained in a proper and efficient condition and operated in a proper and efficient manner.		Prior to commencement of construction activities	Project Manager or their delegate	C2 Conditions of Consent
NV7	<p>Construction, including the delivery of materials to and from site, may only be carried out between the following hours;</p> <ul style="list-style-type: none"> <li>• Monday to Friday 7 am – 6 pm</li> <li>• Saturday 8 am – 1 pm</li> <li>• No work on Sunday or public holidays</li> </ul>		Ongoing	Project Manager or their delegate	C4 Conditions of Consent, Interim Construction Noise Guideline (DECCW 2009)
NV8	<p>Notwithstanding condition C4, provided noise levels do not exceed the existing background noise level plus 5 dB, works may also be undertaken during the following hours:</p> <ul style="list-style-type: none"> <li>• Between 6 pm and 7 pm, Mondays to Fridays inclusive; and</li> <li>• Between 1 pm and 4 pm, Saturdays.</li> </ul>		Ongoing	Project Manager or their delegate	C5 Conditions of Consent, Interim Construction Noise Guideline (DECCW 2009)



<p>NV9</p>	<p>Construction activities may be undertaken outside of the hours in condition C4 and C5 if required:</p> <ul style="list-style-type: none"> <li>• by the Police or a public authority for the delivery of vehicles, plant or materials; or</li> <li>• in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or</li> <li>• where the works are inaudible at the nearest sensitive receivers; or</li> <li>• where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.</li> </ul> <p>Note:</p> <p>Workers and delivery trucks do not congregate at or outside the site before 7am. This is an important factor for managing noise from the site.</p> <p>Notwithstanding the above measure, should works extend past approved SSD hours and have the potential of exceeding criteria <math>L_{eq} (15mins)</math> dBA noise affected (75).</p> <ul style="list-style-type: none"> <li>• Notifying any affected residents as soon as it is identified that works and expected to continue beyond the approved hours and in accordance with Condition C7.</li> <li>• Amend construction methodology to accelerate completion of the works including adding accelerant compound to concrete mix to allow finishing to occur quicker</li> <li>• Trowelling machines used periodically to ensure suitable finish is achieved with a broom finish.</li> <li>• During down periods while waiting for the concrete to finish, labour is returne to the crib rooms</li> <li>• Task lighting installed and positioned to face away from affected residents</li> </ul>		<p>Ongoing</p>	<p>Project Manager or their delegate</p>	<p>C6 Conditions of Consent, Interim Construction Noise Guideline (DECCW 2009)</p>
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ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV10	Notification of such construction activities as referenced in condition C6 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.	Development of a Community Communication Strategy	Ongoing	Project Manager or their delegate	C7 Conditions of Consent,
NV11	Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours: <ul style="list-style-type: none"> <li>• 9 am to 12 pm, Monday to Friday;</li> <li>• 2 pm to 5 pm Monday to Friday; and</li> <li>• 9 am to 12 pm, Saturday</li> </ul>		Demolition	Project Manager or their delegate	C8 Conditions of Consent
NV12	The development must be constructed to achieve the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures identified in the approved Construction Noise & Vibration Management Plan.		Ongoing	Project Manager or their delegate	C13 Conditions of Consent
NV13	The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the site or surrounding residential precincts outside of the construction hours of work outlined under condition C4.		Ongoing	Project Manager or their delegate	C14 Conditions of Consent
NV14	The Applicant must implement, where practicable and without compromising safety of the construction staff or members of the public, the use of 'quackers' to ensure noise impacts on surrounding noise sensitive receivers are minimised. Any moveable plant e.g. compressors should be located as far as practical from the residential premises.		Ongoing	Project Manager or their delegate	C15 Conditions of Consent

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV15	<p>Vibration caused by construction at any residence or structure outside the site must be limited to:</p> <ul style="list-style-type: none"> <li>• For structural damage, the latest version of DIN 4150-3 (1992-02) Structural vibration - Effects of vibration on structures (German Institute for Standardisation, 1999); and</li> <li>• For human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: a technical guideline (DEC, 2006) (as may be updated or replaced from time to time).</li> </ul>		Ongoing	Project Manager or their delegate	C16 Conditions of Consent, AVTG 2006
NV16	<p>Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in condition C16.</p>		Ongoing	Project Manager or their delegate	C17 Conditions of Consent
NV17	<p>The limits in conditions C16 and C17 apply unless otherwise outlined in a Construction Noise and Vibration Management Plan, approved as part of the CEMP required by condition B17 of this consent.</p>		Ongoing	Project Manager or their delegate	C18 Conditions of Consent
NV18	<p>Prior to commencement of operation, the Applicant must engage a suitably qualified person to prepare a post-construction dilapidation report at the completion of construction. This report is:</p> <ul style="list-style-type: none"> <li>• to ascertain whether the construction created any structural damage to adjoining buildings or infrastructure;</li> <li>• to be submitted to the Certifier. In ascertaining whether adverse structural damage has occurred to adjoining buildings or infrastructure, the Certifier must: <ul style="list-style-type: none"> <li>○ compare the post-construction dilapidation report with the pre-construction dilapidation report required by these conditions; and</li> <li>○ have written confirmation from the relevant authority that there is no adverse structural damage to their infrastructure and roads.</li> <li>○ to be forwarded to Council for information</li> <li>○ be provided to the Planning Secretary when requested</li> </ul> </li> </ul>	Suitably Qualified Person – Structural Engineer	Prior to finalisation of construction activities	Project Manager or their delegate	D12 Conditions of Consent

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV19	<p>All contractors and workers are to receive an environmental induction, which must at least include:</p> <ul style="list-style-type: none"> <li>• Project specific and relevant standard noise and vibration mitigation measures.</li> <li>• Permissible hours of work.</li> <li>• Any limitations on high noise generating activities.</li> <li>• Location of nearest sensitive receivers.</li> <li>• Construction employee parking areas.</li> <li>• Designated loading/unloading areas and procedures.</li> <li>• Site opening/closing times (including deliveries).</li> <li>• Environmental incident procedures.</li> </ul>	Site specific Induction	Ongoing	Project Manager or their delegate	Best practice
NV20	<p>Acoustic barriers shall be constructed to the height (1.8m) and extent shown in Figure 4 of the Acoustic Assessment. The acoustic barriers should be constructed using either 16mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 9kg/m<sup>2</sup> and shall be free of gaps and holes.</p>	Installation of permanent and temporary attenuation	Prior to the commencement of Construction Activities	Project Manager or their delegate	Section 10.1 of the Acoustic Assessment for the EIS process
NV21	<p>Community consultation will be required with nearby residences during demolition and construction activities that are likely to exceed noise limits.</p>	Development of a Community Communication Strategy	Prior to the commencement of Construction Activities	Project Manager or their delegate	Section 10.3.3 of the Acoustic Assessment for the EIS process

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV22	<p>The Responsible Person maintain a record of complaints, which records the following details (refer to the example complaint record sheet in the appendix to this plan):</p> <ul style="list-style-type: none"> <li>• The time and date of lodgement of the complaint;</li> <li>• The name and telephone number of the complainant;</li> <li>• The nature of the complaint, including a description of the noise (e.g. likely noise source, duration of the noise event - is the noise continuous, or of a short duration);</li> <li>• The outcome of the investigation.</li> </ul> <p>Assign the task of managing noise emissions to a person (the 'responsible person') that is likely to be present on-site most of the time that activity is occurring (usually the Site Manager). This person would be responsible for handling noise complaints and ensuring that work does not commence before the specified allowable times. The name and contact details of the 'responsible person' should be displayed outside the principal construction office.</p>	Development of a Community Communication Strategy	Ongoing	Project Manager or their delegate	Section 10.3.3 of the Acoustic Assessment for the EIS process
NV23	<p>If a complaint is raised regarding a particular piece of plant, the plant shall be inspected for working condition, with particular attention given to the condition of engine covers or enclosures, and exhaust system. If machinery is in good condition, a high performance silencer should be installed.</p> <p>If complaints arise regarding noise, the complaint will be directed to the 'responsible person' who will determine the source of noise and take immediate steps to investigate further or mitigate the noise as required. This may involve moving the noise source further away from the affected premises, replacing the equipment, installing high performance silencers, or in some cases, engaging a qualified acoustic consultant to provide specialist control advice</p>		Ongoing	Project Manager or their delegate	Section 10.3.3 of the Acoustic Assessment for the EIS process

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV24	Additional attenuation or alternative construction/demolition methodologies will be required to ensure predicted elevated noise levels are mitigated during these activities (jackhammers / concrete saws).	Installation of permanent and temporary attenuation	Prior to the commencement of Construction Activities	Project Manager or their delegate	Section 10.3.4 of the Acoustic Assessment for the EIS process
NV25	<p>Vibration levels in some cases may need to be monitored during demolition and earthworks depending on the ground substrate and equipment used.</p> <p>Due to proximity of neighbouring buildings, vibration levels may need to be continually monitored during the demolition and construction works to ensure vibration levels remain generally compliant with the criteria nominated in Section 7.5 of the EIS Noise and Vibration Impact Assessment, dated 6 May 2021 and prepared by Acoustic Works.</p> <p>Due to the proximity of the school buildings, vibration is predicted to be an issue if not managed. If complaints are received from the school regarding vibration during demolition and basic construction works, it is recommended that continued vibration monitoring at the receiver location with SMS warning system issued to the responsible persons onsite. The Responsible Person shall cease works that may cause vibration intrusion and engage a qualified person to determine suitable management and physical controls to reduce excessive vibration cannot resume until satisfactory mitigation treatment is implemented.</p>	Suitably Qualified Person – Noise and Vibration	During Demolition Activities	Project Manager or their delegate	Section 10.3.4 of the Acoustic Assessment for the EIS process

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV26	<p>The head contractor is to elect a “Responsible Person” who is onsite during construction hours and who has sufficient time and authority to implement the management plan. See Management Plan Template in Office.</p> <p>The Responsible Person (Site Manager identified on site entry will be required to receive, document and respond in an appropriate manner to complaints made against the centre with regards to noise.</p> <p>The Responsible Person is to keep record of performance indicators and feedback from management, staff, subcontractors, and adjacent noise receivers as appropriate.</p> <p>The person would also be responsible for documenting changes/modifications to the Noise Management Plan.</p>	Suitably Qualified Person – Noise and Vibration	During Demolition Activities	Site Manager or their delegate	Section 10.3.3 of the Acoustic Assessment for the EIS process

ID	Measure / Requirement	Resource needed	When to implement	Responsibility	Reference
NV27	<p>Management is to review the incident/complaints register on a regular basis (at least fortnightly) to determine any common or reoccurring issues to be addressed.</p> <p>The plan should be reviewed if processes or activities onsite are changed/modified or new activities are introduced.</p> <p>The plan should be reviewed if noise complaints are being made with regards to single activity or type of noisy activity occurring onsite.</p> <p>Document all changes/modifications to the Noise Management Plan. Management is to review the incident/complaints register on a regular basis (at least fortnightly) to determine any common or recurring issues to be addressed. The plan should be reviewed if processes or activities are introduced.</p> <p>The plan should also be reviewed if noise complaints are being made with regards to a single activity or type of noisy activity occurring onsite, Document all changes/modifications to the Noise Management Plan.</p>	Suitably Qualified Person – Noise and Vibration	During Demolition Activities	Site Manager or their delegate	Section 10.3 of the Acoustic Assessment for the EIS process



## 8 Compliance Management

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### 8.1 Roles and Responsibilities

The RCC Project Team's organisational structure and overall roles and responsibilities are outlined in the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 7 of this Plan.

When RCC become aware that works will potentially may extend past the Hours of Work in accordance with Condition C4 of SSD-8378620, a responsible person from RCC will verbally notify any potentially affected residents as soon as it is practical that works are expected to continue beyond the approved hours and in accordance with Condition C7.

The advice may include but not limited to the type of works being undertaken and/if the expected length of time till complete. The following measures will be in place to mitigate community impact:

- Construction Methodology to accelerate completion of the works including adding accelerant compounds to concrete mix to allow finishing to occur quicker
- Trowelling machine used periodically to ensue suitable finish is achieved with a broom finish
- During down periods while waiting for the concrete to finish, labour to return to the crib rooms

Task lighting installed and positioned to face away from affected residents.

### 8.2 Training

All employees, contractors and 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; and
- General noise and vibration management measures.

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

### 8.3 Inspection and Monitoring

Noise and vibration monitoring will be undertaken (3-4 week durations/ per year) at key staging of the project determined by the Project Manager throughout the construction phase of the Project to verify the predicted noise and vibration impacts. This will assist in identifying impacts to sensitive receivers, quantifying and reporting compliance, determining if mitigation measures are effective and if any further mitigation measures are required to reduce and manage noise and vibration impacts.

The policy and procedures for Noise and Construction Vibration monitoring are set out in section 12.3 and 12.4 of the Noise and Vibration Impact Assessment (Acoustic Works, 2021).

An excerpt (Sections 12.3 and 12.4) of the Acoustic Works report is provided as Appendix B.

## **8.4 Complaints**

Complaint management will be undertaken as per the Community Communications Strategy, relevant to noise and vibration.

Complaints will be recorded and managed as detailed in the CEMP. Information to be recorded will include location of complaint, time/s of occurrence of alleged noise and vibration impacts (including nature of impact particularly with respect to vibration), perceived noise source, prevailing weather conditions and similar details that could be utilised to assist the investigation into the complaint.

## **8.5 Auditing**

Audit requirements are detailed in the CEMP.

## **8.6 Reporting**

Reporting requirements and responsibilities are documented in the CEMP.

## 9 Review and Improvement

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### 9.1 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; and
- Make comparisons with objectives and targets.

### 9.2 Update and Amendment

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

Only the Project Manager and/ or Environmental Site Representative, or delegate, has the authority to change any of the environmental management documentation.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the CEMP and the consent conditions SSD-8378620.

# Appendix A – Consultant Qualification

## **Appendix B – Noise and Construction Vibration Monitoring Policy and Procedures (Acoustic Works, 2021)**

The following is an excerpt of *Acoustic Works (2021) Noise & Vibration Impact Assessment Kingscliff Public School Ref: 2020400-2 R01F Kingscliff Public School ENV CNVMP.docx*

**APPENDIX C – 213223 Noise Monitoring - 12 Orient Street Kingscliff  
NSW 2487**

**APPENDIX D – 216701 Noise Monitoring (Sewer) - 12 Orient Street  
Kingscliff NSW 2487**