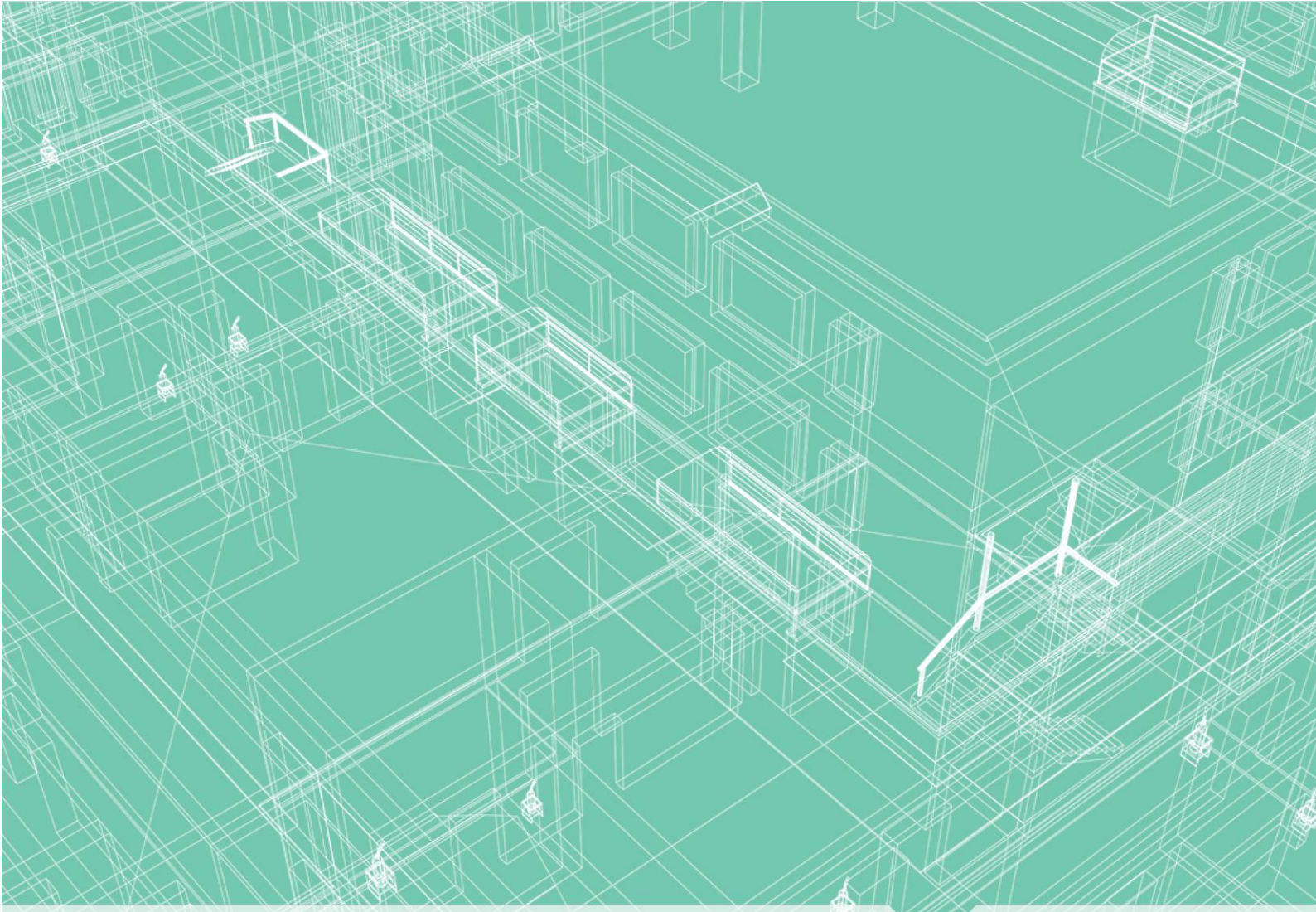

CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

MORIAH COLLEGE REDEVELOPMENT PROJECT

JHA

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DOCUMENT CONTROL SHEET

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CONTENTS

1 INTRODUCTION

1.1 OVERVIEW

JHA Consulting Engineers has been engaged by Buildcorp to provide a Construction Noise and Vibration Management Plan (CNVMP) for the construction works to for the new Moriah College Redevelopment on Lot 3 DP 701512 (3 Queens Park Road) and Lot 22 DP 879582 (101 York Road) in Queens Park, NSW. The development has been approved under State Significant Development Application (SSD 10352), and this CNVMP addresses Consent Condition E15, E12[c], F15, F18, F19 and F20.

The construction works include:

- Enabling works.
- Steam Building Main works:
  - Demolition, Piling, Excavation.
  - Structure Façade.
  - Fitout and STEAM landscaping.
- Stage 1C Landscaping.

The following documentation has been used for the preparation of this report:

- Noise & Vibration Assessment for SSDA prepared by JHA (reference 190310 AC-RPT [B] dated 14/10/2019).
- Community Consultation Strategy report, prepared by Muller Enterprise (December 2025).

This document and related work have been prepared following JHA Consulting Engineers Quality and Environmental Management Systems, which are based on AS/NZS ISO 9001:2015 and ISO 14001:2015, respectively.

1.2 PURPOSE OF THE CNVMP

The purpose of this CNVMP is to ensure that noise and vibration impacts due to construction activities are appropriately managed in accordance with relevant legislation and standards, plus protection of nearby sensitive Noise Catchment Areas (NCAs). The objectives of this acoustic assessment are:

- Identify NCAs that will potentially be affected by the works.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation.
- Determine whether the relevant criteria can be achieved based on assumed construction works and plant for the noise assessments. Where applicable, provide recommendations for any necessary acoustic control measures that will need to be incorporated into the development or use in order to ensure with the assessment criteria.
- Provide recommendations for Construction Noise and Vibration Planning.

This CNVMP identifies the Contractor's obligations and the requirements to manage noise and vibration during construction such that the necessary allowances within the construction costs, programmes and work methodologies can be made. Relevant legislation, guidelines and standards are identified in this CNVMP.

1.3 NOISE AND VIBRATION ISSUES

This CNVMP addresses the stages of construction works as stated in this report for the development. The construction works will contribute noise and vibration emissions to the surrounding environment. Typically, this will comprise of continuous and intermittent noise and vibration from on-site construction equipment and plant equipment.

Construction noise associated with the project may include airborne and ground-borne noise impacts as follows:

- Airborne Noise: Proposed construction works will generate noise that will propagate through the air. Airborne noise generated by external construction activities is likely to impact on surrounding sensitive NCAs.
- Ground-borne noise and vibration impacts: Construction and screw piling / sheet piling works have the potential to generate noise and vibration that propagates through the ground and building structural elements which is then radiated by vibrating wall and floor surfaces of nearby sensitive NCAs.

1.4 RESPONSIBILITIES

The main Contractor must be responsible for ensuring that the noise and vibration from activities carried out on site are minimised as far as practical.

The Contractor is responsible for:

- Ensuring that any site noise and vibration plus any complaints, are monitored, investigated, managed and controlled in accordance with the recommendations provided in this plan.
- Ensuring procurement documents specify any particular requirements in relation to the management of noise and vibration.
- Ensuring all works are undertaken in accordance with the requirements of the contract documents and this plan.
- Ensuring all project personnel and sub-contractors employed are aware of their responsibilities in regard to the management of noise and vibration during construction and assume the responsibilities assigned to them within the plan.
- Monitoring and managing noise and vibration impacts on sensitive NCAs, in accordance with the requirements of the relevant guidelines and standards.

1.5 SSDA-10352 CONDITIONS

Table below shows the relevant conditions and the Sections of this report, in which they are addressed.

Condition	*Description*	*Report Section*
E15	*The Construction Noise and Vibration Management Sub-Plan (CNVMSP) must address, but not be limited to, the following:* *(a) be prepared by a suitably qualified and experienced noise expert;*	1.6
	(b) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	3.3, 6
	(c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	6.5
	(d) include strategies that have been developed with the community for managing high noise generating works;	6.4
	(e) describe the community consultation undertaken to develop the strategies in condition E15(d);	6.4
	(f) include a complaints management system that would be implemented for the duration of the construction; and	6.4
	(g) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures in accordance with condition E11.	6.8
F15	*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 and Vibration Management Sub-Plan.*	5.2, 6
F18	*Vibration caused by construction at any residence or structure outside the site must be limited to:* *(a) 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*	3.4.2
	(b) 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).	3.4.1
F19	*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 F18.*	5.3
F20	*The limits in conditions F18 and F19 apply unless otherwise outlined in a Construction Noise and Vibration Management Sub-Plan, approved as part of the CEMP required by condition E15 of this consent.*	5

Table 1: SSDA-10352 Consent Conditions and reference to Sections in the report where they are addressed.

1.6 AUTHORS

This report was prepared by Sean Matthews and Jorge Reverter. Sean and Jorge are Members of the Australian Acoustical Society (AAS).

2 DESCRIPTION OF THE PROPOSAL

2.1 SITE DETAILS

Queens Park is a suburb in the eastern suburbs of Sydney approximately 6 km south-east of the Sydney CBD in the local government area of Waverley Council. The Moriah College campus is located within the east end of Queens Park and is predominately surrounded by park land.

The existing site is a currently a school catering from early learning to high school. The Moriah College campus is bordered by Queens Park Road, Baronga Ave, York Road and an environmental conservation area. A map of the Moriah College campus (red outline) and the surrounding areas is presented in Figure 1.

The surrounding land uses are as follows:

- *North*: North of the site is a low-density suburban residential area.
- *East*: To the east of the site is Queen's Park. Queen's Park is an active recreation area with multi-use sporting fields equivalent in area to 21 touch football fields and two combination rugby / soccer fields.
- *South*: Land immediately to the south of the site is part of Centennial Park Lands with an environmental conservation area abutting the site to the south west. Land further to the south consists of low and medium density suburban residential area.
- *West*: The bulk of Centennial Parkland lays to the west of the site.

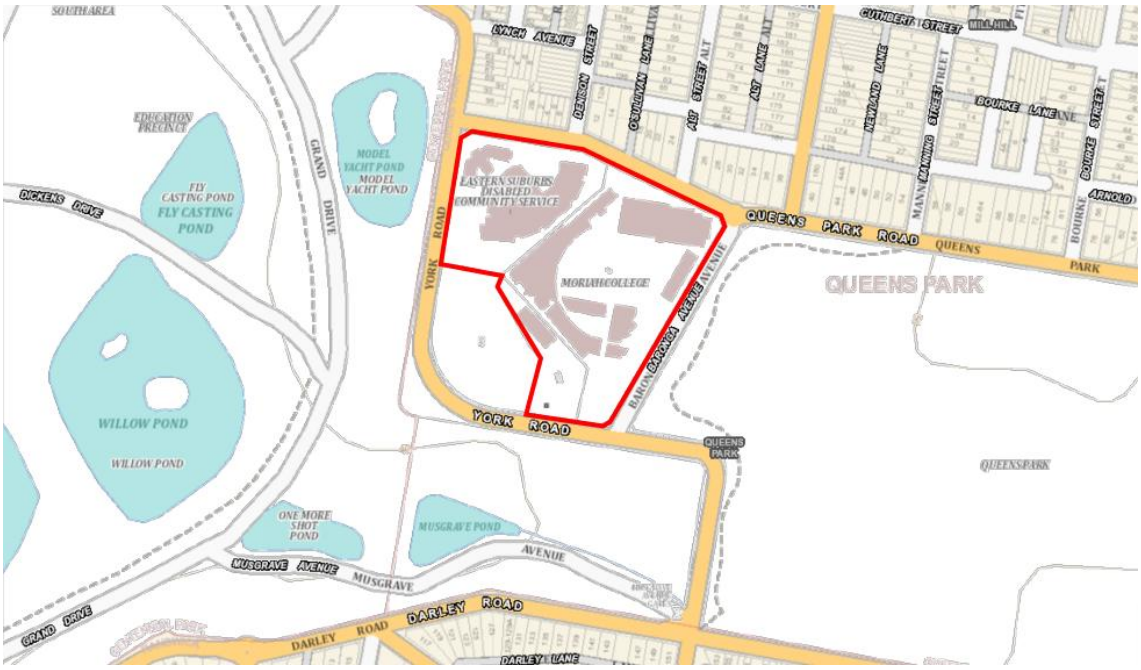


Figure 1: Moriah College campus (red outline)

2.2 NOISE SENSITIVE RECEIVER DETAILS

Figure 2 shows the location of Moriah College Campus site and the surrounding noise sensitive receivers grouped into Noise Catchment Areas (NCAs).

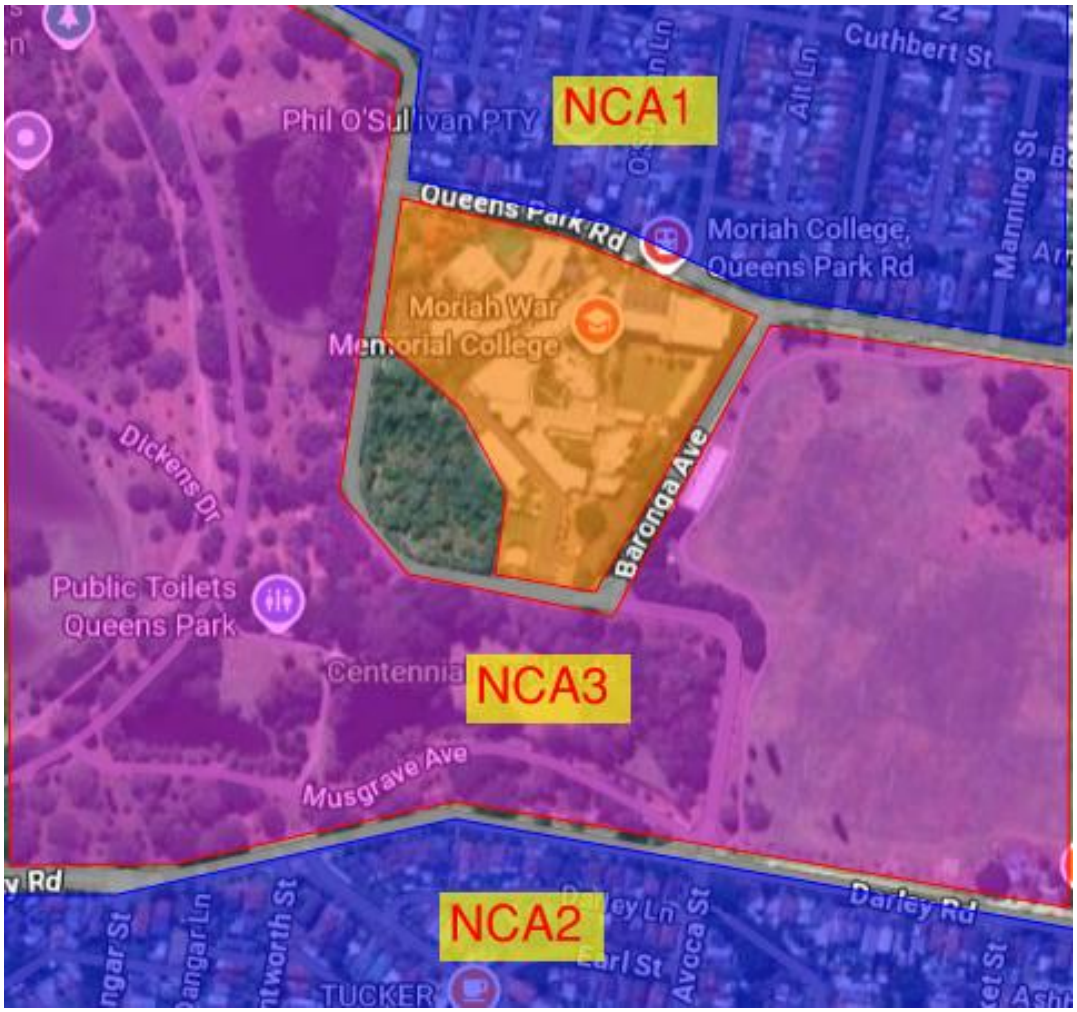


Figure 2: Surrounding receivers.

A summary of the nearest noise sensitive receivers, grouped into NCAs is shown in Table 2, including approximate distances from the site to the NCAs boundaries, noting also the type of receiver within the NCAs.

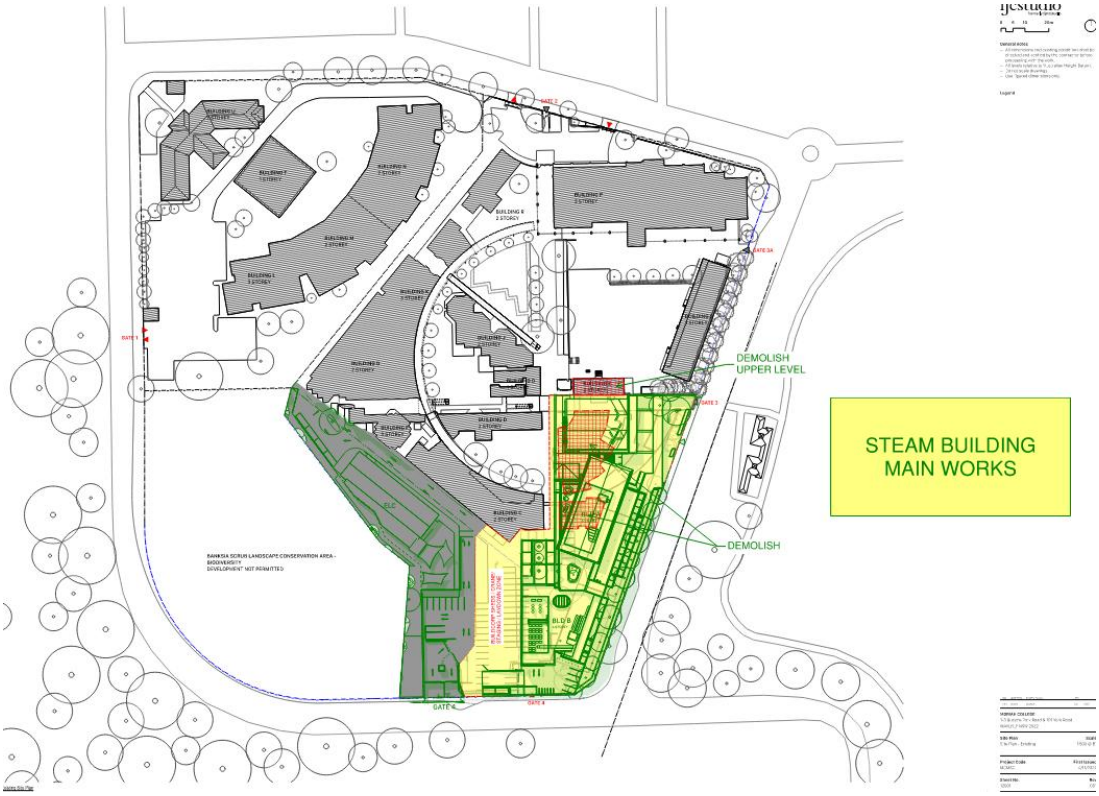
Noise Catchment ID	*Address*	*Receiver Type*	*Distances from construction site boundaries (m)*
NCA1	Residences on Queens Park Road	Residential	70 – 250m
NCA2	Residences on Darley Road	Residential	200-350m
NCA3	Surrounding parks	Active recreation	40-150m

Table 2: NCAs surrounding the site and the approximate distances from boundaries.

It is noted that if noise and vibration impacts associated with the proposed development are controlled at the nearest sensitive NCAs, then compliance with the recommended criteria at all NCAs should be achieved.

2.3 CONSTRUCTION STAGING

The stages of construction and the zones where work is occurring are shown in the following figures.




DEMOLISH
DEMOLISH
DEMOLISH
STAGE 1C & 1D
LANDSCAPING

3 NOISE AND VIBRATION CRITERIA

3.1 RELEVANT CODES AND STANDARDS

In preparing this CNVMP, the following documentation including legislation, codes, standards, and guidelines have been considered:

- Regulatory Framework:
  - Environmental Planning and Assessment (EP&A) Act 1979.
  - Protection of the Environmental Operations (POEO) Act 1997.
- Construction Noise and Vibration:
  - NSW Department of Environment and Climate Change (DECC) *'Interim Construction Noise Guideline'* (ICNG) 2009.
  - NSW DECC Assessing Vibration: A Technical Guideline 2006.
  - Australian Standard AS 2436:2010 *'Acoustics – Guide to Noise Control on Construction, Maintenance & Demolition Sites'*.
  - British Standards Institution BS 6472:2008 *'Evaluation of human exposure to vibration in buildings (1 to 80 Hz)'*.
  - British Standards Institution BS 7385.2:1993 *'Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Ground-borne Vibration'*.

3.2 REGULATORY FRAMEWORK

3.2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT (EP&A) ACT 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides the regulatory framework for the protection of the environment in NSW. The EP&A Act is relevantly about planning matters and ensuring that "environmental impact" associated with the proposed development is properly considered and reasonable before granting development consent to develop.

The assessment of "environmental impact" relies upon the identification of acceptable noise criteria which may be defined in a Development Control Plan or derived from principles using guidelines like NSW EPA Noise Policy for Industry (NPI 2017) or Noise Guide for Local Government (NGLG 2013).

3.2.2 PROTECTION OF THE ENVIRONMENTAL OPERATIONS (POEO) ACT 1997

The Protection of the Environment Operations (POEO) Act 1997 has the objective to protect, restore and enhance the quality of the NSW environment. Abatement of noise pollution is underpinned by the definition of *"offensive noise"* as follows:

"...

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

> *(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or*
>
> *(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.

..."

Noise Guide for Local Government (NGLG) 2013, provides a consideration checklist to determine an *"offensive noise"*.

3.3 NSW INTERIM CONSTRUCTION NOISE GUIDELINE

The ICNG suggest construction noise management levels that may minimise the likelihood of annoyance being caused to noise sensitive residential NCAs depending on the duration of works. The management levels for long-term duration works are as follows for residential NCAs.

Time of Day	*NML $L_{Aeq,15min}$*	*How to Apply*
Approved SSDA hours as per Condition F7: Mon-Fri 7am-6pm Sat 8am-5pm No work on Sundays or public holidays	Noise affected: RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. ▪ Where predicted or measured $L_{Aeq,15min}$ is greater that the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected: 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
ICNGC Criteria for Outside Recommended Standard Hours	Noise affected: RBL + 5dB	▪ A strong justification would typically be required for work outside the recommended standard hours. ▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community.

Table 3: ICNG construction airborne noise criteria for residential NCAs surrounding the construction site.

In order to establish the airborne construction noise criteria, noise levels from the unattended noise monitoring have been used for the NCAs. The background noise levels have been extracted from the approved Noise & Vibration Impact Assessment for SSDA and shown below in Table 4, together with the ambient noise levels (L_{Aeq}) measured for each period. The Rating Background Levels (RBLs) are used to derive the criteria in accordance with the NSW Interim Construction Noise Guideline. The graphical results have been extracted and are presented in Appendix A of this report.

Location (As per SSDA Acoustic Report)	L_{A90} Rating Background Levels, dB(A)			L_{Aeq} Ambient Noise Levels, dB(A)		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
L1	53	45	37	61	58	53

Table 4: Results of the long-term noise monitoring.

Table 5 below summarises the airborne construction noise criteria for most affected noise catchment areas surrounding the development site.

Sensitive NCA		Airborne Construction Noise Criteria, L_{Aeq} dB(A)	
		Within Standard Hours	Outside Standard Hours
Residential (NC1 and NC2)l	Noise affected / External	63	N/A
	Highly noise affected / External	75	N/A
Active recreation areas (NC3)	When in use	65	N/A

Table 5: ICNG construction airborne noise criteria for NCAs surrounding the site.

The ICNG recommends internal ground-borne noise maximum levels at residences affected by nearby construction activities. Ground-borne noise is noise generated by vibration transmitted through the ground into a structure and can be more noticeable than airborne noise for some sensitive NCAs. The ground-borne noise levels presented below from the ICNG are for residential NCAs during evening and night-time periods only, as the objective is to protect the amenity and sleep of people when they are at home.

- Evening: $L_{Aeq,15min}$ 40dB(A) (internal)
- Night: $L_{Aeq,15min}$ 35dB(A) (internal)

The internal noise levels are assessed at the centre of the most affected habitable room. No assessments of ground borne noise have been conducted as no out of standard hours work is proposed to occur during evening time and night-time.

3.4 VIBRATION CRITERIA

There are two items that shall be considered in the assessment of vibration impacts from construction works. These include vibration impacts in terms of human comfort and building damage.

3.4.1 HUMAN COMFORT

The Department of Environment and Climate Change (DECC) developed the document *'Assessing Vibration: A Technical Guideline'* in February 2006 to assist in preventing people from exposure to excessive vibration levels within buildings. It is based on the guidelines contained in BS 6472.1:2008 *'Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting'*. The guideline does not however address vibration induced damage to structures or structure-borne noise effects.

Vibration and its associated effects are usually classified as follows:

- *Continuous vibration*. An uninterrupted vibration for a defined period. This type of vibration is assessed on the basis of weighted root-mean-squared (rms) acceleration values.
- *Impulsive vibration*. A vibration which has a rapid build up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on the frequency and damping).
- *Intermittent vibration*. An interrupted periodic vibration of continuous or repeated periods of impulsive vibration, or continuous vibration that varies significantly in amplitude. This type of vibration is assessed on the basis of Vibration Dose Values (VDV).

Vibration criteria for continuous and impulsive vibration are presented in Table 6, in terms of vibration velocity levels. The values are assessed for the most critical frequency range (higher than 8 Hz assuming sinusoidal motion). When assessing intermittent vibration comprising a number of events, it is recommended that the Vibration Dose Value (VDV) is used Table 7 shows the acceptable VDV values for intermittent vibration.

NCA Type	*Time*	*RMS velocity, mm/s [dB ref 10^{-6}mm/s]*			
		Continuous Vibration		*Impulsive Vibration*	
		Preferred	*Maximum*	*Preferred*	*Maximum*
Residences	Day-time	0.20 [106 dB]	0.40 [112 dB]	6.00 [136 dB]	12.00 [142 dB]
	Night-time	0.14 [103 dB]	0.28 [109 dB]	2.00 [126 dB]	4.00 [132 dB]
Offices	Day or night-time	0.40 [112dB]	0.80 [118dB]	13.0 [142dB]	26.0 [148dB]

Table 6: Continuous and impulsive vibration criteria applicable to the site. Note: Day-time is 07:00am to 10:00pm and night-time is 10:00pm to 07:00am.

Place	*Time*	*Vibration Dose Values, $m/s^{1.75}$*	
		Preferred	*Maximum*
Residences	Day-time	0.20	0.40
	Night-time	0.13	0.26
Offices	Day and night-time	0.40	0.80

Table 7: Intermittent vibration criteria applicable to the site.

3.4.2 STRUCTURAL BUILDING DAMAGE

Ground vibration from construction activities can damage surrounding buildings or structures. For unoccupied buildings, or during periods where the buildings are unoccupied, the vibration criteria for building damage suggested by German Standard DIN 4150.3:2016 *'Structural Vibration – Effects of Vibration on Structures'* and British Standard BS 7385.2:1993 *'Evaluation and Measurement for Vibration in Buildings'* are to be adopted. Guideline values from DIN 4150.3:2016 and BS 7385.2:1993 are presented in Table 8 and Table 9 respectively.

Structural type	*RMS velocity, mm/s*			
	Foundation			*Plane of floor uppermost full storey*
	Less than 10Hz	*10 to 50Hz*	*50 to 100Hz*	*Frequency mixture*
Buildings used for commercial purpose, 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
Particularly sensitive	3	3 to 8	8 to 10	8

Table 8: DIN 4150.3:2016 Guideline values of vibration velocity for evaluating the effects of short-term vibration.

Structural type	*Peak particle velocity, mm/s*	
	4 to 15Hz	*15Hz and above*
Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s @ 4Hz increasing to 20mm/s @ 15Hz	20mm/s @ 15Hz increasing to 50mm/s @ 40Hz and above

Table 9: BS 7385.2:1993 Guideline values of vibration velocity for evaluating cosmetic damage.

4 CONSTRUCTION ACTIVITIES

4.1 DESCRIPTION OF WORKS

Refer to Table 10 for the stages of work that have been assessed.

Stage of Works	*Breakdown of works*
Enabling works	Demolition of pavements, excavation, saw-cutting, formwork, reinforcement, concrete pumping, and potentially temporary and/or permanent shoring piling
Main works for STEAM building	Demolition + Piling + Excavation
	Structure and Facade
	Fitout + STEAM Landscaping
Stage 1C landscaping	Demolition of pavements, saw-cutting, formwork, reinforcement, concrete pumping

Table 10: Stages of work and associated construction plant.

4.2 CONSTRUCTION WORKING HOURS

The construction hours as per the SSDA Consent Condition F7 are as follows:

- Monday to Friday: 7:00am to 6:00pm.
- Saturday: 8:00am to 5:00pm.
- Sundays and Public Holidays: No works.

4.3 EQUIPMENT AND NOISE LEVELS

In accordance with the information provided and in order to assess potential noise and vibration impacts during works from a quantitative point of view, the construction noise sources for the works occurring during the project and the associated equipment noise levels have been assumed and are listed in Table 11.

These levels are based on the databases published by Australian Standard 2436:2010 '*Guide to Noise Control on Construction, Maintenance & Demolition Sites*', Roads and Maritime Services '*Construction Noise and Vibration Guideline*' and the UK Department for Environmental, Food and Rural Affairs (DEFRA).

Stage of Works	*Plant and Construction Equipment in use*	*Typical Sound Power Level L_{10} (dB ref 1pW)*	*Typical Sound Pressure Level L_{Aeq} at 10m (dB ref 20μPa)*
	Enabling works		
Enabling works	Excavators from 1.7t – 20t	107	79
	Padfoot Roller [Smooth-Drum]	110	82
	Truck & Dog Haulage	107	79
	Concrete Boom Pump	108	80
	Concrete Supply Trucks	109	81
	Reinforcement Supply Trucks	107	79
	Mobile Cranes up to 60t	104	76
	Skip Bin Deliverys & Pick Ups	117	89
	Main works		
Demolition + Piling + Excavation	Excavators from 5t – 30t	107	79
	Piling Rig (bored)	111	83
	Anchor Drill Rig	116	88
	Truck & Dog Haulage	107	79
	Concrete Boom Pump	108	80
	Concrete Delivery Trucks	109	81
	Shotcrete	106	78
	Reinforcement Supply Trucks	107	79
	Mobile Cranes [up to 120t]	104	76
	Skip Bin Deliverys & Pick Ups	117	89
Structure and Facade	Tower Crane	105	77
	Concrete Boom Pump	108	80
	Concrete Supply Truck	109	81
	Reinforcement Supply Truck	107	79
	Formwork Supply Trucks	107	79
	Scaffold Supply Trucks	107	79
	General grinding, hammering, power tools, nailing	105	77
	Skip Bin Deliverys & Pick Ups	117	89
	Concrete Boom Pump	108	80
	Concrete Supply Truck	109	81

Stage of Works	*Plant and Construction Equipment in use*	*Typical Sound Power Level L_{10} (dB ref 1pW)*	*Typical Sound Pressure Level L_{Aeq} at 10m (dB ref 20μPa)*
Fitout + STEAM Landscaping	Reinforcement Supply Truck	106	78
	Formwork Supply Trucks	107	79
	Scaffold Supply Trucks	107	79
	General grinding, hammering, power tools, nailing	105	77
	Skip Bin Deliverys & Pick Ups	117	89
Stage 1C landscaping			
Stage 1C landscaping	Excavators from 5t – 30t	107	79
	Truck & Dog Haulage	107	79
	Concrete Boom Pump	108	80
	Concrete Delivery Trucks	109	81
	Concrete saw cutting	117	89
	Reinforcement Supply Trucks	107	79
	Skip Bin Deliverys & Pick Ups	117	89

Table 11: Anticipated maximum airborne noise levels for equipment / plant used during the different stages of the works.

5 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

A construction noise and vibration assessment has been carried out based on the plant and machinery expected throughout the works associated as per Section 4.

5.1 ASSESSMENT METHODOLOGY

An assessment of the likely noise and vibration impacts of the assumed stage of works on the most affected noise sensitive receivers surrounding the site has been carried out. The assessment has been considered the following:

- Proposed construction activities considered in the noise impact are detailed in Section 4.1.
- Proposed construction hours as per Section 4.2.
- Noise source levels considered in the noise impact assessment are detailed in Section 4.3.
- Project specific noise and vibration criteria at sensitive NCAs as outlined in Section 3.
- Assessment is conducted at 1.5m above ground level

It should be noted that the predicted noise levels generated during the construction works may vary depending on many factors including:

- Final selection of plant and equipment which could differ from the plant presented in Table 11.
- Exact location of equipment and plant on site – relative to the noise catchment areas.
- Shielding of noise provided by structures and hoardings on and around the site.
- Reflections provided by existing structures on and around the site.

5.2 NOISE ASSESSMENT

Refer to the sections below for the predicted noise levels for the stages of work as detailed in Table 10.

These levels are typically representative of the worst case 15 minutes that would be expected. The predicted noise levels at noise sensitive receiver locations are calculated to 1.5m above ground level, at the most affected point externally of each noise catchment area that has been identified as the most affected.

The ICNG requires, and it is usual practice, to predict the reasonable worst-case noise level. For construction-type activities this will typically be when plant is operating close to an assessment location. However, it shall be considered that on larger construction sites (such as this one) where plant moves around, noise will not be at the reasonable worst-case noise level throughout the entire duration of the activity: it will be lower when the plant is further away. Therefore, it can be stated that noise levels will be lower at times throughout the construction activity.

Stage of Works	*Plant and Construction Equipment in use*	*Predicted Noise Levels, $L_{Aeq,15min}$ dB(A)*		
		NCA1	*NCA2*	*NCA3*
Enabling works	Excavators from 1.7t – 20t	52 - 48	49 - 46	60 - 52
	Padfoot Roller [Smooth-Drum]	55 - 51	52 - 49	63 - 55
	Truck & Dog Haulage	52 - 48	49 - 46	60 - 52
	Concrete Boom Pump	56 - 51	52 - 49	63 - 56
	Concrete Supply Trucks	56 - 51	52 - 50	64 - 56
	Reinforcement Supply Trucks	51 - 47	48 - 45	59 - 51
	Mobile Cranes up to 60t	51 - 46	47 - 45	59 - 51
	Skip Bin Deliverys & Pick Ups	61 - 56	57 - 55	69 - 61
Enabling works Total Cumulative SPL		**65 - 60**	**61 - 59**	**73 - 65**
Demolition + Piling + Excavation	Excavators from 5t – 30t	52 - 48	49 - 46	60 - 52
	Piling Rig	58 - 53	54 - 52	66 - 58
	Anchor Drill Rig	63 - 58	59 - 57	71 - 63
	Truck & Dog Haulage	51 - 47	48 - 45	59 - 51
	Concrete Boom Pump	55 - 50	51 - 49	63 - 55
	Concrete Delivery Trucks	53 - 49	50 - 47	61 - 53
	Shotcrete	52 - 47	48 - 46	60 - 52
	Reinforcement Supply Trucks	51 - 47	48 - 45	59 - 51
	Mobile Cranes [up to 120t]	51 - 46	47 - 45	59 - 51
	Skip Bin Deliverys & Pick Ups	61 - 56	57 - 55	69 - 61
Demolition / Piling / Excavation Cumulative SPL		**67 - 62**	**63 - 61**	**75 - 67**
Structure and Façade	Tower Crane	52 - 47	48 - 46	60 - 52
	Concrete Boom Pump	55 - 50	51 - 49	63 - 55
	Concrete Supply Truck	53 - 49	50 - 47	61 - 53
	Reinforcement Supply Truck	51 - 47	48 - 45	59 - 51
	Formwork Supply Trucks	51 - 47	48 - 45	59 - 51
	Scaffold Supply Trucks	51 - 47	48 - 45	59 - 51
	General grinding, hammering, power tools, nailing	51 - 46	47 - 45	59 - 51
	Skip Bin Deliverys & Pick Ups	61 - 56	57 - 55	69 - 61
Structure and Façade Cumulative SPL		**64 - 59**	**60 - 58**	**72 - 64**
	Concrete Boom Pump	55 - 50	51 - 49	63 - 55

Stage of Works	Plant and Construction Equipment in use	Predicted Noise Levels, $L_{Aeq,15min}$ dB(A)		
		NCA1	NCA2	NCA3
Fitout + STEAM Landscaping	Concrete Supply Truck	53 - 49	50 - 47	61 - 53
	Reinforcement Supply Truck	50 - 46	47 - 44	58 - 50
	Formwork Supply Trucks	51 - 47	48 - 45	59 - 51
	Scaffold Supply Trucks	51 - 47	48 - 45	59 - 51
	General grinding, hammering, power tools, nailing	51 - 46	47 - 45	59 - 51
	Skip Bin Deliverys & Pick Ups	61 - 56	57 - 55	69 - 61
Fitout + STEAM Landscaping Cumulative SPL		**64 - 59**	**60 - 58**	**72 - 64**
Stage 1C landscaping	Excavators from 5t – 30t	59 - 53	47 - 45	64 - 53
	Truck & Dog Haulage	58 - 51	46 - 44	63 - 51
	Concrete Boom Pump	61 - 54	49 - 47	66 - 54
	Concrete Delivery Trucks	60 - 53	48 - 46	65 - 53
	Concrete cutting	69 - 62	57 - 55	74 - 62
	Reinforcement Supply Trucks	58 - 51	46 - 44	63 - 51
	Skip Bin Deliverys & Pick Ups	67 - 61	55 - 53	72 - 61
Stage 1C landscaping Cumulative SPL		**72 - 66**	**60 - 58**	**77 - 66**

Table 12: Predicted construction noise levels.

In regards to the residential receiver catchment areas NCA1 and NCA2 - For Enabling works and Steam Building Main works, based on the predicted noise levels, there are no exceedances of the highly noise affected levels, and the NMLs are expected to generally be met with the operation of each piece of equipment. When all equipment is operating simultaneously, there is a predicted exceedance to NCA1 of up to 4dB(A) when works are occurring on the closest boundary. This potential exceedance is based on all equipment operating simultaneously, which is unlikely to occur.

For Stage 1C landscaping works, exceedances of the NML to NC1 are expected when works are occurring at the northern boundary. No exceedance of the highly noise affected level is expected.

In regards to the adjacent recreational areas, exceedances of up to 10dB(A) are expected when works are occurring on the boundary when the proximity is close, and less than 5dB(A) when works are occurring away from the boundary.

5.3 VIBRATION ASSESSMENT

The vibration intensive plant used during the construction works may impact adjacent sensitive NCAs. In order to assess the construction vibration impact due to heavy construction plant, the NSW RMS 'Construction Noise and Vibration Guideline' provides safe working distances for vibration intensive plant and are quoted for both 'cosmetic' damage (in accordance with BS 7385.2:1993) and human comfort (in accordance with DEC's 'Assessing Vibration: A Technical Guideline'). The values for structural damage for this CNVMP are based on BS 7385.2 as per the NSW RMS Construction Noise and Vibration Guideline which is an established and commonly used guideline. It should be noted that DIN 4150-3 limits are more conservative and the safe working distances are further.

The recommended safe working distances are provided in Table 13 and shall be complied with by the contractor at minimum.

The minimum working distances are indicative and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage to typical buildings under typical geotechnical conditions. All work, particularly piling, is to be conducted in accordance with the safe working distances.

In relation to human comfort (response), the minimum working distances in Table 13 relate to intermittent vibration (VDV parameter) as for most construction activities, vibration emissions are intermittent in nature. Where the predicted vibration levels will exceed the human comfort objectives, the procedures Section 6.2.2 are to be followed in order to mitigate the potential impacts at sensitive NCAs.

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 F18.

Plant Item	*Description*	*Cosmetic Damage*	*Human Response*
Vibratory Roller	200 kN (Typically 4-6 tonnes)	12m	40m
	300 kN (Typically 7-13 tonnes)	15m	100m
Small Hydraulic Hammer	5-12 t excavator	2m	7m
Medium Hydraulic Hammer	12–18 t excavator	7m	23m
Large Hydraulic Hammer	18-34 t excavator	22m	73m
Bored piling	<800mm	2m (nominal)	N/A
Vibratory piling	Sheet piles	2m to 20m	20m
Jackhammer	Hand held	1m	Avoid contact with structure

Table 13: Recommended minimum working distances for vibration intensive plant from sensitive NCAs.

If the contractor has concerns for disruptions or structural damage to surrounding buildings and receivers due to vibration intensive plant use, it is recommended that prior to the commencement of the works, to undertake a preliminary vibration survey on each key vibration generating activity / equipment. Ensure all construction equipment is operated and selected such that vibration criteria are not exceeded within adjacent buildings.

6 NOISE AND VIBRATION CONTROL RECOMMENDATIONS

This section of the Construction Noise and Vibration Planning provides general recommendations only and provides applicable criteria together with best noise and vibration control practices to be observed during the proposed works associated.

Any noise from construction activities to be carried out on site must not result in *'offensive noise'* to any noise sensitive NCA. To this end, the Contractor employed to undertake the construction works is responsible for ensuring that any site noise and, in particular any complaints shall be monitored, investigated, managed and controlled.

6.1 RESPITE PERIODS

Respite periods should generally be implemented into the work methodology in order to reduce the impact onto the surrounding NCAs, as detailed in Section 6.6.

Consent Condition F10:

Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

a) 9am to 12pm, Monday to Friday;
b) 2pm to 5pm Monday to Friday; and
c) 9am to 12pm, Saturday

6.2 GENERAL CONTROLS FOR NOISE AND VIBRATION

According to ICNG and AS 2436:2010 *'Guide to Noise Control on Construction, Maintenance & Demolition Sites'*, the following techniques could be applied to minimize the spread of noise and vibration to the nearest sensitive NCAs.

6.2.1 NOISE

If a process that generates significant noise levels cannot be avoided, the amount of noise reaching the NCA should be minimized. Two ways of achieving this are to either increase the distances between the noise source and the NCA or to introduce noise reduction measures such as screens.

Physical methods to reduce the transmission of noise between the site works and residences, or other sensitive land uses, are generally suited to works where there is longer-term exposure to the noise. Practices that will reduce noise from the site include:

- Increasing the distances between noise sources and sensitive NCAs.
- Restrict areas in which mobile plant can operate so that it is away from residences and other sensitive land uses at particular times.
- Reducing the line-of-sight noise transmission to residences or other sensitive land uses using temporary barriers (stockpiles, shipping containers and transportable site offices can be effective barriers).
- Constructing barriers that are part of the project design early in the project to introduce the mitigation of site noise.
- Installing purpose built noise barriers, acoustic sheds and enclosures.

6.2.2 VIBRATION

Vibration can be more difficult to control than noise, and there are few generalizations that can be made about its control. It should be kept in mind that vibration may cause disturbance by causing structures to vibrate and radiate noise in addition to perceptible movement. Impulsive vibration can, in some cases, provide a trigger mechanism that could result in the failure of building components that had previously been in a stable state.

During the demolition works, some vibrations (transmitted through the existing structures nearby the demolition sites) are expected, being more of a concern for the surrounding NCAs.

It can also trigger annoyance being elevated into action by occupants of exposed buildings, and should therefore be included in the planning of communication with impacted communities. It should be remembered that failures, sometimes catastrophic, can occur as a result of conditions not directly connected with the transmission of vibrations, e.g. the removal of supports from retaining structures to facilitate site access.

Where site activities may affect existing structures, a thorough engineering appraisal should be made at the planning stage.

General principles of seeking minimal vibration at receiving structures should be followed in the first instance. Predictions of vibration levels likely to occur at sensitive NCAs are recommended when they are relatively close, depending on the magnitude of the source of the vibration or the distances associated. Relatively simple prediction methods are available in texts, codes of practice or other standards, however it is preferable to measure and assess site transmission and propagation characteristics between source and NCA locations.

Guidance for measures available for the mitigation of vibration transmitted can be sought in more detailed standards, such as BS 5228.2:2009 *'Code of practice for noise and vibration control on construction and open sites. Vibration'* or policy documents, such as the NSW DEC *'Assessing Vibration: A technical guideline'*.

Identifying the strategy best suited to the control of vibration follows a similar approach to that of noise avoidance, control at the source, control along the propagation path, control at the NCAs, or a combination of these. It is noted that vibration sources can include stationary plants (pumps and compressors), portable plants (jackhammers and pavement vibrators), mobile plants, pile-drivers, tunneling machines and activities, and blasting, amongst others. Unusual ground conditions, such as a high water-table, can also cause a difference to expected or predicted results, especially when considering the noise propagated from piling.

6.3 UNIVERSAL WORK PRACTICES

To minimise construction noise complaints due to preventable activities at any time of the day, the following work practices shall be considered:

- Regularly train workers and contractors (such as a toolbox talks) to use equipment in ways to minimise noise.
- Ensure site managers periodically check the site and nearby residences and other sensitive land use for noise problems so that solutions can be quickly applied.
- Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that require minimisation of noise and compliance with directions from management to minimise noise.
- Avoid the use of radios or stereos outdoors where neighbours can be affected.

- Avoid shouting, and minimise talking loudly and slamming vehicle doors.
- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices.
- Develop a one-page summary of approval or consent conditions that relate to relevant work practices, and pin it to a noticeboard so that all site operators can quickly reference noise information.
- Workers may at times need to discuss or negotiate practices with their managers.

For work practices outside of construction hours, the following shall be considered:

- Avoid the use of equipment which generates impulsive noise.
- Minimise the need for reversing or movement alarms.
- Avoid dropping materials from a height.
- Avoid metal-to-metal contact on equipment.
- Schedule truck movements to avoid residential streets if possible.
- Avoid mobile plant clustering near residences and other sensitive land uses.
- Ensure periods of respite are provided in the case of unavoidable maximum noise level events.

6.4 CONSULTATION AND NOTIFICATION

The community is more likely to be understanding and accepting of noise if the information provided is frank, does not attempt to understate the likely noise level, and if commitments are firmly adhered to. Recommended actions before and during construction:

- Provide, reasonably ahead of time, information such as total building time, what works are expected to be noisy, their duration, what is being done to minimise noise and when respite periods will occur. For works outside standard hours, inform affected residents and other sensitive land use occupants between 5 and 14 days before commencement.
- Provide information to neighbours before and during construction through communication channels outlined in Section 4.1 of the CCS report (Appendix B).
- Use a site information board at the front of the site with the name of the organisation responsible for the site and their contact details, hours of operation and regular information updates. The signage should be clearly visible from the outside and include after-hours emergency contact details.
- Maintain good communication between the community and project staff.
- Provide general contact details, e.g., phone numbers and email address, and site manager's contact details for stakeholders to submit feedback, enquiries and complaints in relation to the project, as per Section 4.4 of the CSS report (Appendix B).
- Facilitate contact with people to ensure that everyone can see that the site manager understands the potential issues, that a planned approach is in place and that there is an ongoing commitment to minimise noise.
- Community forums to enable information and feedback as per Section 4.2 of the CCS Report (Appendix B).
- Complaints management system shall be established as per Section 4.6 and Appendix A of the CCS Report (Appendix B).

To assist in the management of noise and vibration complaints, various procedures are to be followed. These include:

- Clearly visible signage identifying any key personnel along with their contact details to be erected along the perimeter of the building site including a 24 hour contact name, phone number and email address provided for the resident to address any complaint.
- Give complaints a fair hearing.
- Have a documented complaint process, including an escalation procedure so that if a complaint is not satisfied there is a clear path to follow.
- Call back as soon as possible to keep people informed of action to be taken to address noise problems. Call back at night-time only if requested by the complainant to avoid further disturbance.
- Provide a quick response to complaints, with complaint handling staff having both a good knowledge of the project and ready access to information.
- Assign the issue to the appropriate staff for resolution.
- Try to ascertain from the complaint which equipment / plant is causing the problem.
- Where necessary, establish from the monitoring equipment and or attended monitoring if the allowable noise and vibration levels have been complied with.
- Establish if the equipment / plant positioning has previously been highlighted as a problem area. If not, and the noise levels are above the allowable limits, then the equipment / plant and its position shall be noted.
- Implement all feasible and reasonable measures to address the source of the complaint plus advise the individual who raised the issue of the resolution.
- Follow-up corrective measures after seven days to ensure that they are satisfactory.
- The Communications Register is to be kept by the Contractor to keep a record of complaints and detail any information associated with them. The registration of a particular item will remain open until the compliant has been appropriately dealt with. The contents of the register will include:
    - The name and the address of the complaint
    - Time and date of the complaint
    - The nature of the complaint (Noise/Vibration)
    - Subsequent details
    - Remedial action undertaken

The contents of the Communications Register will be maintained and updated with any new complaint without delay. The report will be reported to both Authority and the Contractor. The investigation of the complaint and any remedial actions will be performed by the builder and/or client representative. Client representative will need to be informed of any and all complaints regarding noise and remedial actions undertaken.

6.5 MANAGING NOISE LEVELS AND MAINTENANCE PROGRAM FOR PLANT AND EQUIPMENT

In terms of both cost and results, controlling noise at the source is one of the most effective methods of minimising the noise impacts from any construction activities. Recommendations for managing noise levels from plant and equipment are as follows:

- Use quieter methods:
  - Examine and implement, where feasible and reasonable, alternatives to rock-breaking work methods, such as hydraulic splitters for rock and concrete, hydraulic jaw crushers, chemical rock and concrete splitting, and controlled blasting such as penetrating cone fracture. The suitability of alternative methods should be considered on a case-by-case basis.
  - Use alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric controlled units where feasible and reasonable. Where there is no electricity supply, use an electrical generator located away from residences.
- Use quieter equipment
  - Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine. For example, rubber wheeled tractors can be less noisy than steel tracked tractors.
  - Noise labels are required by NSW legislation for pavement breakers, mobile compressors, chainsaws and mobile garbage compactors. These noise labels can be used to assist in selecting less noisy plant.
  - Pneumatic equipment is traditionally a problem – select super silenced compressors, silenced jackhammers and damped bits where possible.
  - When renting, select quieter items of plant and equipment where feasible and reasonable.
  - When purchasing, select, where feasible and reasonable, the most effective mufflers, enclosures and low-noise tool bits and blades. Always seek the manufacturer's advice before making modifications to plant to reduce noise.
- Operate plant in a quiet and efficient manner
  - Reduce throttle setting and turn off equipment when not being used.
  - Examine and implement, where feasible and reasonable, the option of reducing noise from metal chutes and bins by placing damping material in the bin.

If necessary, the Contractor shall prepare and implement a regular plant and equipment use and Maintenance program. This is to ensure that 'noisy' equipment or tools are not used. This program should ensure that the contractor will:

- Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.
- Equipment must not be operated until it is maintained or repaired, where Maintenance or repair would address the annoying character of noise identified.
- For machines with enclosures, check that doors and door seals are in good working order and that the doors close properly against the seals.
- Return any hired equipment that is causing noise that is not typical for the equipment – the increased noise may indicate the need for repair.
- Ensure air lines on pneumatic equipment do not leak.

6.6 WORKS TIMING RESTRICTIONS AND SCHEDULING

Works should be carried out during periods specified by the approved Construction Hours. Scheduling noisy work during periods when people are least affected reduces noise impact on those. Recommendations for work scheduling are as follows:

- Provide respite periods.
- Schedule activities to minimise noise impacts.
  - Organise work to be undertaken during the recommended standard hours where possible.
  - When works outside the recommended standard hours are planned, avoid scheduling on Sundays or public holidays.
  - Schedule work when neighbours are not present (for example, commercial neighbours).
  - Schedule noisy activities around times of high background noise (local road traffic or when other local noise sources are active) where possible to provide masking or to reduce the amount that the construction noise intrudes above the background.
  - Consult with affected neighbours about scheduling activities to minimise noise impacts.
- Organise deliveries and access.
  - Nominate an off-site truck parking area, away from residences, for trucks arriving prior to gates opening.
  - Amalgamated loads can lead to less noise and congestion in nearby streets.
  - Optimise the number of vehicle trips to and from the site – movements can be organised to amalgamate loads rather than using a number of vehicles with smaller loads.
  - Inform, and consult where possible, the potentially noise-affected residences or other sensitive land uses of designated access routes to and from site, and make drivers aware of nominated vehicle routes.
  - Provide on-site parking for staff and on-site truck waiting areas away from residences and other sensitive land uses. Truck waiting areas may require walls to minimise noise.
  - Schedule deliveries to nominated hours only.

6.7 ADDITIONAL NOISE AND VIBRATION CONTROLS

As there will likely be times/situations when construction works are likely to exceed stated criteria at the nearest NCAs, particularly when works occur in the areas closer to the NCAs. Therefore, all feasible and reasonable noise control measures should be considered.

If, during construction, an item of equipment exceeds either the noise criteria at any location or the equipment noise level limits, the following noise control measures, together with construction best practices presented in this Section shall be considered to minimise the noise and vibration impacts of the project on the surrounding noise catchment areas.

- Schedule noisy activities to occur outside of the most sensitive times of the day for each nominated NCA. For example, the residential NCAs are likely to be more sensitive to noise before 8am and after 6pm.
- Consider implementing equipment specific temporary screening for noisy equipment, or other noise control measures recommended in Appendix C of AS2436:2010. This is most likely to apply to noisier hand-held items such as jackhammers and circular saws.

- Locate specific activities such as carpentry areas (use of circular saws, etc.) to internal spaces or where shielding is provided by existing structures or temporary screening.
- Limit the number of trucks and heavy vehicles on site at any given time through scheduling deliveries at differing times.
- Traffic rules should be prepared to minimise the noise impact on the community.
- When loading and unloading trucks, adopt best practice noise management strategies to avoid materials being dropped from height.
- Avoid unnecessary idling of trucks and equipment.
- Ensure that any miscellaneous equipment (extraction fans, hand tools, etc.) not specifically identified in this plan incorporates silencing/shielding equipment as required to meet the noise criteria.

If the measured construction vibration levels exceed the appropriate criteria during the works, one or more of the following measures should be taken:

- Modifications to construction equipment used.
- Modifications to methods of construction.
- Rescheduling of activities to less sensitive times.

If the measures given cannot be implemented or have no effect on noise or vibration levels or impact generated, a review of the criteria should be undertaken and the noise and vibration strategy amended.

6.8 MONITORING PROGRAM

In the event of ongoing complaints received from local residents, noise and vibration levels are recommended to be monitored from time to time to ensure that noise generated as a result of remediation and construction activities does not disturb the nearby noise and vibration sensitive receivers.

Monitoring may be in the form of regular checks by the builder or indirectly by an acoustic consultant engaged by the builder and in response to any noise or vibration complaints.

Where noise and vibration criteria are being exceeded or in response to valid complaints, noise and / or vibration monitoring should be undertaken. This would be performed inside the premises of the affected property and on site adjacent to the affected NCAs.

Monitoring is to be undertaken by an experienced noise and vibration monitoring professional or an acoustic consultant. The results of any noise or vibration monitoring are to be provided to the relevant party or person in a timely manner allowing the builder to address the issue and respond to the complaints.

Noise and vibration monitoring can take two forms:

- Short-term monitoring: Short-term monitoring consists of attended monitoring when critical stages of the construction are occurring. This normally provides real-time assistance and guidance to the sub-contractor on site letting them know when the noise and vibration criteria are exceeded allowing the selection of alternative method on construction or equipment selection in order to minimise noise and vibration impacts.
- Long-term monitoring: Similarly long-term monitoring uses noise and vibration loggers providing real-time alerts to the builder / site manager when the noise and vibration criteria are exceeded. Typically, the noise and vibration loggers stay on site for a period of several months for the critical construction stages of the project. Sometimes the period of construction noise and vibration monitoring is dictated by the local authorities through the Conditions of Consent if applicable.

Both methodologies are complementary and normally used simultaneously providing a significant of amount of data via the long-term monitoring but also providing information on the sources of noise and vibration generating exceedances via the short-term or attended monitoring.

The following may be included in a noise monitoring report:

- The type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method.
- The noise / vibration conditions on the consent / license, or the relevant noise management objectives.
- Descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint.
- Plan or diagram showing the location of the monitoring and the noise generating works.
- Description of the instrumentation used.
- Name and relevant qualifications or professional memberships of monitoring personnel.
- The weather conditions during monitoring.
- The time(s) and duration(s) of monitoring, including dates – in the case of complaints.
- A clear description of the construction activities taking place during the monitoring.
- The results of monitoring at each monitoring location, including a comparison with the consent conditions or relevant noise management objectives.
- A clear statement outlining the project's compliance or non-compliance with the conditions or objectives.
- Where the monitored level is higher than the conditions or objectives, the reasons for non-compliance should be stated, strategies for minimising noise identified and stated, and the appropriate actions to implement the strategies.

6.9 WORKERS TRAINING AND AWARENESS

The Contractor shall provide all project personnel and subcontractors with training on the environmental obligations through project inductions, toolbox talks, and through Safety Works Methods (SWMs).

All Project work personnel and subcontractors shall undergo a general project induction prior to commencing work. This should include a noise component to reinforce the importance of noise issues and the measures that will be implemented to protect the environment.

All inductions shall be carried out by the site manager, or his designate in the site office as appropriate.

Site inductions and toolbox talks will highlight the specific environmental requirements and activities being undertaken at each work area which will include relevant noise management matters.

6.10 OCCUPATIONAL HEALTH AND SAFETY

In addition to potential noise and vibration impacts on the community and structures, construction noise and vibration can also have an adverse impact upon the health of workers. It is important that Contractors adopt noise management strategies to prevent or minimise worker exposure to excessive noise and vibration. Such measures will also assist in reducing noise and vibration impacts on the surrounding community.

The National Occupational Health and Safety Commission (NOHSC) recommends a maximum acceptable workplace noise exposure level of 85dB(A) ($L_{Aeq,8h}$) for an eight hour time period.

Personnel involved in operations should be issued with ear plugs or ear muffs which must be used whenever noise levels interfere with normal speech when individuals are standing at a distance of 1m from each other, or when the $L_{Aeq,8hr}$ exceeds 85dB(A).

Signs should be erected and made visible at the entry to all areas where noise levels will exceed 85dB(A).

6.11 CONSTRUCTION TRAFFIC ROUTES

The contractor shall establish and implement traffic routes for deliveries to the site, which minimise the noise impact on surrounding noise catchment areas as best possible.

7 SUMMARY AND CONCLUSIONS

JHA Consulting Engineers has been engaged by Buildcorp to provide a Construction Noise and Vibration Management Plan (CNVMP) for the construction works to for the new Moriah College Redevelopment. This CNVMP has been prepared in order to satisfy SSDA Condition E15, E12[c], F15, F18, F19 and F20.

This report identifies the Contractor's obligations and the requirements to manage noise and vibration during construction such that Contractor can make the necessary allowances within the construction costs, programmes and work methodologies.

The responsibilities of all stakeholders are identified and a framework for the management of noise and vibration during construction works is provided.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development.

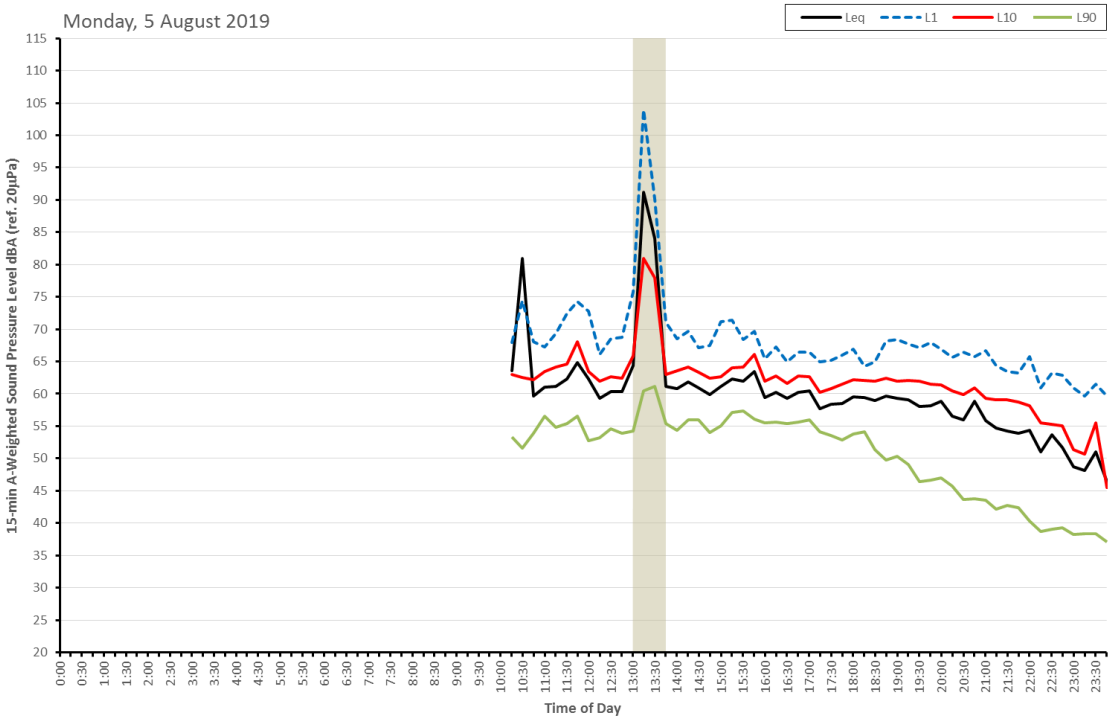
Potential construction noise and vibration impact on the surroundings have been presented in this report and recommendations based on the relevant guidelines are provided. Where there are exceedances of the NMLs in the surrounding NCAs, the proponent shall apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 5 for details.

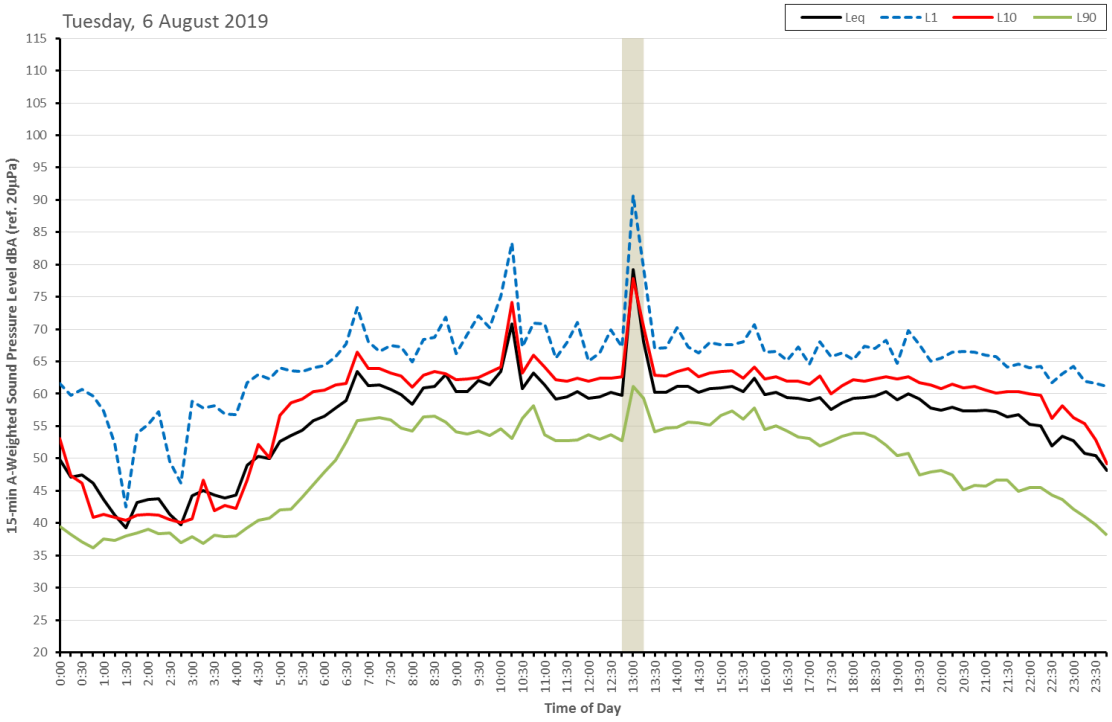
For each of these work stages and associated plant, noise control measures presented in Section 6 shall be considered and implemented wherever reasonable and feasible in order to minimise any potential noise impact. Operation time restrictions shall be applied to 'noisy' construction plant to minimise noise impact to the nearest sensitive NCAs.

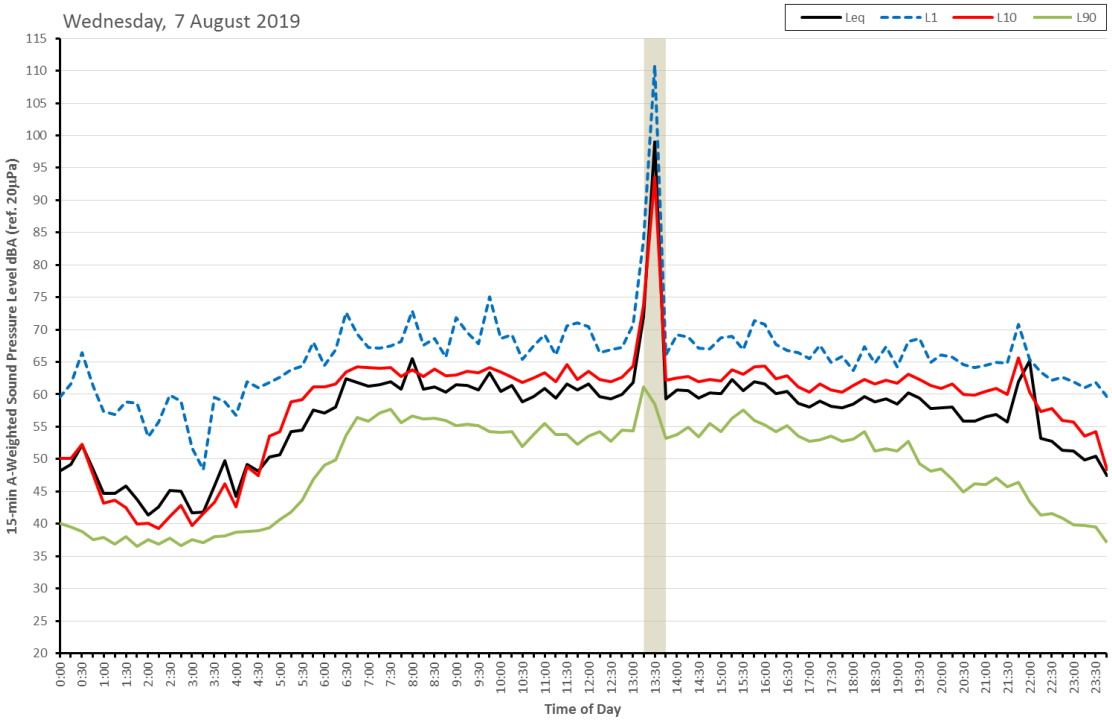
The information presented in this report shall be reviewed if any modifications to selection of equipment / machinery, construction methodologies and modifications to the works construction program.

Based on the information presented in this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

APPENDIX A – LONG TERM NOISE MONITORING DATA



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L10
L90
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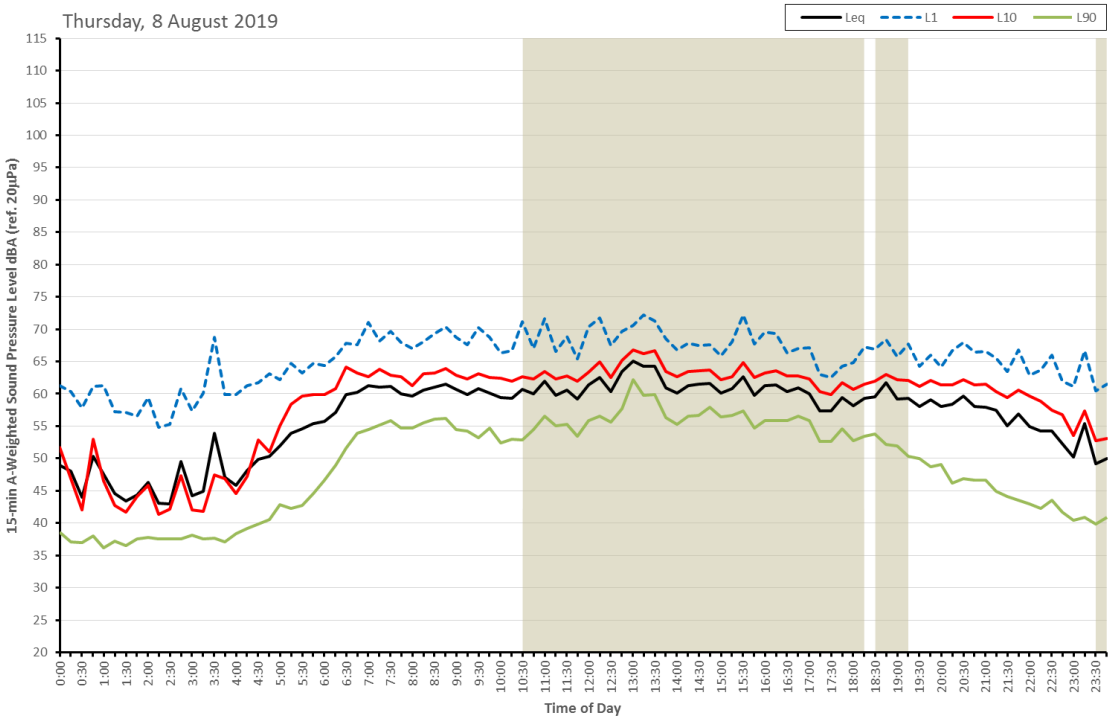
Time of Day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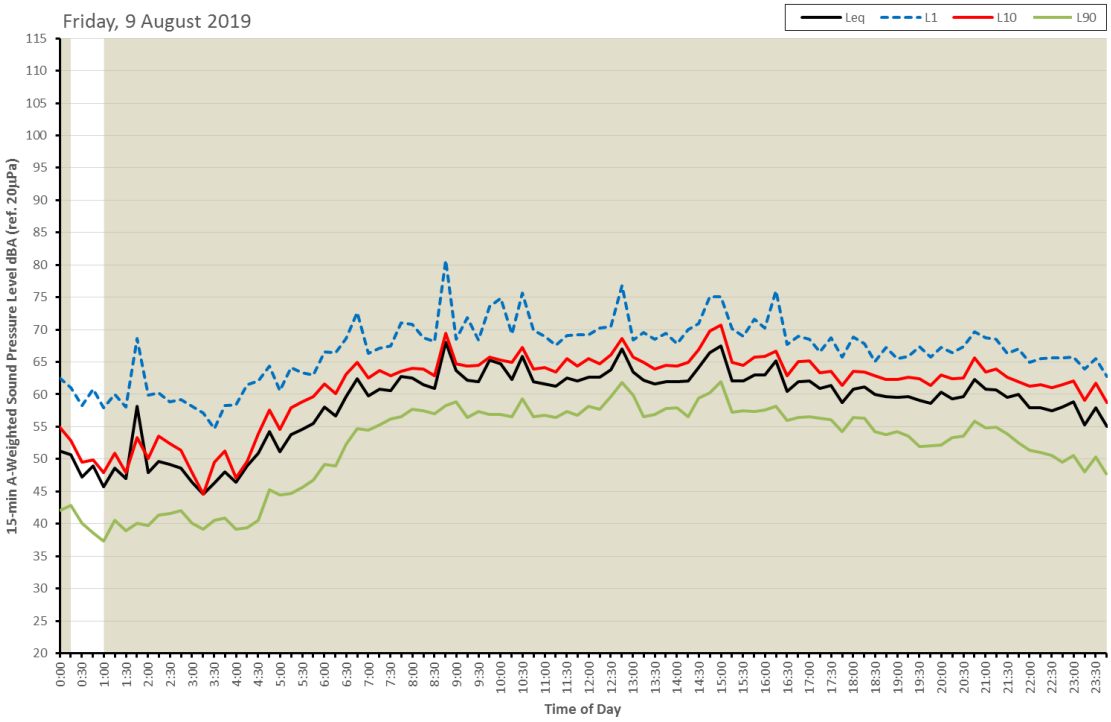
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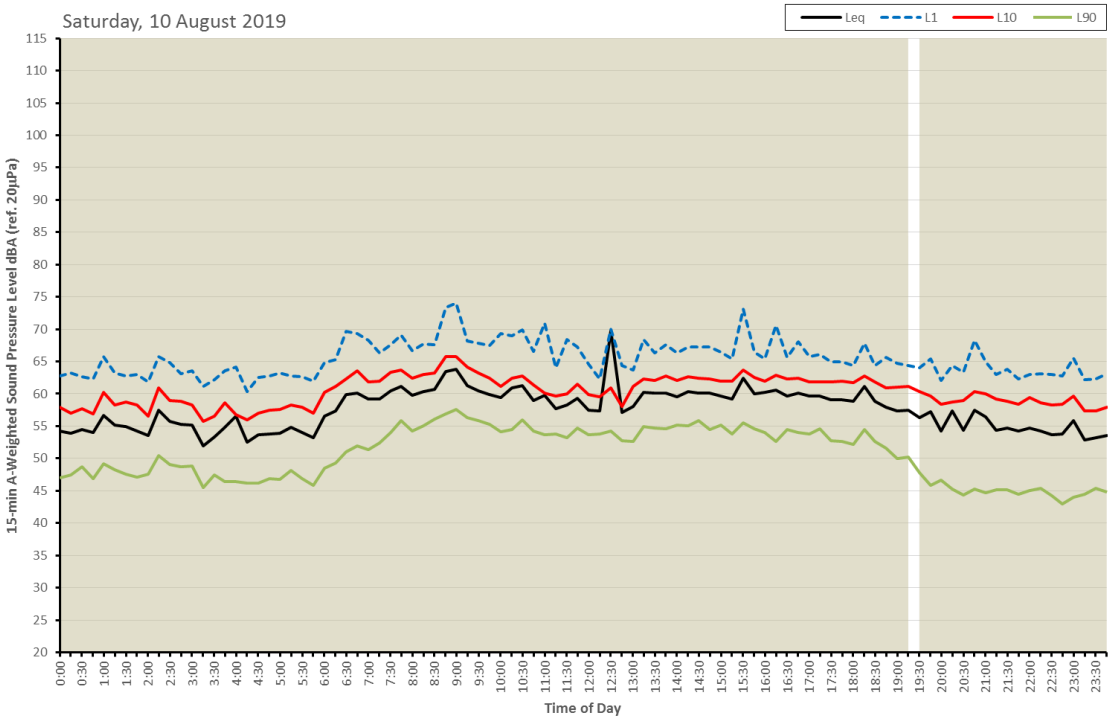
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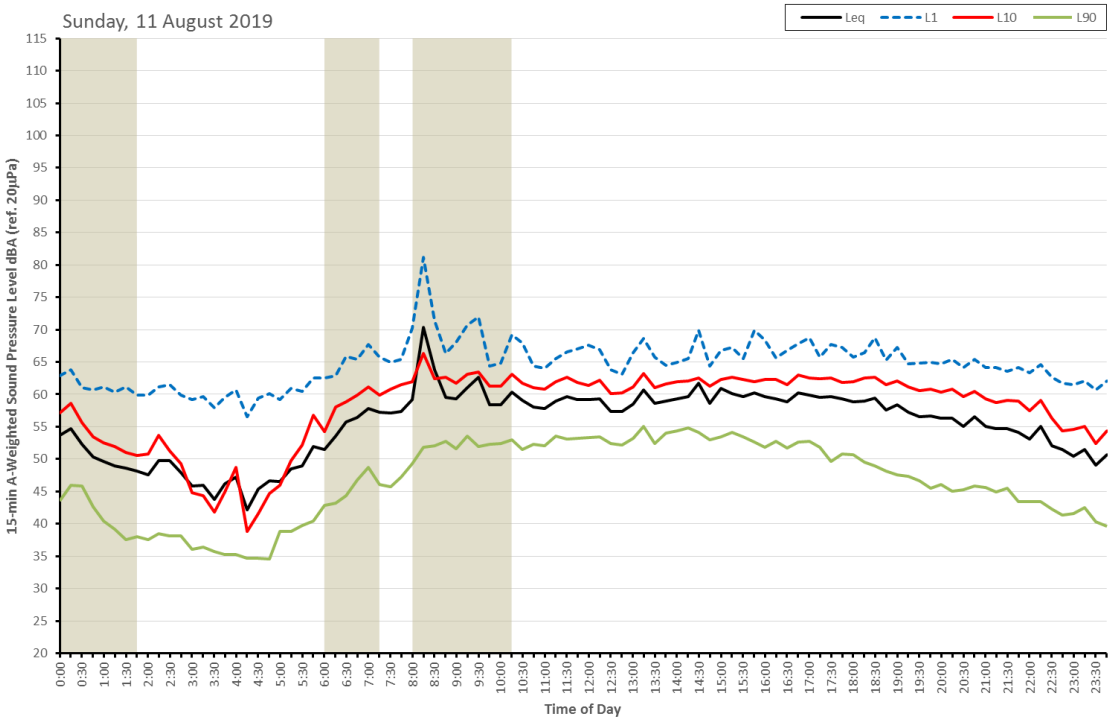
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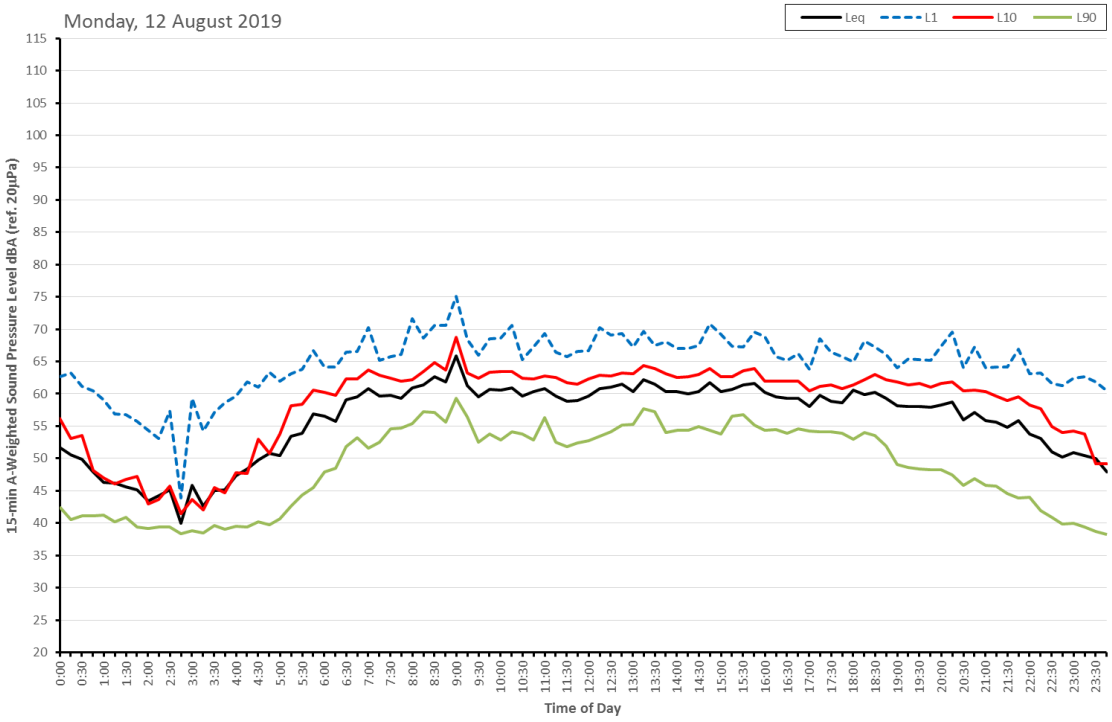
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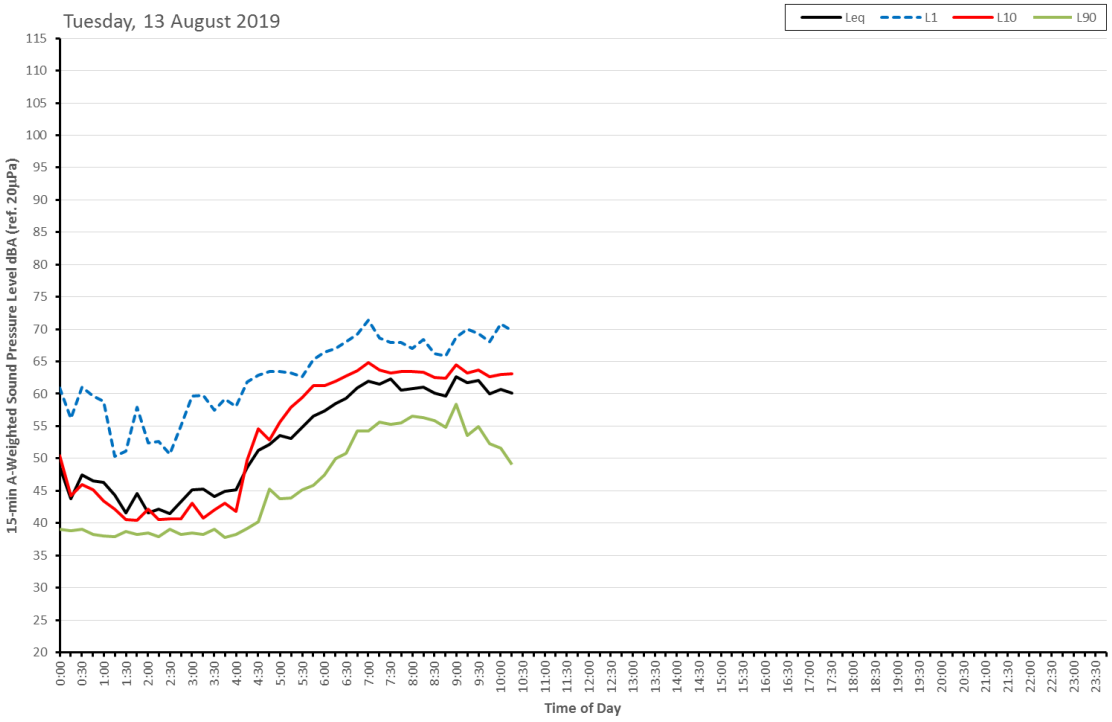
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L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
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APPENDIX B – COMMUNITY COMMUNICATION STRATEGY

Moriah College
בית ספר הר המוריה

COMMUNITY COMMUNICATION STRATEGY

Moriah College Redevelopment – Stage 1
SSD – 10352

Prepared for
Moriah War Memorial College
December 2025

Muller Enterprise

CONTENTS

1. INTRODUCTION

The NSW Department of Planning, Housing and Infrastructure has provided consent for the Concept Plan of Stages 1 & 2 and the construction of Stage 1 of the redevelopment of the Moriah War Memorial College Queens Park Campus (the Project).

The project will provide a modern new building to house Science, Technology, Engineering, Art and Mathematics (STEAM) and an Independent Learning Centre (ILC), including a new high school library. It will also deliver enhanced landscaping and external recreational areas for the school community, and improved school entry, vehicle access, and drop-off and pick-up arrangements. The works will be undertaken in stages.

This Community Communication Strategy (the Strategy) has been prepared in accordance with requirements of condition E9 of the Conditions of Consent for Stage 1 of the Moriah College Redevelopment (SSD-10352). It provides an overview of the procedures and mechanisms which will be in place to facilitate communication between the Project and key stakeholders during construction and for a minimum of 12 months following the completion of construction.

The Strategy has been prepared by R&S Muller Enterprise Pty Ltd (Muller Enterprise), consultants engaged by Moriah War Memorial College (the College). Implementation will be overseen by the College and its authorised representatives, including Superintendent Ernst & Young and the Principal Building Contractor.

1.1 Consent requirements

Table 1 below identifies the specific requirements that apply under Condition of Consent E9 – Community Communication Strategy and indicates where they are addressed in the Strategy.

Table 1: Consent requirements covered in this Strategy

Consent condition	Requirement	Strategy reference
E9	No later than two weeks before the commencement of construction, a Community Communication Strategy must be submitted to the Planning Secretary for approval and approved by the Planning Secretary prior to the commencement of construction or within another timeframe agreed with the Planning Secretary.	This document
E9	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, residents in Queens Park 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.	Section 4
The Community Communication Strategy must:		
E9 (a)	Identify people to be consulted during the design and construction phases.	Section 3
E9 (b)	Set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development.	Section 4.1

E9 (c)	Provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development.	Section 4.2
E9 (d)	Set out procedures and mechanisms: (i) through which the community can discuss or provide feedback to the Applicant; (ii) through which the Applicant will respond to enquiries or feedback from the community; and (iii) 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.	 Section 4.1 Section 4.4 Section 4.5
E9 (e)	Include any specific requirements around traffic, noise and vibration, visual impacts, amenity, flora and fauna, soil and water, contamination, heritage.	Section 4.3

2. ABOUT THE PROJECT

2.1 Site

The Moriah College Queens Park Campus (the Site) is located within the suburb of Queens Park, approximately 6 kilometres south-east of Sydney's CBD.

The Site is bordered by Queens Park Road to the north, Baronga Avenue to the east, and York Road to the south and west. It comprises three lots and extends to an area of 4.51 hectares. Moriah College has operated from the Queens Park Campus since 1994, and the site contains a number of existing buildings and improvements.

The legal description and addresses of the site are:

- 101 York Road, Queens Park (Lot 22 in DP 879582) which currently contains one single-storey classroom building (the Early Learning Centre), a hardstand amphitheatre, and landscaping
- 1 Queens Park Road, Queens Park (Lot 1 in DP 701512) which comprises the junior school and accommodates a series of classroom and administration buildings, and associated facilities, play-spaces, and car parking
- 3 Queens Park Road, Queens Park (Lot 3 in DP 701512) which comprises the main senior school and comprises a series of classroom and administration buildings, and associated facilities, landscaping, and car parking.

Figure 1: Aerial view of the Site

2.2 Locality

The Site is surrounded by large areas of public open space on three sides including:

- To the east: Queens Park which is a 26-hectare public open space that forms part of the Centennial Parklands and includes a playground and sporting fields
- To the south and west: sections of Centennial Parklands
- On the south-west corner, adjacent to the operational part of the campus: a small area of vegetation which is part of the protected 'Eastern Suburbs Banksia Scrub' conservation area. The project has been designed to not impact this area.

To the north is a residential area which forms part of the suburb of Queens Park comprising predominantly single and two-storey dwellings. The planned works are located in the southern portion of the site, away from Queens Park Road. Heavy vehicle travel routes and construction access points will also avoid Queens Park Road to minimise any potential impacts on the residential area.

2.3 Project scope

The College has been granted concept approval for the staged redevelopment of the southern portion of the senior school campus and consent for the first stage of buildings works.

The Stage 1 works will include:

- demolition of school buildings, demountable structures and hardstand areas;
- removal of trees and bulk earthworks;
- construction of a part three-storey and part-four storey STEAM and ILC building;
- creation of 93 car parking spaces and 160 bicycle parking spaces;
- improved vehicle and pedestrian access and new on-site drop-off and pick-up area for the senior school and Early Learning Centre (ELC);
- new active recreation zone;
- signage, lighting and boundary walls; and
- implementation of a Vegetation Management Plan (VMP) and landscape master plan.

2.4 Project commencement

Site establishment and early works for the project are planned to commence on, or shortly after, 28 January 2026.

3. STAKEHOLDERS

Table 2 below identifies the stakeholder groups that will be informed and consulted during the project as well as their likely areas of interest and impact and potential communication methods.

Table 2: Stakeholders, areas of interest and communication methods

Stakeholder/s	Areas of interest	Communication methods	Frequency of consultation
Moriah College community ▪ Parents and carers ▪ Staff ▪ Students	▪ Project objectives, scope of work and benefits ▪ Project timing, milestones and progress ▪ Changes or impacts to College operations ▪ Security and student, staff and visitor health and safety ▪ Changes to vehicle or pedestrian access arrangements	▪ Project webpage ▪ College communication channels and correspondence ▪ College assemblies and events ▪ Presentations to Parents and Friends Association ▪ Moriah Community Consultative Committee (MCCC)	▪ Monthly website updates ▪ Quarterly consultative committee meetings ▪ Other communication as and when required
Local residents	▪ Timing and nature of construction works ▪ Construction impacts and mitigations ▪ Heavy vehicle movements, traffic and parking ▪ Impacts to vegetation and environment ▪ Impacts on local amenity	▪ Project webpage ▪ College communication channels ▪ Local residents, including Queens Park Precinct Group, representation on project and college consultative committees ▪ Construction notifications as required ▪ Contact us channels for feedback, enquiries and complaints ▪ Site signage	▪ Monthly website updates ▪ Quarterly consultative committee meetings ▪ Other communication as and when required

Waverley Council	▪ Project timing, milestones and progress ▪ Transport management, traffic and parking ▪ Environmental impacts ▪ Impacts to Centennial Parklands and Queens Park operations ▪ Adherence to conditions of consent from the SSDA consent and other relevant development consents	▪ Project webpage ▪ College communication channels ▪ Council representation on the project Moriah College Redevelopment Community Consultative Committee (MCRCCC) ▪ Contact us channels for feedback, enquiries and complaints ▪ Meetings and discussions regarding conditions of consent and Council signoff (where required)	▪ Monthly website updates ▪ Other communication as and when required
NSW Department of Planning, Housing and Infrastructure	▪ Compliance with conditions of consent	▪ Project reporting as required by conditions of consent ▪ Meetings and discussions regarding conditions of consent and DPHI signoff (where required)	▪ Consultation as and when required

4. COMMUNICATION PROCEDURES AND MECHANISMS

4.1 Channels and activities

Table 3 below outlines the communication channels and activities that will be in place for the regular distribution of accessible information about the project.

Table 3: Channels and activities for information distribution and feedback

Channel / activity	Details
Project webpage	A dedicated webpage has been established on the Moriah College website to provide access to information about and relevant to the project. This page will be used to provide ongoing access to the information and documents which are required to be publicly available under condition C26. The page will also provide regularly updated information regarding project context, progress, milestones and next steps. https://www.moriah.nsw.edu.au/about-moriah/our-building-project
College communication channels	Information regarding the building project will be made available to the College community via existing College communication channels, including the fortnightly newsletter. Information will also be shared via publicly accessible posts on the College Facebook and Instagram pages.
Project 'contact us' channels	A postal address, email address, 24-hour phone number, and online contact form will be available so that stakeholders can easily provide feedback, ask questions or lodge complaints during the course of the project. Contact details will be included in all communication materials. Further details on the procedures and mechanisms for receiving and responding to stakeholder enquiries and complaints is provided in Section 4.2 below.
Signage	As required by condition F1 a site notice, including approved hours of work and contact details for enquiries or complaints, will be prominently displayed at the boundaries of the site during construction to make sure the public is informed of how to contact the project.
Construction notifications	In accordance with condition F9, written notification will be provided to affected residents where construction activities are to be undertaken outside the usual approved hours of work.

4.2 Community Forums

Moriah College Redevelopment Community Consultative Committee (MCRCCC)

The Moriah College Redevelopment Community Consultative Committee (MCRCCC) was convened in August 2025 and meets quarterly. It will run for the duration of construction of the project and 6 months following completion.

The MCRCCC is chaired by an independent Chairperson appointed by the NSW Department of Planning, Housing and Infrastructure, and includes representatives of Moriah College, Waverley Council, and the local community.

The MCRCCC is not a decision-making body but performs an advisory and consultative role, providing a conduit between Moriah College, the project, and the community.

Moriah Community Consultative Committee (MCCC)

Moriah College has been engaging with local residents and community members for more than 25+ years via the Moriah Community Consultative Committee. As not all members of this original group were able to be represented on the MCRCCC, the college will continue to share information and welcome feedback about the project through this forum.

4.3 Construction management

The project Construction Environmental Management Plan (CEMP) and sub-plans outline how construction will be managed effectively to avoid, minimise or mitigate any potential effects on the surrounding community and environment, specifically:

- The CEMP includes details of:
  - Dust, odour, stormwater and sediment control measures
  - Hours of work
  - Contact details for the site and for lodging complaints
  - Protocol and communication procedure for unexpected finds of contaminated materials
  - Protocol and communication procedure for unexpected finds of Aboriginal and non-Aboriginal heritage artefacts
- The Traffic and Pedestrian Management Sub-Plan (CTPMSP) details heavy vehicle routes, access and parking arrangements and the measures that will be put in place to ensure road safety and network efficiency during construction
- The Construction Noise and Vibration Management Sub-Plan (CNVMSP) includes strategies developed in consultation with the community for managing high noise generating works as well as how the project will meet EPA noise management guidelines
- The Construction Soil and Water Management Sub-Plan (CSWMSP) describes erosion, sediment, and stormwater controls that will be in place to avoid, manage or mitigate impacts on the surrounding area

The CEMP and sub-plans listed above will be accessible to stakeholders and the community via links on the project webpage to provide visibility and transparency of management and mitigation measures and demonstrate effective management of traffic; noise and vibration; soil and water; contamination; and heritage issues.

4.4 Project contact details

Table 4 below provides details of the ways stakeholders can submit feedback, enquiries and complaints in relation to the project.

Stakeholders will be encouraged to utilise the email address and online form for general enquiries and complaints, while there will be a 24-hour site phone number available for urgent construction-related enquiries and complaints, including construction or noise complaints.

These contact channels will be established at least 2 weeks prior to commencement and remain available throughout construction.

Table 4: Project contact details

Contact type	Details
Postal address	Reception Moriah College Queens Park Road Queens Park, NSW 2022
Email address	buildingproject@moriah.nsw.edu.au
Online form	https://www.moriah.nsw.edu.au/about-moriah/our-building-project
Site manager	Contact details for the Buildcorp site manager, including a 24-hour phone number, will be prominently displayed on the Site Notice, as required by condition F1.

4.5 Feedback and enquiry management

The College will aim to respond to feedback and enquiries within the timeframes outlined in Table 5 below. Where it is not possible to fully respond within these timeframes, updates will be provided within the target timeframe and until the response is finalised and issued.

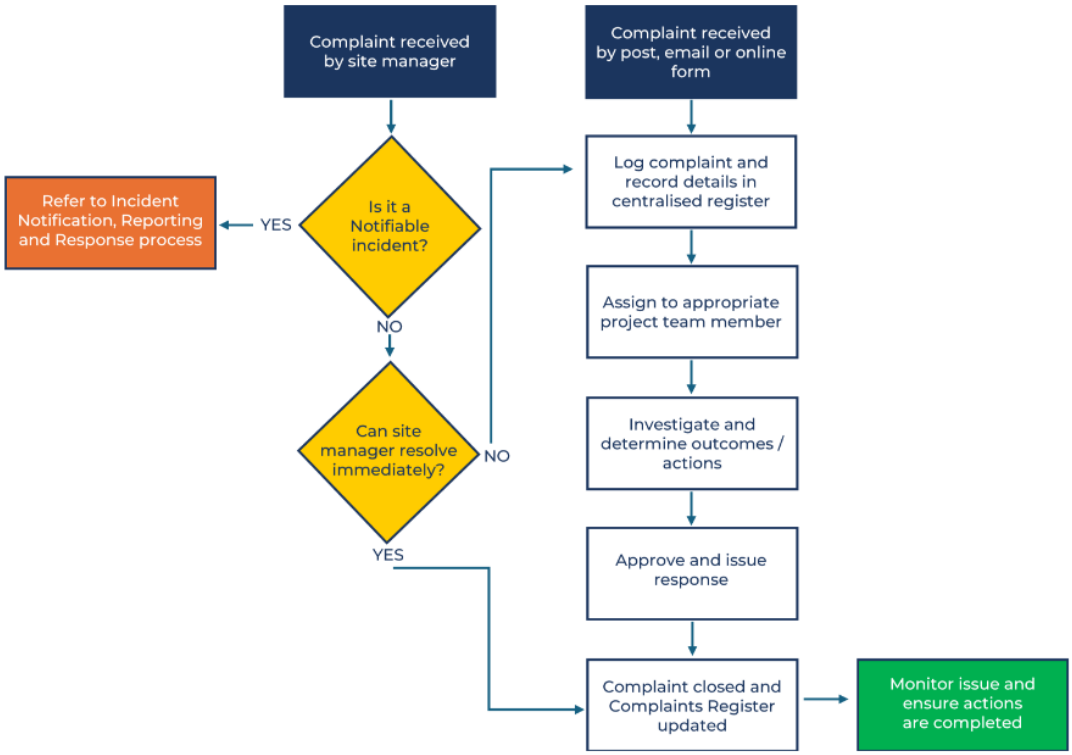
Table 5: Enquiry and complaint response times

Contact type	Acknowledgement time	Target response time
Traditional mail	N/A	Within 10 business days
Email and online form	Immediate, automatic response	Within 5 business days
24-hour phone number	During site hours – at time of call Out of hours – next business day	Within 5 business days
NOTE: Social media is not a contact channel for the project and comments will not be responded to		

4.6 Complaint resolution

As outlined in Figure 2 below, a structured process is in place to log, resolve, respond to and report on complaints. Where complaints are unable to resolved through this process, and an issue or dispute arises, the matter will be escalated to the Project Control Group in the first instance, and the complainant may be offered an online meeting with an appropriate project representative. Complaints received will be recorded in a Complaints Register (Appendix A) which will be published to the project website and updated monthly, as per condition C26.

Figure 2: Complaint resolution process



5. DISCLAIMER

This Community Communication Strategy has been prepared R&S Muller Enterprise Pty Ltd (ABN: 32 137 748 595) (the Consultant) for Moriah War Memorial College (the Client) for the specific purpose of guiding communication and engagement activities related to Stage 1 of the redevelopment of Moriah College.

The Strategy is dated 14 November 2025 and is based on information provided and events occurring up until that date only. The information, recommendations, and opinions contained in this document are based on information provided by the Client and other stakeholders, as well as the Consultant's professional knowledge and experience at the time of writing. The Consultant has relied upon the accuracy and completeness of the information supplied and has not independently verified all data sources.

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6. APPENDIX A – Complaints Register Template

Moriah College Redevelopment – Stage 1
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COMPLAINTS REGISTER

Updated [DD MM YYYY]

This is a register of complaints received by Moriah War Memorial College regarding stage 1 of the redevelopment of the Moriah College Queens Park Campus since the State Significant Development (SSD) application was granted. A complaints register is a requirement for all SSD projects.

Date of complaint	Date of response	Method of complaint	Nature of complaint	Response	Complaint status	Is this complaint an emergency?