

RP2J Project OOHW application form

Out of hours work approval request form			
No:	Notification date:	Approval date:	Project:
028	14/12/2021		RP2J – Southern Utilities
A. Contact details			
	Name	Mobile number	Email
Contractor Environmental Site Representative	Richard Lipar	██████████	██████████
Contractor Project Manager	Mike Billington	██████████	██████████
Contractor Foreman	Daniel Tregeagle	██████████	██████████
Contractor Project Engineer	Joey O'Connor	██████████	██████████
B. Details of work:			
Include a map showing location of work extent and nearest sensitive receivers			
Location / chainages:	McCaffrey Drive - Eastbound Shoulder CH60 to CH420 		
NCA/s:	NCA-13 – Lookout Rd Residents NCA-10 – Rankin Park Residents		

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Description of works – also include a brief description of the sequence of activities:	<p>Works involve sawcutting the existing asphalt, trench excavation, installation of a new watermain and backfilling in the existing McCaffrey Drive Shoulder. Sequence of works will be repetitive on each night with works being completed progressively along McCaffrey Drive from West to East.</p> <p>The typical sequence of activities for each nightshift will be as follows:</p> <p>19:00 – 19:30 Complete pre-start briefing with project team at compound</p> <p>19:30 - 20:15 Set up traffic control and close lane</p> <p>20:15 – 20:30 Mobilise equipment to work area</p> <p>20:30 – 22:00 Sawcut pavement and commence watermain trench excavation.</p> <p>22:00 – 00:00 Continue to excavate watermain trench with 2nd Crew installing the watermain as the excavation proceeds ahead.</p> <p>00:00 – 04:00 Install remaining watermain and backfill trenches.</p> <p>03:45 - 04:15 Clean up and demobilise equipment from work area.</p> <p>04:15 – 05:00 Remove traffic control and reopen lanes to traffic.</p>
Machinery/ plant to be used	<p>(6-12T) Excavator x 2</p> <p>(5-10T) Truck x 2</p> <p>Daymakers x 2</p> <p>Trench Rammer</p> <p>Concrete Agitator Truck (for shifts 2 and 3 only)</p> <p>Road Saw (evening period only)</p>
Traffic control measures required:	McCaffrey Drive Eastbound Lane Closures
Lighting required:	Lighting towers will be provided to highlight road works zone for motorists, and battery operated task lighting will be provided at specific locations.
Proposed dates:	21/02/22 - 01/03/22 (7 Nights on McCaffrey Drive)
Proposed times:	Start 1900 – Finish 0500 on each shift
Justification – why does work need to occur outside of standard construction hours?: (attach support information as required)	Work needs to be carried out under lane closure of McCaffrey Drive for the safety of workers and public. This cannot happen during the day as City of Newcastle Council will not issue a Road Occupancy Licence (ROL) for daytime lane closures on McCaffrey Drive.
C. Risk assessment	
NML (refer Table 3-2 of OOHW protocol)	<p>NCA13 - Evening: 54 dB(A). Night: 38 dB(A)</p> <p>NCA10 – Evening: 40 dB(A). Night: 31 dB(A)*</p> <p><i>*A NML of 35 dB (A) has been adopted for NCA10 for noise assessment purposes, in accordance with EPA Guidelines</i></p>
Is the work highly noise intensive? (above 75dB(A) L_{Aeq} (15 minute))	No
Risk factor category (refer section 4.3 of OOHW protocol):	<p>Low Risk.</p> <p>Maximum worst case cumulative predicted noise level (L_{Aeq} 15 min.) = 47dB(A).</p>
D. Details of noise or vibration assessment completed:	

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Detailed noise assessments were completed using noise modelling program named *KNOWnoise: Minor Works* which is developed and owned by Hutchison Weller. This program, and its more advanced version *KNOWnoise*, are used on many large-scale infrastructure projects to determine and model likely noise impacts on sensitive receivers.

As works are predicted to be carry over the Evening and Night OOHW Periods affecting separate Noise Catchment Areas (NCA's), multiple noise assessments were completed to determine worst case predicted noise impacts for the works. Detailed noise assessment reports are attached to this OOHW Application. Report includes a map of predicted impacts on sensitive receivers and predicted noise levels at each receiver's address.

The length of the watermain installation is approximately 400m. Installation will occur over seven shifts working from West to East. The noise assessments have been split into separate assessments to more accurately model the impacts on specific receivers as the work location moves along. Where noise reductions such as noise blankets are applied to the noise assessments it is detailed in the table in **Appendix A** of the noise assessments. The reductions applied are in line with the following:

Reduction	
Some "rules of thumb" for possible noise reductions through shielding.	
3 dB	Noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of-sight between the noise source and the receiver.
5 dB	Noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g. Wavebar or similar).
5 dB to 8 dB	Noise source is completely shielded with a solid barrier close to the source - use 8 dB. Enclosure and/or barrier has some gaps in it - reduce to 5 dB.
10 dB	Noise source is completely enclosed with a solid barrier located close to the source.

All applicable data was added to the model, including but not limited to, specific information on the proposed activity, project adopted RBLs and NMLs, extent of works, plant and equipment to be used, proposed mitigation measures etc. Using this data, and data within the program, detailed noise assessment reports were produced giving accurate predicted noise impacts for the period assessed. Specific assessment methodology is described on Page 3 of each report.

Predicted impacts:

The noise assessment considers 4 separate locations of work, impacts are summarised as follows:

McCaffrey Drive Watermain Install Night 1 (21/02/22)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 46dB(A) during the Evening Period. There are 6 receivers for which the works will be Clearly Audible (5 - 15 dB(A) above NML). There are 49 receivers for which the works will be noticeable (1- 5 dB(A) above NML).

McCaffrey Drive Watermain Install Nights 2 & 3 (22/02/22 & 23/02/22)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 37dB(A). There are 7 receivers for which the works will be noticeable (1- 5 dB(A) above NML).

McCaffrey Drive Watermain Install Nights 4 & 5 (24/02/22 & 25/02/22)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 41dB(A). There are 8 receivers for which the works will be noticeable (1- 5 dB(A) above NML).

McCaffrey Drive Watermain Install Nights 6 & 7 (28/02/22 & 29/02/22)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 47dB(A). There are 4 receivers for which the works will be Clearly Audible (5 - 15 dB(A) above NML). There are 4 receivers for which the works will be noticeable (1- 5 dB(A) above NML).

Refer to the detailed Noise Assessments in **Appendix A**:

Predicted Vibration Impacts:

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No vibration impacts are predicted as a result of these works. No plant or equipment will encroach within the minimum safe working distance (18m).

The activity is not considered to encroach into either "human comfort" or "structural damage" vibration criteria, based on distance, and equipment and methodology used (rubber tyred plant completing non-vibratory activities).

E. Proposed mitigation measures, including respite

The following mitigation measures were proposed based on those identified in the *OOHW Protocol – Section 5.1* and *Table 5-1: Hierarchy for application of additional mitigation for airborne noise*.

Standard Mitigation Measures (OOHW Protocol):

- Modifying behavioural practices on site
- Equipment selection / maintaining and monitoring plant
- Use and siting of plant and hoardings
- Site inductions
- Use of non-tonal reversing alarms
- Stakeholder notification
- Planning noisier work to be carried out earlier in the period.

NVMP Mitigation measures:

- Noise blankets to be utilised around static plant e.g. Daymakers
- Where practical, operating machines at low speed / power and switching them off when not in use rather than leaving them idling for prolonged periods;
- Minimising the reversing of machines;
- All employees, contractors and subcontractors are to receive an environmental induction.
- No swearing or unnecessary shouting or loud stereos/radios on site.
- Limit compression braking at night in residential areas.
- No dropping of materials from height, throwing of metal items and slamming of doors.

Additional Mitigation Measures (OOHW Protocol):

For Residents 5-15 dB(A) above NML

- Notification
- Verification
- Duration Respite

F. Community consultation

Outline consultation undertaken for the proposed OOHW:

The properties identified in **Appendix D** will be provided a written notification describing the upcoming OOH works and likely impacts. Refer to **Appendix C** for draft notification letters to be delivered no more than 5 days prior to undertaking the works.

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Has respite periods for OOHW been identified with the affected community on a monthly basis and a three-month schedule of likely OOHW provided (refer CoA E29)?

Yes, likely OOHW identified in 3 monthly look-ahead notification which covers likely OOHW. December notification was delivered to the community on 6/12/21. Refer to **Appendix B** for three month Lookahead.

Respite has been considered in the sequencing and location of works.

For Rankin Park residents, previous out of hours works will be completed on 11/01/22 providing about 6 weeks respite before works on the 21/02/22.

For Lookout Road residents, previous out of hours works will be completed on 14/01/22 providing about 6 weeks respite before works on the 24/02/22.

Has the outcome of community consultation, the identified respite periods and scheduling of likely OOHW been provided to the ER, EPA and Planning Secretary?

The outcomes of community consultation, the identified respite periods and likely schedule of OOHW is provided to the ER, EPA and the Planning Secretary on a monthly basis. Transport for NSW also provides this information to the ER and Planning Secretary through the OOHW application process when relevant to OOHW, and when approval is sought.

G. Respite framework

Outline any previous respite within the last month and the status of community agreements (where relevant)?

For Rankin Park residents, previous out of hours works will be completed on 11/01/22 (OOH Application #29) providing about 6 weeks respite before works on the 21/02/22.

For Lookout Road residents, previous out of hours works will be completed on 14/01/22 (OOH Application #29) providing about 6 weeks respite before works on the 24/02/22.

Have cumulative impacts from OOHW permitted by an EPL been considered during the development appropriate respite?

N/A

H. Details of non-residential receivers (if any) and corresponding NMLs

Comments:

Using the current noise assessment software it is noted that noise at the nearby sensitive receiver of John Hunter Hospital will not exceed the NML of 38db(A) during the planned works.

I. Are there any properties at risk of exceeding the screening criteria for cosmetic damage?

Comments:

No – All properties are >18m from works.

I. Review/ Endorsements

**Contractor
Community
Liaison
Representative**

Date: 14 Dec 2021

The affected sensitive receivers will be notified no later than 5 days prior to start of work via letter

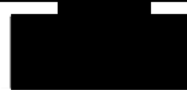
Have the works been reviewed and endorsed? Yes

Name:

Signature:

Date:

Nikki Taylor



19/11/21

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	Comments:		
Transport for NSW Environmental Manager (or delegate)	Agreed mitigation measures:		
	Have the works been reviewed and endorsed?		Yes / No
	Have the works been approved where neither low or high risk?		Yes / No
	Name:	Signature:	Date:
	Andrew Grainger	[REDACTED]	17/12/2021
	Comments:		
Transport for NSW Project Manager	Have the works been reviewed and endorsed?		Yes / No
	Have the works been approved where neither low or high risk?		Yes / No
	Name:	Signature:	Date:
	Anton Russek	[REDACTED]	17/12/2021
	Comments:		
ER approval (low risk activities)	Are the works approved?		Yes / No
	Name:	Signature:	Date:
	Simon Williams	[REDACTED]	21/12/2021
		Comments:	
Planning Secretary approval (high risk activities)	Are the works approved?		Yes / No
	Name:	Signature:	Date:
		Comments:	

Appendix A – Noise Impact Assessments

Construction noise impact assessment

McCaffrey Drive Watermain - Shift 1 - NCA 10			
Proposed works	Shift 1 - NCA 10 - Evening Period		
Proponent	Quickway		
Assessment Date	16/11/2021		
Prepared by	Tom St Vincent Welch	Assessment Id	001

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Sawcut Pavement and excavate for watermain

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 17/01/2022 and would be completed by 18/01/2022.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML (L _{Aeq,15min})
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:

PC = Phone calls
 V = verification
 IB = Individual briefings
 N = Notification
 AA = Alternative accommodation

SN = Specific notifications
 RO = Respite offer
 R1 = Respite period 1
 R2 = Respite period 2
 DR = Duration respite

Perception = relates to levels above RBL
 NML = Noise management level
 HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Suburban/ Urban, characterised as:

Areas with low density transportation.

Typically local traffic, light vehicles, intermittent traffic flow

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	Suburban/ Urban		Using custom background noise data?		Yes
	Day	Weekend Day	Evening	Night	Sleep
RBL	38	38	35		30
NML	43	43	40	35	35

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of L_{Amax} 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) *Propagation of noise from petroleum and petrochemical complexes to neighboring communities*.

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- “ Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- “ Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- “ Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)
- “ British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites

⁶⁶ United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Evening period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Evening period.

Criterion	Predicted number of receivers
Maximum cumulative predicted L _{Aeq, 15 minute} noise level	46 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	39
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Evening period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	49
Clearly audible	5 – 15 dB above NML	6
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Evening period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

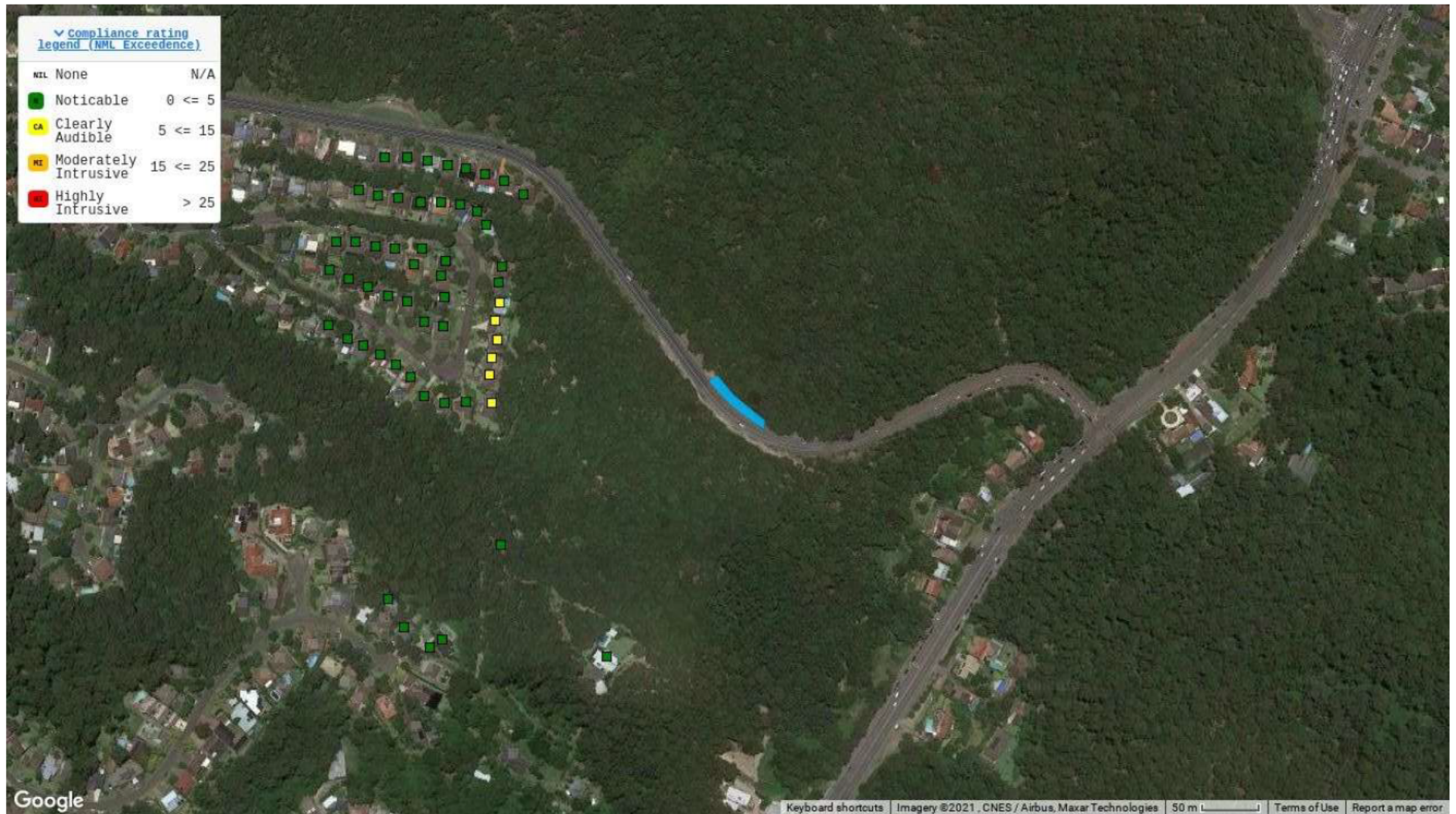
The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	<p>Notify the affected community.</p> <p>The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number.</p> <p>Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.</p>
Site inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include:</p> <ul style="list-style-type: none"> • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures <p>site opening/closing times (including deliveries) environmental incident procedures</p>
Behaviour	<p>No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>Limit compression braking at night in residential areas.</p> <p>No dropping of materials from height, throwing of metal items and slamming of doors.</p>
Verification	<p>Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.</p>
Construction hours	<p>Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.</p>
Respite for out-of-hours works	<p>Respite would be scheduled as indicated in Appendix C and described in the CNVG.</p>
Equipment selection	<p>Use quieter construction methods where feasible and reasonable.</p> <p>Ensure plant including the silencer is well maintained.</p> <p>Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG</p>
Use and siting of plant	<p>The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.</p> <p>Plant used intermittently to be throttled down or shut down.</p> <p>Noise-emitting plant to be directed away from sensitive receivers.</p>

Action	Description
Plan worksites and activities to minimise noise and vibration.	<p>Locate compounds away from sensitive receivers and discourage access from local roads.</p> <p>Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.</p> <p>Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible.</p> <p>Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm.</p> <p>Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.</p>
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	None

Appendix A Project location and predicted level of impact



Appendix B Proposed activities and equipment

Sawcutting

Equipment	Quantity	Usage	Reduction	SWL
Concrete Saw (Std)*	1	10 %	5	104
Daymakers / Lighting plant	1	100 %	5	88
Ute	1	10 %	3	72

Activity Sound Power Level: 104

Trench Excavation

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (12 tonne)	1	30 %	3	96
Truck (10 tonne)	1	20 %	3	90

Activity Sound Power Level: 97

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Shift 1 - NCA 10 - Evening Period				Evening	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	556821	57 ATHERTON CLOSE RANKIN PARK	RES	40	40	0	Noticable
	556819	53 ATHERTON CLOSE RANKIN PARK	RES	40	40	0	Noticable
	556814	3A MARSHALL STREET NEW LAMBTON HEIGHTS	RES	40	43	3	Noticable
	556797	57 ATHERTON CLOSE RANKIN PARK	RES	40	41	1	Noticable
	556782	55 ATHERTON CLOSE RANKIN PARK	RES	40	40	0	Noticable
	556759	14 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556757	43 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Clearly Audible
	556755	329 MCCAFFREY DRIVE RANKIN PARK	RES	40	42	2	Noticable
	556754	57 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556752	47 KINGSWAY AVENUE RANKIN PARK	RES	40	46	6	Clearly Audible
	556750	23 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556749	37 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Noticable
	556748	10 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556747	33 KINGSWAY AVENUE RANKIN PARK	RES	40	44	4	Noticable
	556746	49 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Clearly Audible
	556745	1A MARSHALL STREET NEW LAMBTON HEIGHTS	NONE	40	44	4	Noticable
	556744	61 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556743	32 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556742	30 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556741	19 KINGSWAY AVENUE RANKIN PARK	RES	40	40	0	Noticable
	556740	24 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556739	28 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556738	321 MCCAFFREY DRIVE RANKIN PARK	RES	40	40	0	Noticable
	556734	59 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556732	12 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556731	41 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Clearly Audible
	556730	34 KINGSWAY AVENUE RANKIN PARK	RES	40	40	0	Noticable
	556729	27 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556728	39 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Noticable
	556726	331 MCCAFFREY DRIVE RANKIN PARK	RES	40	43	3	Noticable
	556725	22 KINGSWAY AVENUE RANKIN PARK	RES	40	44	4	Noticable
	556724	327 MCCAFFREY DRIVE RANKIN PARK	RES	40	42	2	Noticable
	556723	51 KINGSWAY AVENUE RANKIN PARK	RES	40	45	5	Clearly Audible
	556722	45 KINGSWAY AVENUE RANKIN PARK	RES	40	46	6	Clearly Audible
	556721	323 MCCAFFREY DRIVE RANKIN PARK	RES	40	41	1	Noticable
	556720	29 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556719	21 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556712	325 MCCAFFREY DRIVE RANKIN PARK	RES	40	41	1	Noticable

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Shift 1 - NCA 10 - Evening Period				Evening	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	556710	8 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556704	335 MCCAFFREY DRIVE RANKIN PARK	RES	40	44	4	Noticable
	556703	69 KINGSWAY AVENUE RANKIN PARK	RES	40	40	0	Noticable
	556701	26 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556698	25 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556697	31 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556695	20 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556694	333 MCCAFFREY DRIVE RANKIN PARK	RES	40	43	3	Noticable
	556693	16 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556692	55 KINGSWAY AVENUE RANKIN PARK	RES	40	44	4	Noticable
	556689	65 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556687	6 KINGSWAY AVENUE RANKIN PARK	RES	40	40	0	Noticable
	556686	63 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556685	67 KINGSWAY AVENUE RANKIN PARK	RES	40	41	1	Noticable
	556684	18 KINGSWAY AVENUE RANKIN PARK	RES	40	43	3	Noticable
	556681	14 KINGSWAY AVENUE RANKIN PARK	RES	40	42	2	Noticable
	556680	53 KINGSWAY AVENUE RANKIN PARK	RES	40	44	4	Noticable

Construction noise impact assessment

	McCaffrey Drive Watermain - Shift 1 - NCA 10		
Proposed works	Shift 1 - NCA 10 - Night Period		
Proponent	Quickway		
Assessment Date	16/11/2021		
Prepared by	Tom St Vincent Welch	Assessment Id	001

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Sawcut Pavement and excavate for watermain

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 17/01/2022 and would be completed by 18/01/2022.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML (L _{Aeq,15min})
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:

PC = Phone calls
 V = verification
 IB = Individual briefings
 N= Notification
 AA = Alternative accommodation

SN = Specific notifications
 RO = Respite offer
 R1 = Respite period 1
 R2 = Respite period 2
 DR = Duration respite

Perception = relates to levels above RBL
 NML = Noise management level
 HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Suburban/ Urban, characterised as:

Areas with low density transportation.

Typically local traffic, light vehicles, intermittent traffic flow

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	Suburban/ Urban		Using custom background noise data?		Yes
	Day	Weekend Day	Evening	Night	Sleep
RBL	38	38	35	30	
NML	43	43	40	35	35

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of L_{Amax} 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) *Propagation of noise from petroleum and petrochemical complexes to neighboring communities*.

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- “ Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- “ Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- “ Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)
- “ British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites

“ United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted L _{Aeq, 15 minute} noise level	40 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	36
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	42
Clearly audible	5 – 15 dB above NML	6
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

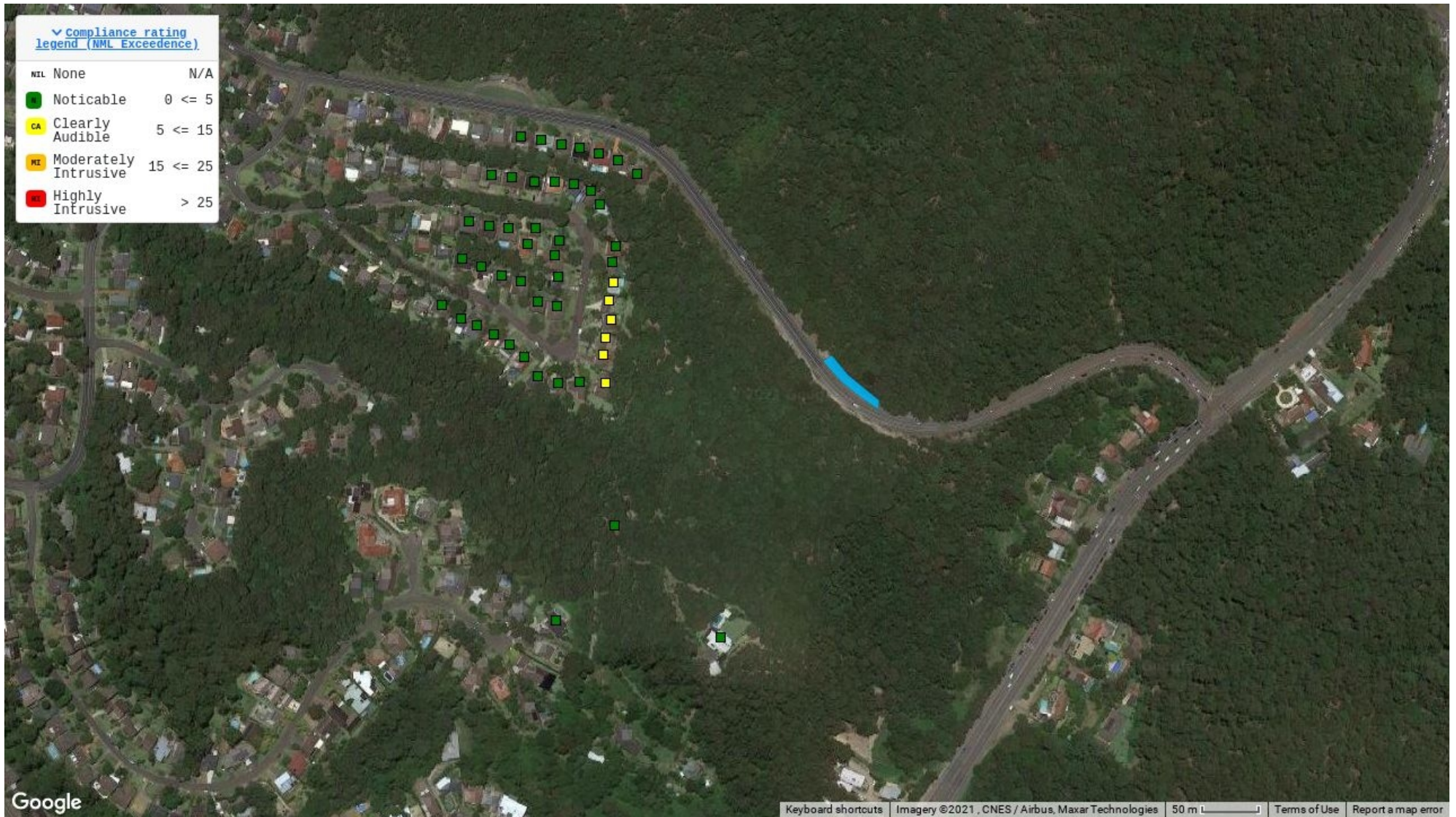
Table 6 Safeguards and controls

Action	Description
Community consultation or notification	<p>Notify the affected community.</p> <p>The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number.</p> <p>Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.</p>
Site inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include:</p> <ul style="list-style-type: none"> • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures <p>site opening/closing times (including deliveries) environmental incident procedures</p>
Behaviour	<p>No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>Limit compression braking at night in residential areas.</p> <p>No dropping of materials from height, throwing of metal items and slamming of doors.</p>
Verification	<p>Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.</p>
Construction hours	<p>Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.</p>
Respite for out-of-hours works	<p>Respite would be scheduled as indicated in Appendix C and described in the CNVG.</p>
Equipment selection	<p>Use quieter construction methods where feasible and reasonable.</p> <p>Ensure plant including the silencer is well maintained.</p> <p>Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG</p>
Use and siting of plant	<p>The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.</p> <p>Plant used intermittently to be throttled down or shut down.</p> <p>Noise-emitting plant to be directed away from sensitive receivers.</p>

Construction noise impact statement

Action	Description
Plan worksites and activities to minimise noise and vibration.	<p>Locate compounds away from sensitive receivers and discourage access from local roads.</p> <p>Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.</p> <p>Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible.</p> <p>Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm.</p> <p>Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.</p>
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	None

Appendix A Project location and predicted level of impact



Appendix B Proposed activities and equipment

Trench Excavation

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (12 tonne)	1	30 %	3	96
Truck (10 tonne)	1	20 %	3	90

Activity Sound Power Level: 97

Trench Backfill

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (06 tonne)	1	30 %	3	86
Plate compactor (small e.g. 60kg)	1	15 %	3	93
Truck (5 tonne)	1	15 %	3	90

Activity Sound Power Level: 96

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Shift 1 - NCA 10 - Night Period				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	556814	3A MARSHALL STREET NEW LAMBTON HEIGHTS	RES	35	38	3	Noticable
	556797	57 ATHERTON CLOSE RANKIN PARK	RES	35	35	0	Noticable
	556759	14 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556757	43 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556755	329 MCCAFFREY DRIVE RANKIN PARK	RES	35	37	2	Noticable
	556754	57 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556752	47 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556750	23 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556749	37 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Noticable
	556748	10 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556747	33 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556746	49 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556745	1A MARSHALL STREET NEW LAMBTON HEIGHTS	NONE	35	38	3	Noticable
	556744	61 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556743	32 KINGSWAY AVENUE RANKIN PARK	RES	35	35	0	Noticable
	556742	30 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556740	24 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556739	28 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556734	59 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556732	12 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556731	41 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556729	27 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556728	39 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Noticable
	556726	331 MCCAFFREY DRIVE RANKIN PARK	RES	35	37	2	Noticable
	556725	22 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556724	327 MCCAFFREY DRIVE RANKIN PARK	RES	35	36	1	Noticable
	556723	51 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556722	45 KINGSWAY AVENUE RANKIN PARK	RES	35	40	5	Clearly Audible
	556721	323 MCCAFFREY DRIVE RANKIN PARK	RES	35	35	0	Noticable
	556720	29 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556719	21 KINGSWAY AVENUE RANKIN PARK	RES	35	35	0	Noticable
	556712	325 MCCAFFREY DRIVE RANKIN PARK	RES	35	36	1	Noticable
	556710	8 KINGSWAY AVENUE RANKIN PARK	RES	35	35	0	Noticable
	556704	335 MCCAFFREY DRIVE RANKIN PARK	RES	35	39	4	Noticable
	556703	69 KINGSWAY AVENUE RANKIN PARK	RES	35	35	0	Noticable
	556701	26 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556698	25 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556697	31 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Shift 1 - NCA 10 - Night Period				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	556695	20 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556694	333 MCCAFFREY DRIVE RANKIN PARK	RES	35	38	3	Noticable
	556693	16 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556692	55 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556689	65 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556686	63 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556685	67 KINGSWAY AVENUE RANKIN PARK	RES	35	36	1	Noticable
	556684	18 KINGSWAY AVENUE RANKIN PARK	RES	35	38	3	Noticable
	556681	14 KINGSWAY AVENUE RANKIN PARK	RES	35	37	2	Noticable
	556680	53 KINGSWAY AVENUE RANKIN PARK	RES	35	39	4	Noticable

Construction noise and vibration impact assessment

Proposed works	McCaffrey Drive Watermain - Shift 2/3 - NCA 10		
Proponent	Night Shift 2/3 NCA 10 Quickway		
Assessment Date	18/11/2021		
Prepared by	Tom St Vincent Welch	Assessment Id	003

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Sawcut existing pavement, trench, install and concrete encase new watermain

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 18/01/2022 and would be completed by 20/01/2022.

Assessment criteria and mitigation requirements

Noise

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML (L _{Aeq,15min})
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and Construction Noise and Vibration Guideline (CNVG), would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:

PC = Phone calls
 V = verification
 IB = Individual briefings
 N= Notification
 AA = Alternative accommodation

SN = Specific notifications
 RO = Respite offer
 R1 = Respite period 1
 R2 = Respite period 2
 DR = Duration respite

Perception = relates to levels above RBL
 NML = Noise management level
 HA = Highly affected

Vibration

Effects of vibration from construction may be segregated into:

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

Vibration criteria relating to human comfort applicable to this project are taken from the DEC (2006) document *Assessing Vibration – A Technical Guideline for intermittent vibration* – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously. Intermittent vibration is assessed as a vibration dose value (VDV) and relates to the level of vibration over time (cumulative over the night or day period). VDV's that may result in adverse comment from receivers are summarised in Table 5.

Table 3 Summary of vibration dose values which might result in adverse comment

Time	Low probability of adverse comment (m/s ^{1.75})	Adverse comment possible (m/s ^{1.75})	Adverse comment probable (m/s ^{1.75})
Day (6am to 10pm)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Night (10pm to 6am)	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Guidance for the consideration of potential building damage from construction vibration is in line with BS 7385-1 *Evaluation and measurement for vibration in buildings - Guide for measurement of vibration and evaluation of their effects on buildings*. These guideline values are presented in Table 4.

Table 4 Building damage vibration guidelines (BS 7385-1)

Type of building	Guideline values for vibration (PPV mm/s)		
	4Hz to 15Hz	15Hz to 40Hz	40Hz and above
Reinforced or framed structures / Industrial and heavy commercial buildings	50		
Un-reinforced or light framed structures / Residential or light commercial type buildings	15 - 20	20 - 50	50

For heritage structures, criteria are in line with the German Standard *DIN 4150-3: Structural Vibration- effects of vibration on structures*, as summarised in Table 5.

Table 5 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on heritage structures (DIN 4150-3).

Type of building	Guideline values for vibration (PPV mm/s)			
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	Vibration at horizontal plane of highest floor at all frequencies
Structures that, because of their sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g. listed buildings under preservation order)	3	3 to 8	8 to 10	8

The safe working distances presented in Table 6 are indicative and will vary depending on the item of plant and local geotechnical conditions. The cosmetic damage thresholds apply to typical buildings under typical geotechnical conditions and vibration monitoring is recommended at specific sites. Where structures are more sensitive, such as heritage items, more stringent conditions are applicable and should be considered individually.

In relation to human response, the safe working distances relate to continuous vibration. For most construction activities, vibration emissions are intermittent and higher vibration levels over shorter periods are acceptable. Additional assessment should be undertaken where the human response criteria are exceeded.

Table 6 Safe working distances for vibration intensive plant

Plant item	Rating/description	Safe working distance	
		Cosmetic damage (BS 7385-1)	Human response (DECCW)
Vibratory roller	<50 kN (typically 1-2 t)	5 m	15 m to 20 m
	<100 kN (typically 2-4 t)	6 m	20 m
	<200 kN (typically 4-6 t)	12 m	40 m
	<300 kN (typically 7-13 t)	15 m	100 m
	>300 kN (typically 13-18 t)	20 m	100 m
	>300 kN (> 18 t)	25 m	100 m
Small hydraulic hammer	300 kg – 5 to 12 t excavator	2 m	7 m
Medium hydraulic hammer	900 kg – 12 to 18t excavator	7 m	23 m
Large hydraulic hammer	1600 kg – 18 to 34 t excavator	22 m	73 m
Vibratory pile driver	Sheet piles	2 m to 20 m	20 m
Pile boring	≤800 mm	2 m	n/a
Jackhammer	Hand held	1 m	Avoid contact with structure

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Suburban/ Urban, characterised as:

Areas with low density transportation.

Typically local traffic, light vehicles, intermittent traffic flow

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 7. NMLs have been established in line with the ICNG.

Table 7 Construction NMLs

Land use	Suburban/ Urban		Using custom background noise data?			Yes
	Day	Weekend Day	Evening	Night	Sleep	
RBL	38	38	35	30		
NML	43	43	40	35	35	

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of L_{Amax} 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) *Propagation of noise from petroleum and petrochemical complexes to neighboring communities*.

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- “ Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- “ Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- “ Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)
- “ British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites
- “ United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 8 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted LAeq, 15 minute noise level	37 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	7
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 9 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	11
Clearly audible	5 – 15 dB above NML	0
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, sleep disturbance is considered. Table 10 summarises the number of residents predicted to exceed the sleep disturbance screening criterion. Further analysis is also provided to indicate the number of receivers expected to be woken, at L_{max} noise levels greater than 65 dBA.

Where exceedances of the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Table 10 Summary of predicted exceedances of sleep disturbance screening criterion and awakening criterion.

Criterion	Predicted number of receivers
Potentially Sleep Disturbed (exceed RBL + 15 screening criterion)	15
Sleep Disturbed (exceed 65 dBA awakening criterion)	0

Predicted vibration impacts

The level of vibration impact on sensitive receivers (buildings and human comfort) will largely depend on the type of machinery in use and the distance from source to receiver.

Based on the proposed work locations and selected equipment, the following level of vibration impact is expected. A summary of vibration impacts is provided for each sensitive receiver in Appendix C.

Impact classification	Number of potentially affected receivers
Human comfort	0
Cosmetic damage	0
Heritage structure	0

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

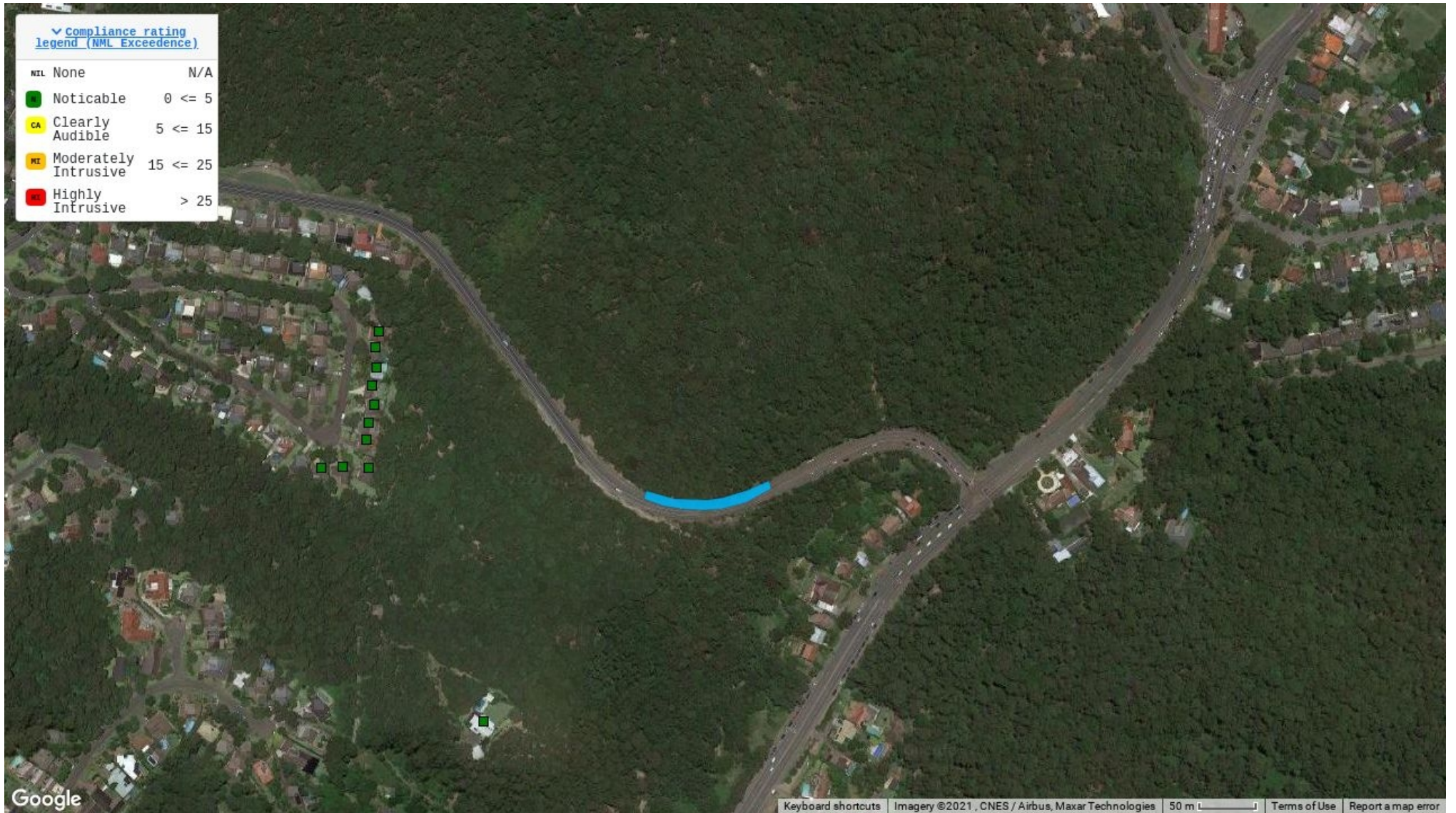
Table 11 Safeguards and controls

Action	Description
Community consultation or notification	<p>Notify the affected community.</p> <p>The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number.</p> <p>Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.</p>
Site inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include:</p> <ul style="list-style-type: none"> • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures <p>site opening/closing times (including deliveries) environmental incident procedures</p>
Behaviour	<p>No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>Limit compression braking at night in residential areas.</p> <p>No dropping of materials from height, throwing of metal items and slamming of doors.</p>
Verification	<p>Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.</p>
Construction hours	<p>Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.</p>
Respite for out-of-hours works	<p>Respite would be scheduled as indicated in Appendix C and described in the CNVG.</p>
Equipment selection	<p>Use quieter construction methods where feasible and reasonable.</p> <p>Ensure plant including the silencer is well maintained.</p> <p>Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG</p>
Use and siting of plant	<p>The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.</p> <p>Plant used intermittently to be throttled down or shut down.</p> <p>Noise-emitting plant to be directed away from sensitive receivers.</p>

Construction noise and vibration impact statement

Action	Description
Plan worksites and activities to minimise noise and vibration.	<p>Locate compounds away from sensitive receivers and discourage access from local roads.</p> <p>Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.</p> <p>Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible.</p> <p>Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm.</p> <p>Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.</p>
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	None

Appendix A Project location and predicted level of impact



Appendix B Proposed activities and equipment

Trench Excavation

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (12 tonne)	1	30 %	3	96
Truck (10 tonne)	1	15 %	3	89

Activity Sound Power Level: 97

Watermain Concrete Encase

Equipment	Quantity	Usage	Reduction	SWL
Concrete Vibrator	1	10 %	3	87
Concrete Truck / Agitator - discharging	1	30 %	3	91

Activity Sound Power Level: 92

Appendix C Detailed noise predicted for each receiver

Noise

Assessment: Night Shift 2/3 NCA 10				NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary										
NCA	Rec	Address	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification			
													Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night
NCA 1	5603 72	3A MARSHALL STREET NEW LAMBTON HEIGHTS	RES			40	35	Y		37	47				0	2	-	2			Noticable	Noticable
NCA 1	5603 14	43 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable
NCA 1	5603 11	47 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable
NCA 1	5603 08	37 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	46				0	1	-	1			Noticable	Noticable
NCA 1	5603 05	49 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable
NCA 1	5602 92	41 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable
NCA 1	5602 89	39 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	46				0	1	-	1			Noticable	Noticable
NCA 1	5602 85	51 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		37	47				0	2	-	2			Noticable	Noticable
NCA 1	5602 84	45 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable
NCA 1	5602 62	55 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		35	46				0	0	-	0			Noticable	Noticable
NCA 1	5602 54	53 KINGSWAY AVENUE RANKIN PARK	RES			40	35	Y		36	47				0	1	-	1			Noticable	Noticable

Vibration

NCA	Receiver	Address	Vibration Impact
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Construction noise impact assessment

McCaffrey Drive Watermain Shift 4/5			
Proposed works	Night Period Shift 4/5		
Proponent	Quickway		
Assessment Date	09/11/2021		
Prepared by	Tom St Vincent Welch	Assessment Id	004

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Excavate trench, install watermain and backfill

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 20/01/2022 and would be completed by 22/01/2022.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML (L _{Aeq,15min})
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:

PC = Phone calls
 V = verification
 IB = Individual briefings
 N= Notification
 AA = Alternative accommodation

SN = Specific notifications
 RO = Respite offer
 R1 = Respite period 1
 R2 = Respite period 2
 DR = Duration respite

Perception = relates to levels above RBL
 NML = Noise management level
 HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Suburban/ Urban, characterised as:

Areas with low density transportation.

Typically local traffic, light vehicles, intermittent traffic flow

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	Suburban/ Urban		Using custom background noise data?		Yes
	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of L_{Amax} 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) *Propagation of noise from petroleum and petrochemical complexes to neighboring communities*.

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- “ Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- “ Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- “ Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)
- “ British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites

“ United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted L _{Aeq, 15 minute} noise level	41 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	4
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	8
Clearly audible	5 – 15 dB above NML	0
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

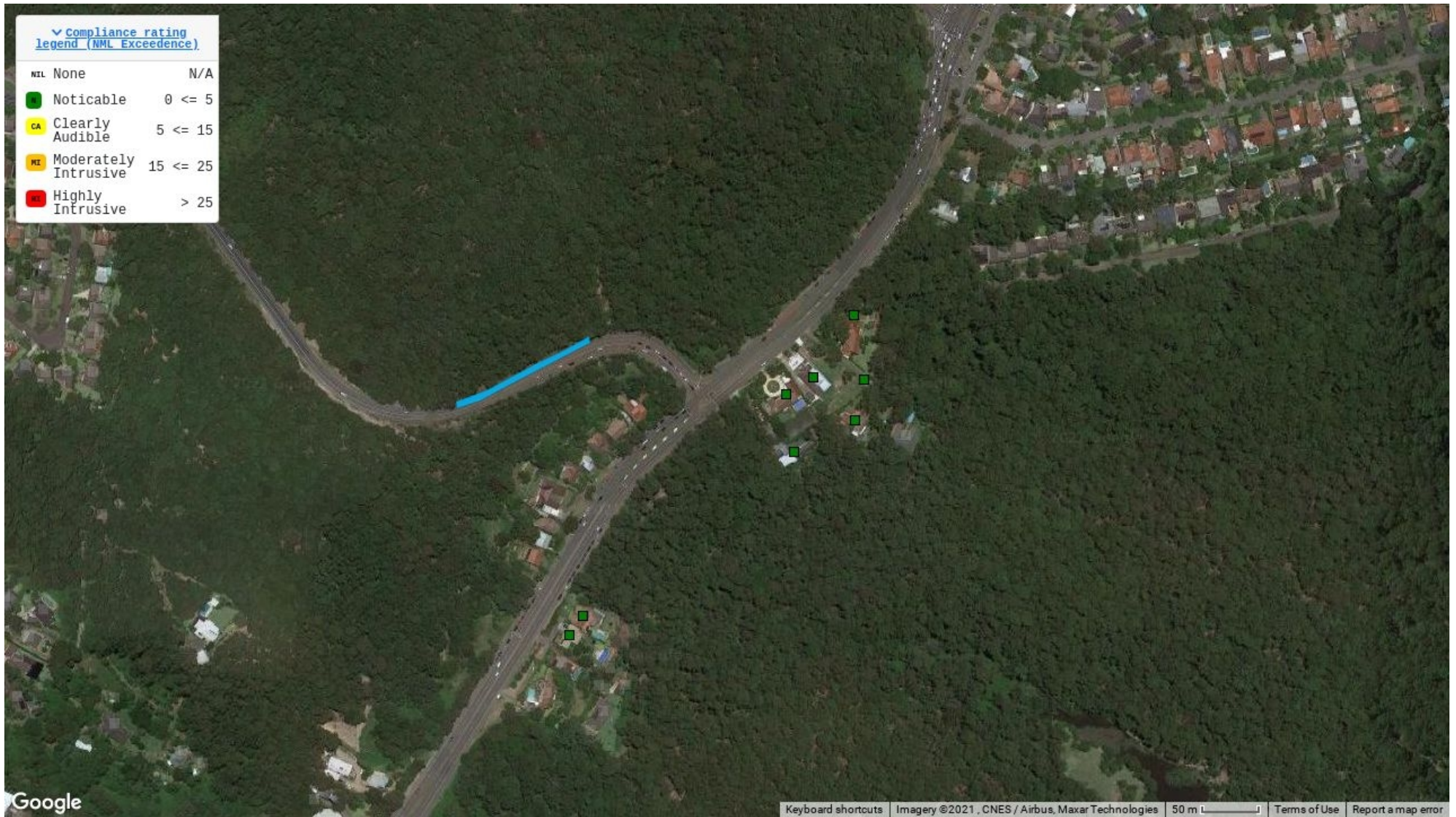
The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	<p>Notify the affected community.</p> <p>The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number.</p> <p>Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.</p>
Site inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include:</p> <ul style="list-style-type: none"> • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures <p>site opening/closing times (including deliveries) environmental incident procedures</p>
Behaviour	<p>No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>Limit compression braking at night in residential areas.</p> <p>No dropping of materials from height, throwing of metal items and slamming of doors.</p>
Verification	<p>Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.</p>
Construction hours	<p>Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.</p>
Respite for out-of-hours works	<p>Respite would be scheduled as indicated in Appendix C and described in the CNVG.</p>
Equipment selection	<p>Use quieter construction methods where feasible and reasonable.</p> <p>Ensure plant including the silencer is well maintained.</p> <p>Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG</p>
Use and siting of plant	<p>The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.</p> <p>Plant used intermittently to be throttled down or shut down.</p> <p>Noise-emitting plant to be directed away from sensitive receivers.</p>

Action	Description
Plan worksites and activities to minimise noise and vibration.	<p>Locate compounds away from sensitive receivers and discourage access from local roads.</p> <p>Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.</p> <p>Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible.</p> <p>Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm.</p> <p>Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.</p>
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	None

Appendix A Project location and predicted level of impact



Appendix B Proposed activities and equipment

Trench Excavation

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (12 tonne)	1	30 %	3	96
Truck (10 tonne)	1	20 %	3	90

Activity Sound Power Level: 97

Trench Backfill

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (06 tonne)	1	30 %	3	86
Plate compactor (small e.g. 60kg)	1	15 %	3	93
Truck (5 tonne)	1	15 %	3	90

Activity Sound Power Level: 96

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Night Period Shift 4/5				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	546090	117 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	Noticable
	546079	119 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	Noticable
	546038	81A LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	Noticable
	546021	79 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	Noticable
	546014	79A LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	Noticable
	546012	85 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	Noticable
	546006	81 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	Noticable
	545992	83 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	Noticable

Construction noise impact assessment

McCaffrey Drive Watermain Shift 6/7			
Proposed works	Night Period Shift 6/7		
Proponent	Quickway		
Assessment Date	09/11/2021		
Prepared by	Tom St Vincent Welch	Assessment Id	005

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Excavate trench, install watermain and backfill

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 24/01/2022 and would be completed by 26/01/2022.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML (L _{Aeq,15min})
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

Predicted airborne LAeq(15min) noise level at receiver			
Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
All hours			
75 dB(A) or greater			N, V, PC, RO
Standard hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)			
Noticeable	5 to 10	0	-
Clearly audible	10 to 20	< 10	-
Moderately intrusive	20 to 30	10 to 20	N, V
Highly intrusive	> 30	> 20	N, V
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)			
Noticeable	5 to 10	<5	-
Clearly audible	10 to 20	5 to 15	N, R1, DR
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR
Highly intrusive	> 30	>25	V, IB, N, R1, DR, PC, SN
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)			
Noticeable	5 to 10	<5	N
Clearly audible	10 to 20	5 to 15	V, N, R2, DR
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR
Highly intrusive	> 30	>25	AA, V, IB, N, PC, SN, R2, DR

Notes:

PC = Phone calls
 V = verification
 IB = Individual briefings
 N= Notification
 AA = Alternative accommodation

SN = Specific notifications
 RO = Respite offer
 R1 = Respite period 1
 R2 = Respite period 2
 DR = Duration respite

Perception = relates to levels above RBL
 NML = Noise management level
 HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Suburban/ Urban, characterised as:

Areas with low density transportation.

Typically local traffic, light vehicles, intermittent traffic flow

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	Suburban/ Urban		Using custom background noise data?		Yes
	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of L_{Amax} 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) *Propagation of noise from petroleum and petrochemical complexes to neighboring communities*.

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- “ Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- “ Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- “ Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)
- “ British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites

“ United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted L _{Aeq, 15 minute} noise level	47 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	7
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	4
Clearly audible	5 – 15 dB above NML	4
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

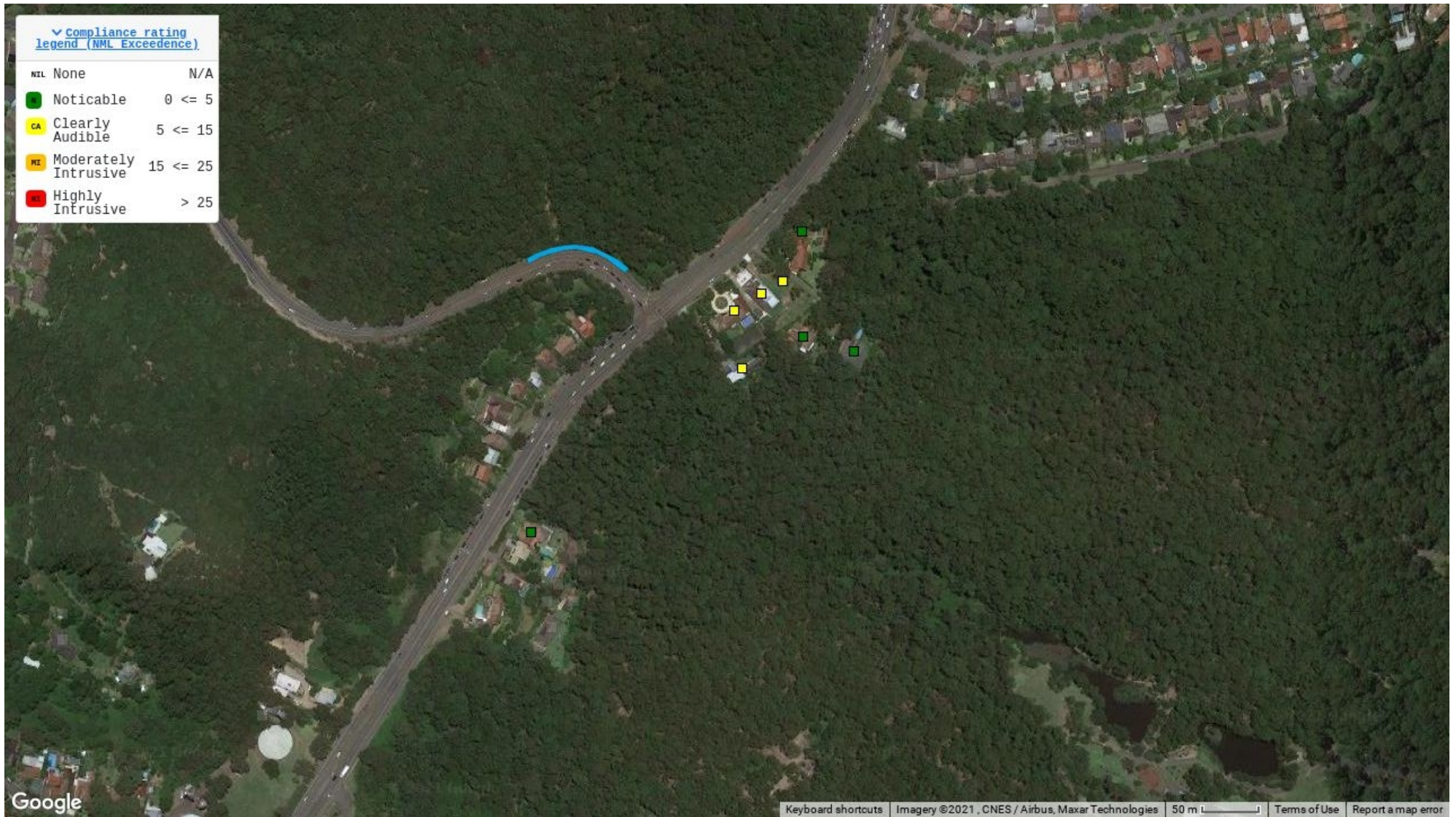
The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	<p>Notify the affected community.</p> <p>The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number.</p> <p>Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.</p>
Site inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include:</p> <ul style="list-style-type: none"> • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures <p>site opening/closing times (including deliveries) environmental incident procedures</p>
Behaviour	<p>No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>Limit compression braking at night in residential areas.</p> <p>No dropping of materials from height, throwing of metal items and slamming of doors.</p>
Verification	<p>Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.</p>
Construction hours	<p>Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.</p>
Respite for out-of-hours works	<p>Respite would be scheduled as indicated in Appendix C and described in the CNVG.</p>
Equipment selection	<p>Use quieter construction methods where feasible and reasonable.</p> <p>Ensure plant including the silencer is well maintained.</p> <p>Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG</p>
Use and siting of plant	<p>The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.</p> <p>Plant used intermittently to be throttled down or shut down.</p> <p>Noise-emitting plant to be directed away from sensitive receivers.</p>

Action	Description
Plan worksites and activities to minimise noise and vibration.	<p>Locate compounds away from sensitive receivers and discourage access from local roads.</p> <p>Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.</p> <p>Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible.</p> <p>Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm.</p> <p>Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.</p>
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	None

Appendix A Project location and predicted level of impact



Appendix B Proposed activities and equipment

Trench Excavation

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (12 tonne)	1	30 %	3	96
Truck (10 tonne)	1	20 %	3	90

Activity Sound Power Level: 97

Trench Backfill

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (06 tonne)	1	30 %	3	86
Plate compactor (small e.g. 60kg)	1	15 %	3	93
Truck (5 tonne)	1	15 %	3	90

Activity Sound Power Level: 96

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Night Period Shift 6/7				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	546202	117 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	Noticable
	546155	79 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	Noticable
	546139	79A LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	Noticable
	546138	79B LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	Noticable
	546137	85 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	44	6	Clearly Audible
	546128	81 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	45	7	Clearly Audible
	546105	83 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	47	9	Clearly Audible
	546103	81A LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	44	6	Clearly Audible

Appendix B – 3 Month Look Ahead Notification Letter

Out of hours early work at New Lambton Heights from December 2021 to February 2022

The NSW Government is funding early work for the Newcastle Inner City Bypass between Rankin Park and Jesmond.

Early work to relocate major utilities at the southern end of the Rankin Park to Jesmond project will be continuing from December 2021 to February 2022. We will be carrying out essential night work on Lookout Road, McCaffrey Drive and surrounding areas. Work is required outside normal project hours for the safety of workers and road users, and to minimise traffic delays. Work hours will be between **7pm and 6am, Monday to Friday**, weather permitting. High impact noisy work will be done **before 11pm**. No work will be carried out day or night between **24 December 2021 and 9 January 2022**.

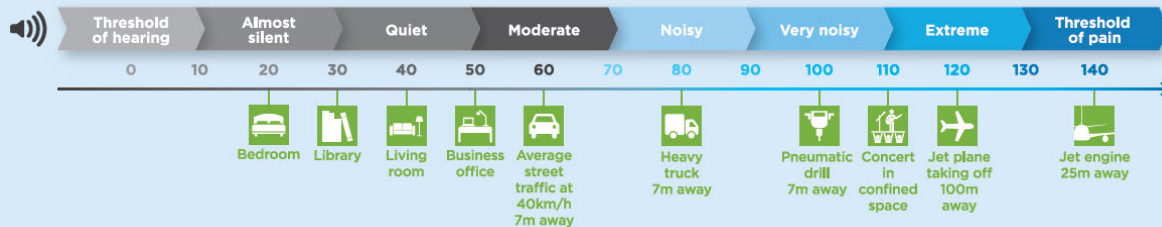
Date	Work Activity	Equipment
Mid December	Overhead powerline work on Lookout Road Expected duration – two consecutive shifts	Traffic control, trucks, elevated working platforms, lighting towers
Early January	Overhead powerline work on McCaffrey Drive and Lookout Road Expected duration – two consecutive shifts	Traffic control, trucks, elevated working platforms, lighting towers
Early January	Water main work on Lookout Road Expected duration – five consecutive shifts	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw
February	Water main work on McCaffrey Drive Expected duration – seven shifts over nine nights	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw
February	Asphalting, linemarking and water main work on Lookout Road and McCaffrey Drive Expected duration – eight shifts over three weeks	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw, asphalt profiler, asphalt paver, concrete agitator trucks

How will the work affect you?

The work will involve the use of machinery which generates noise, light and vibration. We will make every effort to minimise these impacts with our equipment selection, positioning of machines and noise blankets, turning off vehicles when not in use and using non-tonal reversing alarms. Appropriate respite periods for the night work will be provided in consultation with the community at each affected location.

Noise levels will vary between moderate to noisy, the diagram below provides a guide to the noise you can expect. Directly affected residents will be contacted and advised of the likely impact and what we are doing to minimise disruption during the work.

Sound levels in decibels (approximate)



Traffic changes

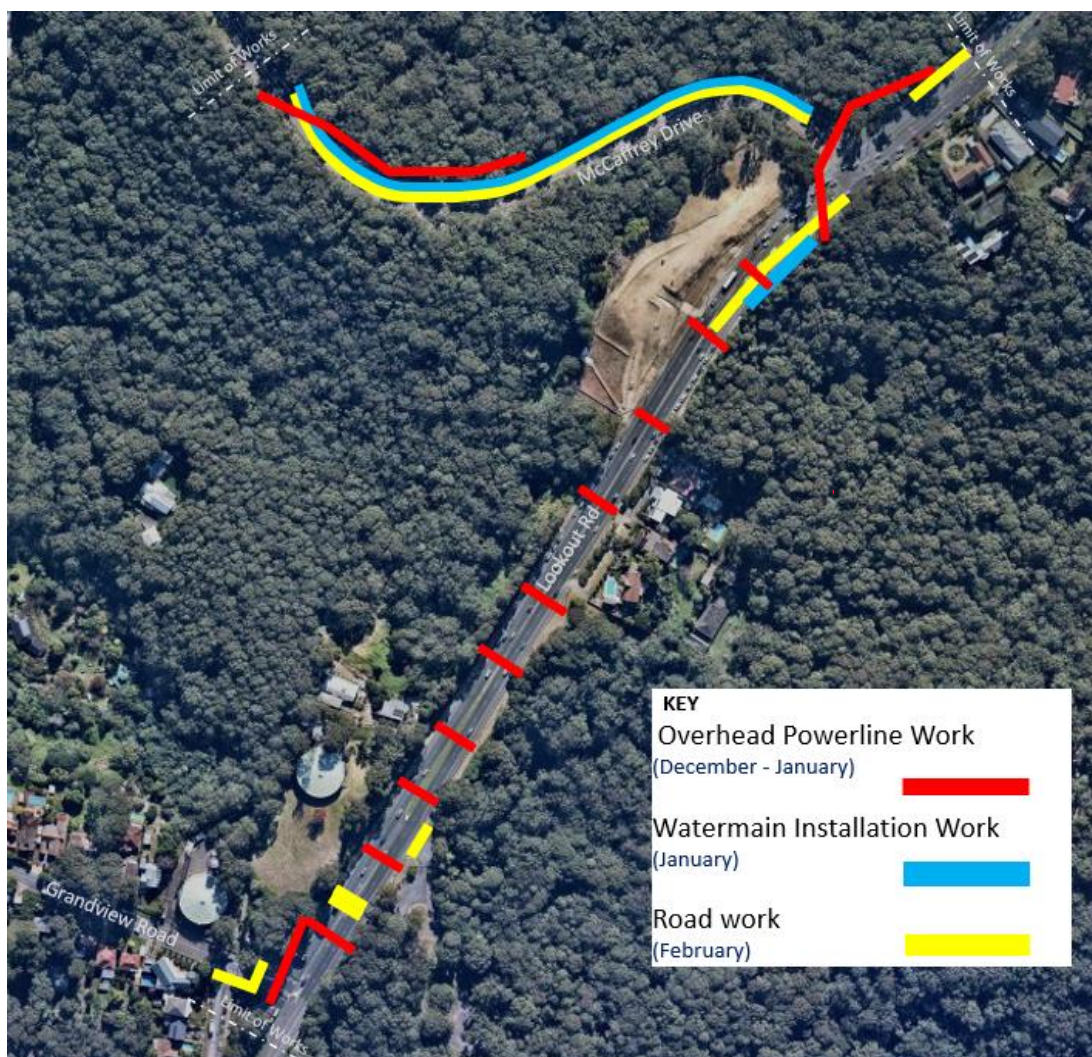
There will be temporary traffic changes to ensure the work zone is safe including lane closures on Lookout Road and McCaffrey Drive. A 40km/h speed limit will apply during the temporary lane closures. Travel times will be affected.

Please keep to speed limits and follow the direction of traffic controllers and signs. For the latest traffic updates, you can call 132 701, visit livetraffic.com or download the Live Traffic NSW App.

Contact

If you would like to provide feedback, or have any questions about this work, please contact our project team on 1800 818 433 (24 hours – select option 2) or email southern.utilities.RP2J@quickway.com.au. For more information about the Newcastle Inner City Bypass between Rankin Park and Jesmond, visit nswroads.work/rp2j. Thank you for your patience during this important work.

Location of work



Appendix C

- **Draft Notification Letter for Residents**

Out of hours early work at New Lambton Heights from 21st February 2022

The NSW Government is funding early work for the Newcastle Inner City Bypass between Rankin Park and Jesmond.

Transport for NSW has awarded a contract to Quickway to relocate major utilities at the southern end of the Rankin Park to Jesmond project to help prepare for the main construction of the bypass. This early work will be continuing in January.

We will be carrying out essential night work on McCaffrey Drive. Work will include:

Installing New Watermain

Work is required outside normal project hours for the safety of workers and road users, and to minimise traffic delays.

We will be completing works over seven nights from **7pm** to **5am** between **Monday 21 February** and **Wednesday 02nd March** weather permitting. High impact noisy work will be done before **11pm**. If wet weather prevents the work occurring as planned, it will be rescheduled on, and you will be notified.

How will the work affect you?

The work will involve the use of machinery which generates noise and light. We will make every effort to minimise these impacts with our equipment selection, positioning of machines and noise blankets, turning off vehicles when not in use and using non-tonal reversing alarms.

Traffic changes

There will be some temporary traffic changes to ensure the work zone is safe including lane closures on McCaffrey Drive. A 40km/h speed limit will apply during temporary lane closures and travel times will be affected. Please keep to speed limits and follow the direction of traffic controllers and signs. For the latest traffic updates, you can call 132 701, visit livetraffic.com or download the Live Traffic NSW App.

Contact

If you would like to provide feedback, have any questions about this work or would like to provide your contact details for future notices, please contact our Community Relations Manager on 1800 818 433 (24 hours – select option 2) or email southern.utilities.RP2J@quickway.com.au.

For more information about the Newcastle Inner City Bypass between Rankin Park and Jesmond, visit nswroads.work/rp2j. Thank you for your patience during this important work.

Appendix D – Consultation Record

Address	NCA	Land Use	Period	NML (RBL +5 dB(A))	Predicted Noise Level at receiver	Exceedance of NML	Exceedance of RBL	OOH Protocol Risk Rating (high/low)	Impact Classification	Mitigation Measures (PC, V, IB, N, AA, SN, RO, R1, R2, DR)	Date Notification completed / sent	Notification type (SMS / Email / Phone Call / Notification Letter / Door knock)	Written Agreement to all OoHW
6 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	40	0.1	5	Low	Noticable	N	TBC	Notification Letter	
19 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	40	0.1	5	Low	Noticable	N	TBC	Notification Letter	
55 ATHERTON CLOSE RANKIN PARK	10	Residential	Evening	40	40	0.1	5	Low	Noticable	N	TBC	Notification Letter	
34 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	40	0.2	5	Low	Noticable	N	TBC	Notification Letter	
321 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	40	0.2	5	Low	Noticable	N	TBC	Notification Letter	
53 ATHERTON CLOSE RANKIN PARK	10	Residential	Evening	40	40	0.2	5	Low	Noticable	N	TBC	Notification Letter	
69 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	40	0.4	5	Low	Noticable	N	TBC	Notification Letter	
8 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	0.5	6	Low	Noticable	N	TBC	Notification Letter	
21 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	0.5	6	Low	Noticable	N	TBC	Notification Letter	
32 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	0.6	6	Low	Noticable	N	TBC	Notification Letter	
323 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	41	0.6	6	Low	Noticable	N	TBC	Notification Letter	
119 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	39	0.8	6	Low	Noticable	N	TBC	Notification Letter	
67 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	0.9	6	Low	Noticable	N	TBC	Notification Letter	
23 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	1.0	6	Low	Noticable	N	TBC	Notification Letter	
10 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	1.0	6	Low	Noticable	N	TBC	Notification Letter	
325 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	41	1.1	6	Low	Noticable	N	TBC	Notification Letter	
30 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	1.1	6	Low	Noticable	N	TBC	Notification Letter	
65 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	1.3	6	Low	Noticable	N	TBC	Notification Letter	
117 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	39	1.3	6	Low	Noticable	N	TBC	Notification Letter	
79B LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	39	1.3	6	Low	Noticable	N	TBC	Notification Letter	
12 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	41	1.5	6	Low	Noticable	N	TBC	Notification Letter	
25 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	1.5	7	Low	Noticable	N	TBC	Notification Letter	
327 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	42	1.6	7	Low	Noticable	N	TBC	Notification Letter	
28 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	1.7	7	Low	Noticable	N	TBC	Notification Letter	

Address	NCA	Land Use	Period	NML (RBL +5 dB(A))	Predicted Noise Level at receiver	Exceedance of NML	Exceedance of RBL	OOH Protocol Risk Rating (high/low)	Impact Classification	Mitigation Measures (PC, V, IB, N, AA, SN, RO, R1, R2, DR)	Date Notification completed / sent	Notification type (SMS / Email / Phone Call / Notification Letter / Door knock)	Written Agreement to all OoHW
63 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	1.7	7	Low	Noticable	N	TBC	Notification Letter	
329 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	42	2.0	7	Low	Noticable	N	TBC	Notification Letter	
27 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	2.0	7	Low	Noticable	N	TBC	Notification Letter	
14 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	2.1	7	Low	Noticable	N	TBC	Notification Letter	
61 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	2.2	7	Low	Noticable	N	TBC	Notification Letter	
26 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	2.2	7	Low	Noticable	N	TBC	Notification Letter	
29 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	42	2.5	7	Low	Noticable	N	TBC	Notification Letter	
331 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	43	2.5	8	Low	Noticable	N	TBC	Notification Letter	
59 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	2.6	8	Low	Noticable	N	TBC	Notification Letter	
24 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	2.9	8	Low	Noticable	N	TBC	Notification Letter	
16 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	3.0	8	Low	Noticable	N	TBC	Notification Letter	
57 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	3.0	8	Low	Noticable	N	TBC	Notification Letter	
18 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	3.0	8	Low	Noticable	N	TBC	Notification Letter	
31 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	3.0	8	Low	Noticable	N	TBC	Notification Letter	
333 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	43	3.1	8	Low	Noticable	N	TBC	Notification Letter	
3A MARSHALL STREET NEW LAMBTON HEIGHTS	10	Residential	Evening	40	43	3.2	8	Low	Noticable	N	TBC	Notification Letter	
20 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	43	3.3	8	Low	Noticable	N	TBC	Notification Letter	
22 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	44	3.5	9	Low	Noticable	N	TBC	Notification Letter	
33 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	44	3.6	9	Low	Noticable	N	TBC	Notification Letter	
1A MARSHALL STREET NEW LAMBTON HEIGHTS	10	Residential	Evening	40	44	3.6	9	Low	Noticable	N	TBC	Notification Letter	
55 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	44	3.7	9	Low	Noticable	N	TBC	Notification Letter	
79A LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	42	3.7	9	Low	Noticable	N	TBC	Notification Letter	
335 MCCAFFREY DRIVE RANKIN PARK	10	Residential	Evening	40	44	3.9	9	Low	Noticable	N	TBC	Notification Letter	
79 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	42	4.4	9	Low	Noticable	N	TBC	Notification Letter	

Address	NCA	Land Use	Period	NML (RBL +5 dB(A))	Predicted Noise Level at receiver	Exceedance of NML	Exceedance of RBL	OOH Protocol Risk Rating (high/low)	Impact Classification	Mitigation Measures (PC, V, IB, N, AA, SN, RO, R1, R2, DR)	Date Notification completed / sent	Notification type (SMS / Email / Phone Call / Notification Letter / Door knock)	Written Agreement to all OoHW
53 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	44	4.4	9	Low	Noticable	N	TBC	Notification Letter	
37 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	4.9	10	Low	Noticable	N	TBC	Notification Letter	
39 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	5.0	10	Low	Noticable	N	TBC	Notification Letter	
41 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	5.4	10	Low	Clearly Audible	N, V	TBC	Notification Letter	
43 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	5.4	10	Low	Clearly Audible	N, V	TBC	Notification Letter	
49 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	5.5	10	Low	Clearly Audible	N, V	TBC	Notification Letter	
51 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	45	5.5	10	Low	Clearly Audible	N, V	TBC	Notification Letter	
47 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	46	5.6	11	Low	Clearly Audible	N, V	TBC	Notification Letter	
45 KINGSWAY AVENUE RANKIN PARK	10	Residential	Evening	40	46	5.7	11	Low	Clearly Audible	N, V	TBC	Notification Letter	
81A LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	44	5.7	11	Low	Clearly Audible	N, V	TBC	Notification Letter	
85 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	44	5.8	11	Low	Clearly Audible	N, V	TBC	Notification Letter	
81 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	45	7.1	12	Low	Clearly Audible	N, V	TBC	Notification Letter	
83 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Night	38	47	8.8	14	Low	Clearly Audible	N, V	TBC	Notification Letter	