Sydney Metro – WSA – SSTOM – Detailed Noise and Vibration Impact Statement – Claremont Meadows Services Facility - OOH Works

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Detailed Noise and Vibration Impact Statement

Sydney Metro Western Sydney Airport SSTOM Package

Claremont Meadows Shaft - EPL Variation

Webuild Group
Level 19, 99 Walker Street
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This Report by VMS Australia Pty Ltd is prepared for Webuild Group and is based on the objective, scope, conditions and limitations as agreed. The Report presents only the information that VMS Australia Pty Ltd believes, in its professional opinion, is relevant and necessary to describe the issues involved. The Report should not be used for anything other than the intended purpose. All surveys, forecasts, projections, and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to VMS Australia Pty Ltd at the date of this report, and upon which VMS Australia Pty Ltd relied.

This report in its finalised version has been prepared, checked and authorised by suitably qualified and experienced personnel from VMS Australia Pty Ltd, who hold memberships with the Australian Acoustical Society (AAS). Draft versions of this report may not be subject to this qualification.

VMS Australia Pty Ltd does not accept any liability or responsibility to any party with respect to the information and opinions contained in this report.

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1 Introduction

The Sydney Metro Western Sydney Airport (SMWSA) Environmental Impact Statement (EIS) was prepared in October 2020, which assessed the impacts of the construction (and operation) of the development. Approval for the development of the SMWSA project occurred on 23 July 2021 (Mod 1 approved 14 April 2022) with conditions as outlined in the SMWSA - Conditions of Approval - State Significant Infrastructure (SSI) 10051. Chapter 10 of the EIS included a summary of the Noise and Vibration assessment, with the complete assessment provided in Technical Paper 2.

The SMWSA project is made up of three major contract packages. In December 2022, the third contract was awarded to Parklife Metro JV (PLM) who will deliver approximately 23 kilometres of railway track, including six new stations between St Marys and Bradfield, 12 new metro trains, core rail systems, and the Stabling and Maintenance Facility (SMF) to be built at Orchard Hills.

After completion of these works, PLM will also operate and maintain the SMWSA line for 15 years after it becomes operational.

This contract is known as Stations, Systems, Trains, Operations and Maintenance (SSTOM).

VMS Australia Pty Ltd (VMS) has been engaged by PLM to provide acoustic advice during the construction phase of this project, including the preparation of a Detailed Noise and Vibration Impact Statement (DNVIS).

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in **Appendix A**.

2 Overall Project Description

In terms of construction works, the SSTOM Works scope as part of the SMWSA Project includes:

- Installation of tracks, signalling, mechanical and electrical systems,
- Construction of a SMF at Orchard Hills,
- Construction of the lower chamber of Bringelly shaft, along with capping and backfill,
- Construction of the lower chamber of Claremont Meadows shaft, along with capping and backfill, and
- Construction of six stations, including:
  - A new metro station connecting to, and providing an interchange with, the T1 Western Line (part of the existing Sydney Trains suburban rail network) at St Marys,
  - Two new metro stations between the T1 Western Line and Western Sydney International; one at Orchard Hills and one at Luddenham within the Northern Gateway Precinct,
  - Two new metro stations within the Western Sydney Airport site (WSA); one at the Airport Terminal and one at the Airport Business Park, both of which are located on Airport land, and
  - A new metro station within the Bradfield precinct, south of WSA (it should be noted that Bradfield Station was formerly known as Aerotropolis Core Station).

Construction works relating to SSTOM are expected to be completed during the third quarter of 2026, with commissioning and testing completed early 2027.

A site plan showing the extent of the entire project is shown in **Figure 1**.

Figure 1 Overall Project Site Plan

Source: Sydney Metro.

2.1 Scope of this DNVIS

This DNVIS focuses on the construction works related to Claremont Meadows Shaft and, in particular, a proposal to vary Environment Protection Licence (EPL) 21807 to allow works for tunnelling and underground station box fit out works 24 hours a day, seven days a week.

Such a request is considered to align with the following aspect of Condition E41, which is reproduced below:

> "***Variation to Work Hours***
>
> *E41 Notwithstanding Conditions E38 and E39 work may be undertaken outside the hours specified in the following circumstances*:
>
> [...]
>
> *(c) By Approval, including:*
>
> *(i)* where different construction hours are permitted or required under an EPL in force in respect of the CSSI;
>
> [...]"

Work considered as part of this DNVIS includes:

- Ventilation - four (4) fans are proposed to be operational at all times.
- Materials Handling - These works could occur at any time and include:
  - Gantry Crane
  - Laydown Areas (4 off)
- Compound Use - Light and heavy vehicle movements that could occur at all times.
- Water Treatment Plant (WTP) that could operate at all times.
- Concreting works that will operate at all times.

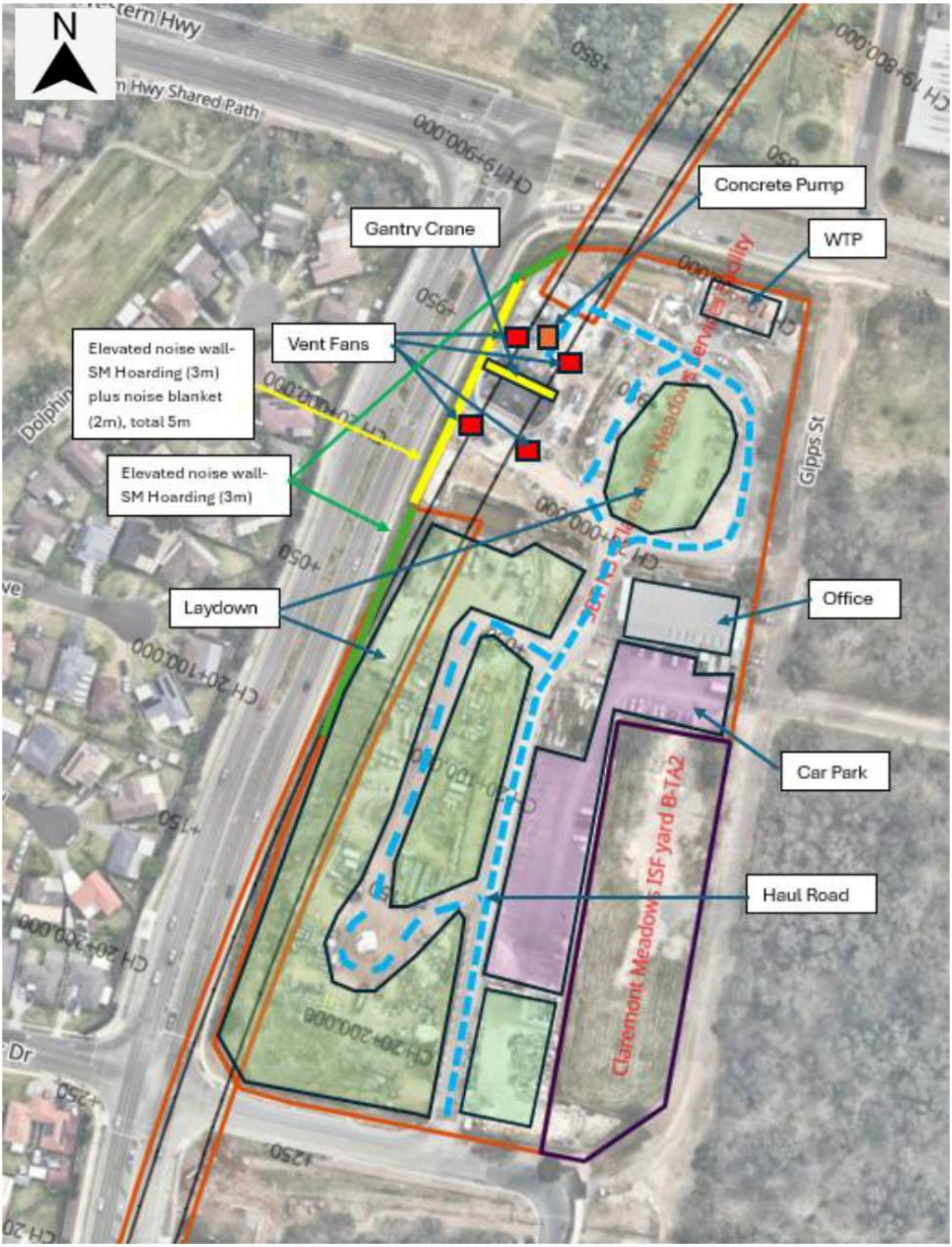
Figure 2 shows the work areas associated with these works including the location and height of the main noise barriers.

As can be seen from the above proposed work, neither vibration-intensive nor high noise impact activities and works are proposed.

Although not specifically requested as part of an EPL or the Approval, noise impacts associated with construction traffic (off-site) have been assessed as per SMWSA - Construction Noise and Vibration Standard (CNVS).

On the basis of the above, only airborne construction noise impacts for on-site activities and for off-site construction traffic are considered in this assessment.

Figure 2 Main Work Areas



Source: PLM.

2.2 Project Compliance Management

In relation to the proposed works, compliance is required with the EPL 21807 document.

In addition, this assessment is conducted in consideration and accordance with the Sydney Metro Western Sydney Airport (SMWSA) - SSI 10051.

Considering the relevant aspects of the above documents, compliance is summarised in **Table 1** which also includes relevant SMWSA Revised Environmental Management Measures (REMMs).

The following documents were also referenced in the preparation of this DNVIS:

- Department of Environment & Climate Change NSW (DEC - now the EPA) - Interim Construction Noise Guideline (ICNG).
- Department of Environment, Climate Change and Water NSW (DECCW - now the EPA) - Road Noise Policy (RNP).
- PLM - Construction Environmental Management Plan (CEMP).
- PLM - Noise and Vibration Management Sub-Plan, Revision 2 (NVMP).
- Renzo Tonin & Associates (RT&A) - SMWSA - Station Boxes and Tunnelling Works (SBT) - DNVIS - OHE Tunnel Support Worksite - Ref: TM008-03-01F01 SMWSA-SBT_DNVIS-OHE (r8), Revision 8, dated 11 July 2023 (OHE SBT DNVIS).
- SMWSA - Community Communications Strategy (CCS).
- SMWSA - Construction Noise and Vibration Standard (CNVS).
- SMWSA - Submissions Report.
- SMWSA - Technical Paper 2: Noise and Vibration.
- Sydney Metro - Construction Environmental Management Framework (CEMF).
- Transport for NSW (TfNSW) - Construction Noise and Vibration Guideline - Public Transport Infrastructure (CNVG - PTI).

Table 1 Project Compliance Management Summary

ID	Condition	DNVIS Reference
SMWSA - Conditions of Approval - SSI 10051 - Noise and Vibration		
E37	A detailed land use survey must be undertaken to confirm sensitive land use(s) (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration and construction ground-borne noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction noise, vibration or ground-borne noise in that area. The results of the survey must be included in the **Detailed Noise and Vibration Impact Statements** required under **Condition E47.**	**Section 3.2** **Appendix B**
E38	Work must only be undertaken during the following hours: a) 7:00am to 6:00pm Mondays to Fridays, inclusive; b) 8:00am to 1:00pm Saturdays; and c) at no time on Sundays or public holidays.	**Section 2.1** OOH works to take place as permitted by an EPL.
E39	Except as permitted by an EPL or approved in accordance with the Out-of-Hours Works Protocol required by **Condition E42**, highly noise intensive work that result in an exceedance of the applicable NML at the same receiver must only be undertaken: a) between the hours of 8:00 am to 6:00 pm Monday to Friday; b) between the hours of 8:00 am to 1:00 pm Saturday; and c) if continuously, then not exceeding three (3) hours, with a minimum cessation of work of not less than one (1) hour. For the purposes of this condition, 'continuously' includes any period during which there is less than one (1) hour between ceasing and recommencing any of the work.	OOH works to take place as permitted by an EPL.
E40	This approval does not permit blasting.	NA to this DNVIS. Blasting not proposed.

ID	Condition	DNVIS Reference
E41	Variation to Work Hours: Notwithstanding Conditions E38 and E39 work may be undertaken outside the hours specified in the following circumstances: (a) Safety and Emergencies, including: (i) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (ii) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (b) Low impact, including: (i) construction that causes $L_{Aeq(15\ minute)}$ noise levels: • no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and • no more than the 'Noise affected' NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and (ii) construction that causes: • continuous or impulsive vibration values, measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), or • intermittent vibration values measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006); or (c) By Approval, including: (i) where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or (ii) works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition E42; or (iii) negotiated agreements with directly affected residents and sensitive land user(s); or (d) By Prescribed Activity, including: (i) tunnelling and ancillary support activities (excluding cut and cover tunnelling and surface works not directly supporting tunnelling) are permitted 24 hours a day, seven days a week; or (ii) grout batching at the Orchard Hills construction site is permitted 24 hours per day, seven days per week; or (iii) delivery of material that is required to be delivered outside of standard construction hours in Condition E38 to directly support tunnelling activities, except between the hours 10:00 pm and 7:00 am to / from the Orchard Hills ancillary facility; or (iv) haulage of spoil generated through tunnelling is permitted 24 hours per day, seven days per week except between the hours of 10:00 pm and 7:00 am to / from the Orchard Hills construction site; or (v) works within an acoustic enclosure are permitted 24 hours a day, seven days a week where there is no exceedance of noise levels or intermittent vibration levels under Low impact circumstances identified in Condition E41(b), unless otherwise agreed with the Planning Secretary; or (vi) tunnel and underground station box fit out works are permitted 24 hours per day, seven days per week. On becoming aware of the need for emergency work in accordance with (a)(ii) above, the ER, the Planning Secretary and the EPA must be notified of the reasons for such work. The Proponent must use best endeavours to notify as soon as practicable all noise and/or vibration affected sensitive land user(s) of the likely impact and duration of those work. Notes: 1. Tunnelling does not include station box excavation. 2. Tunnelling ancillary support activities includes logistics support and material handling and delivery.	Relevant activities included in this DNVIS are in accordance with EPL condition L5.14

ID	Condition	DNVIS Reference
E42	Out-of-Hours Work Protocol - Work not subject to an EPL An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of work (not subject to an EPL) that is outside the hours defined in Conditions E38 and E39. The Protocol must be approved by the Planning Secretary before commencement of the out-of-hours work. The Protocol must be prepared in consultation with the ER. The Protocol must provide: (a) justification for why out-of-hours work need to occur; (b) identification of low and high-risk activities and an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where: (i) the ER reviews all proposed out-of-hours activities and confirms their risk levels; (ii) low risk activities that can be approved by the ER; and (iii) high risk activities that are approved by the Planning Secretary; (c) a process for the consideration of out-of-hours work against the relevant NML and vibration criteria; (d) a process for selecting and implementing mitigation measures for residual impacts in consultation with the community at each affected location, including respite periods consistent with the requirements of Condition E56. The measures must take into account the predicted noise levels and the likely frequency and duration of the out-of-hours works that sensitive land user(s) would be exposed to, including the number of noise awakening events; (e) procedures to facilitate the coordination of out-of-hours work including those approved by an EPL or undertaken by a third party, to ensure appropriate respite is provided; and (f) notification arrangements for affected receivers for all approved out-of-hours works and notification to the Planning Secretary of approved low risk out-of-hours works. This condition does not apply if the requirements of Condition E41 are met. Note: Out-of-hours work is any work that occurs outside the construction hours identified in Condition E38 and E39.	Refer to NVMP.
E43	Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration criteria: a) construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009); b) preferred vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); c) Australian Standard AS 2187.2 – 2006 "Explosives – Storage and Use – Use of Explosives" (for human exposure); d) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and e) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage for structurally unsound heritage items). Any work identified as exceeding the noise management levels and / or vibration criteria must be managed in accordance with the Noise and Vibration CEMP Sub-plan. Note: The ICNG identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction Noise Management Level.	**Section 4.1** **Section 7**
E44	All reasonable and feasible mitigation measures must be applied when the following residential ground-borne noise levels are exceeded: (a) evening (6:00 pm to 10:00 pm) — internal $L_{Aeq(15\ minute)}$: 40 dB(A); and (b) night (10:00 pm to 7:00 am) — internal $L_{Aeq(15\ minute)}$: 35 dB(A). The mitigation measures must be outlined in the Noise and Vibration CEMP Sub-plan, including in any Out-of-Hours Work Protocol, required by Condition E42.	Not triggered. No vibration intensive works and no works within a tunnel.
E45	Noise generating work in the vicinity of potentially-affected community, religious, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories, and operating theatres) resulting in noise levels above the NMLs must not be time tabled with sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution.	Not triggered. NML for residential only exceeded.

ID	Condition	DNVIS Reference
E46	Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise levels are minimised around sensitive land user(s). Practices must include, but are not limited to: a)use of regularly serviced low sound power equipment; b)at source control, temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and activities such as rock hammering and concrete cutting; c)use of non-tonal reversing alarms; and d)use of alternative construction and demolition techniques.	**Section 7**
E47	**Detailed Noise and Vibration Impact Statements (DNVIS)** must be prepared for any work that may exceed the NMLs, vibration criteria and / or ground-borne noise levels specified in **Conditions E43** and **E44** at any residence outside construction hours identified in **Condition E38**, or where receivers will be highly noise affected or subject to vibration levels above those otherwise determined as appropriate by a suitably qualified structural engineer under **Condition E87**. The **DNVIS** must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the works. A copy of the **DNVIS** must be provided to the ER before the commencement of the associated works. The Planning Secretary and the EPA may request a copy(ies) of the **DNVIS**.	This document.
E48	Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before works that generate vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers are to be provided a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Sub-plan.	Not triggered. No vibration intensive works.
E49	Where sensitive land use(s) are identified in Appendix B as exceeding the highly noise affected criteria during typical case construction, mitigation measures must be implemented with the objective of reducing typical case construction noise below the highly noise affected criteria at each relevant sensitive landuse(s). Activities that would exceed highly noise affected criteria during typical case construction must not commerce until the measures identified in this condition have been implemented, unless otherwise agreed with the Planning Secretary. Note: Mitigation measures may include path barrier controls such as acoustic sheds and/or noise walls, at-property treatment, or a combination of path and at-property treatment.	Not triggered. Highly noise affected level not exceeded.
E50	For all construction sites where acoustic sheds are installed, the sheds must be designed, constructed and operated to minimise noise emissions. This would include the following considerations: (a) all significant noise producing equipment that would be used during the night-time would be inside the sheds, where feasible and reasonable; (b) noise generating ventilation systems such as compressors, scrubbers, etc, would be located inside the sheds and external air intake/discharge ports would be appropriately acoustically treated; and (c) the doors of acoustic sheds would be kept closed during the night-time period. Where night-time vehicle access is required at sites with nearby residences, the shed entrances would be designed and constructed to minimise noise breakout.	NA to this DNVIS. Acoustic sheds not proposed.
E51	Where Condition E49 determines that at-property treatment (temporary or permanent) is the appropriate measure to reduce noise impacts, this at-property treatment must be offered to landowners of residential properties for habitable living spaces, unless other mitigation or management measures are agreed to by the landowner. Landowners must be advised of the range of options that can be installed at or in their property and given a choice as to which of these they agree to have installed. A copy of all guidelines and procedures that will be used to determine at-property treatment at their residence must be provided to the landowner.	Not triggered.
E52	Any offer for at-property treatment or the application of other noise mitigation measures in accordance with Condition E51 does not expire until the noise impacts specified in Condition E49 affecting that property are completed, even if the landowner initially refuses the offer. Note: If an offer has been made but is not accepted, this does not preclude the commencement of construction under Condition E49.	Not triggered.
E53	The implementation of at-property treatment does not preclude the application of other noise and vibration mitigation and management measures including temporary and long term accommodation.	Not triggered.

ID	Condition	DNVIS Reference
E54	Vibration testing must be conducted during vibration generating activities that have the potential to impact on Heritage items to verify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures. Such measures must include, but not be limited to, review or modification of excavation techniques.	NA to this DNVIS. No vibration intensive works.
E55	The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring at Heritage items.	Not triggered.
E56	All work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must: (a) reschedule any work to provide respite to impacted noise sensitive land use(s) so that the respite is achieved in accordance with Condition E57; or (b) consider the provision of alternative respite or mitigation to impacted noise sensitive land use(s); and (c) provide documentary evidence to the ER in support of any decision made by the Proponent in relation to respite or mitigation. The consideration of respite must also include all other approved Critical SSI, SSI and SSD projects which may cause cumulative and / or consecutive impacts at receivers affected by the delivery of the CSSI.	PLM is conducting ongoing coordination with other contractors to ensure that respite periods are maintained throughout the works.
E57	In order to undertake out-of-hours work outside the work hours specified under Condition E38, appropriate respite periods for the out-of-hours work must be identified in consultation with the community at each affected location on a regular basis. This consultation must include (but not be limited to) providing the community with: (a) a progressive schedule for periods no less than three (3) months, of likely out-of-hours work; (b) a description of the potential work, location and duration of the out-of-hours work; (c) the noise characteristics and likely noise levels of the work; and (d) likely mitigation and management measures which aim to achieve the relevant NMLs under Condition E43 (including the circumstances of when respite or relocation offers will be available and details about how the affected community can access these offers). The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour work must be provided to the ER before the out of hours work commences, and to the EPA and the Planning Secretary on request. Note: Respite periods can be any combination of days or hours where out-of-hours work would not be more than 5 dB(A) above the RBL at any residence.	As notified by PLM, consultation will be undertaken in accordance with this Condition, and in accordance with the EPL. E57 Report will be provided to the ER as required.
EPL - 21807		
L3.1	The licensee must minimise noise and vibration impacts at residences and other sensitive land uses. To meet the requirements of this condition the licensee must: a) implement the guidance in the Interim Construction Noise Guideline (DEC, 2009) and the Assessing Vibration: a technical guideline (DEC, 2006); b) implement all reasonable and feasible measures to minimise noise impacts in accordance with the Interim Construction Noise Guideline (DEC, 2009); and c) implement vibration mitigation in accordance with the Assessing Vibration: a Technical Guideline (DEC, 2006). In this condition, 'reasonable' and 'feasible', in relation to noise management, have the same meaning as defined in the Interim Construction Noise Guideline (DEC, 2009).	**Section 4** **Section 7**
L3.2	When construction activities include 'High Noise Impact Activities and Works' as defined in the special dictionary in this licence, quantitative construction noise assessments must apply a +5dB correction to the measured or predicted level of construction noise at the nearest Noise Sensitive Receiver location before assessment against the Interim Construction Noise Guideline (DECC, 2009) noise management levels.	Not triggered. No High Noise Impact Activities and Works are planned.
L4.1	All blasting activities are prohibited on the licensed premises.	Not triggered. Blasting not proposed.

ID	Condition	DNVIS Reference
L5.1	Standard construction hours Unless permitted by another condition of this licence, works and activities must: a) only be undertaken between the hours of 7:00 am and 6:00 pm Monday to Friday; b) only be undertaken between the hours of 8:00 am and 1:00 pm Saturday; and c) not be undertaken on Sundays or Public Holidays.	This DNVIS is intended to support variation to EPL regarding the works considered in this DNVIS.
L5.2	High Noise Impact Activities and Works Unless permitted by another condition of this licence, any High Noise Impact Activities and Works that exceed the applicable Noise Management Level (NML) at a Noise Sensitive Receiver must only be undertaken: a) between 8:00 am and 6:00 pm Monday to Friday; b) between 8:00 am and 1:00 pm Saturday; and c) if high noise impact works are to be conducted continuously and the location of the works means that it is likely to impact the same receivers, then the works must be conducted in continuous blocks of no more than 3-hours, with at least a 1-hour respite between each block of continuous high noise impact work; except as expressly permitted by another condition of this licence. Note: For the purposes of this condition 'continuous' includes any period where there is a less than 1-hour respite between ceasing and recommencing of any work that is subject to this condition.	Not triggered. No High Noise Impact Activities or Works are planned.
L5.3	Exemptions to standard construction hours for low noise impact works Works and activities may be carried on outside of standard construction hours specified in condition L5.1 if the works and activities do not cause, when assessed at the boundary of the most affected Noise Sensitive Receiver: a) LAeq(15 minute) noise levels greater than 5dB above the day, evening and night Rating Background Level (RBL) as applicable; b) LAmax noise levels greater than 15dB above the night RBL for night works; c) the preferred continuous or impulsive vibration values greater than those for human exposure to vibration, set out for residences in Table 2.2 in Assessing Vibration: a technical guideline (DEC, 2006); and d) the preferred intermittent vibration values greater than those for human exposure to vibration, set out for residences in Table 2.4 in Assessing Vibration: a technical guideline (DEC, 2006). For the purposes of this condition, the RBLs are those contained in an environmental assessment for the activities subject to this licence prepared under the Environmental Planning and Assessment Act 1979. Alternatively, the licensee may use another RBL determined in accordance with the Noise Policy for Industry (EPA, 2017) and provided to the EPA prior to carrying out any works or activities under this condition. The notification requirements under condition L5.4 do not apply to this condition.	Not triggered. This DNVIS is intended to support variation to EPL regarding the works considered in this DNVIS.

ID	Condition	DNVIS Reference
L5.4	Works outside of standard construction hours - Notification The licensee must notify potentially affected Noise Sensitive Receivers of works outside of standard construction hours unless notification under this condition is not required as specified in another condition of this licence. a) The notification must: i. be given not less than 5 calendar days and not more than 14 calendar days before those works are to be undertaken, unless otherwise agreed with the affected community and notified to the EPA; ii. be undertaken by letterbox drop, email, text message or other targeted and equivalent method; and iii. be detailed on the project website or other relevant website notified to the EPA. b) The notification required by this Condition must: i. clearly outline the reason that the work is required to be undertaken outside the hours specified in condition L5.1; ii. include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks; iii. include details of the date, timing and relevant time restrictions that apply to the proposed works; iv. clearly outline in plain English, the location, nature, scope and duration of the proposed works; v. detail the expected noise impact of the works on Noise Sensitive Receivers; vi. clearly state how complaints may be made and additional information obtained; vii. include the number of the telephone complaints line required by condition M5.1, an after hours contact phone number specific to the works undertaken outside the hours specified in condition L5.1, and the project website address; and viii. include consideration of culturally and linguistically diverse Noise Sensitive Receivers where required.	**Section 7**
L5.5	Exemptions to standard construction hours in exceptional circumstances a) The licensee may undertake works and activities outside of standard construction hours specified in condition L5.1 for: i. emergency works required to avoid the loss of life or property, or to prevent material harm to the environment; and ii. the delivery of oversized plant, structures or materials determined by the police or other authorised authorities to require special arrangements to transport along public roads. b) The licensee must, on becoming aware of the need to undertake emergency works under this condition notify the EPA's Environment Line as soon as practicable and submit a report to the EPA by 4:00 pm on the next business day after the emergency works commenced that describes: i. the cause, time and duration of the emergency; ii. action taken by or on behalf of the licensee in relation to the emergency; and iii. details of any measures taken or proposed to be taken by the licensee to prevent or mitigate against a recurrence of the emergency. For the purposes of this condition, 'material harm to the environment' has the same meaning as in section 147 of the POEO Act. Emergency works do not require a notification under condition L5.4.	NA to this DNVIS.
L5.6	The licensee must make all reasonable and feasible efforts to coordinate all works outside of standard construction hours with any neighbouring concurrent construction works that have the potential to impact the same Noise Sensitive Receivers. The licensee must ensure Respite Periods are being achieved as much as is reasonably practicable.	**Section 7**
L5.7	Condition L5.6 does not apply to low impact noise work permitted by condition L5.3 or emergency works permitted by L5.5 of this licence.	Noted. Refer to CNVMP.

ID	Condition	DNVIS Reference
L5.8	Works outside of standard construction hours Under this condition, works and activities may be undertaken outside of standard construction hours specified in condition L5.1 and L5.2, but only if they are required in relation to one or more of the following: a) carrying on those works and activities during standard construction hours would result in a high risk to construction personnel or public safety, based on a risk assessment carried out in accordance with AS/NZS ISO 31000:2018 "Risk Management"; b) the Relevant Road Network Operator has advised the licensee in writing that carrying out the works and activities during standard construction hours would result in a high risk to road network operational performance; c) a relevant utility service operator has advised the licensee in writing that carrying out the works and activities during standard construction hours would result in a high risk to the operation and integrity of the utility network; d) the TfNSW Transport Management Centre (or other road authority) have refused to issue a road occupancy licence during standard construction hours; or e) Sydney Trains (or other rail authority) requires a rail possession for the activities to be performed outside of standard construction hours.	Not triggered. This DNVIS is intended to support variation to EPL regarding the works considered in this DNVIS.
L5.9	Works outside of standard construction hours - Regulatory Requirements In undertaking any works and activities outside of standard construction hours under condition L5.8, the licensee must comply with the following: a) Prepare a construction noise and vibration impact assessment in accordance with the Interim Construction Noise Guideline (DEC, 2009) that is to include: i. a description of the proposed works and activities outside of standard construction hours; ii. predictions of LAeq (15 minute) dB noise levels at noise sensitive receivers from these works and activities, where noise levels are predicted to be greater than those permitted under condition L5.3; and iii. a monitoring plan to validate the noise predictions, based on monitoring at the boundary of representative sensitive receivers during noise generating activities that are representative of the works and activities, including during the period/s predicted to have the highest noise level impacts. b) Undertake noise monitoring in accordance with the monitoring plan required by condition L5.9(a)(iii). c) Only undertake activities between the hours of 6:00pm on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays and 7:00am the following day (unless permitted by another condition of this licence). d) Activities are not to be undertaken between the hours of 6:00pm on Saturdays, Sundays or Public Holidays and 7:00am the following day (unless permitted by another condition of this licence). e) Ensure that works and activities do not result in noise levels exceeding those specified in condition L5.3 at the same noise sensitive receivers (unless specified in another condition of this licence) on more than: i. 2 consecutive evenings and/or nights at any time; and ii. 3 evenings and/or nights per week; and iii. 10 evenings and/or nights per month. f) Undertake any high noise impact works before 12:00 am (midnight) where reasonable and feasible. g) Where high noise impact activities are undertaken, the respite provisions as per the requirements of condition L5.2(c) do not apply provided that all High Noise Impact Activities and Works are undertaken prior to 12:00 am (midnight). h) Where high noise impact activities are undertaken after 12:00 am (midnight), the respite provisions in condition L5.2(c) apply. i) Upon request of an authorised officer, the licensee must provide within 5 business day: i. the construction noise and vibration impact assessment required by condition L5.9(a); ii. noise monitoring results required by condition L5.9(b); iii. written evidence demonstrating the works are necessary and permitted under condition L5.8; and/or iv. any other relevant information or records requested by the EPA. j) the notification requirements under condition L5.4 apply to this condition.	This DNVIS (where appropriate) is intended to support a variation application to the EPL regarding OOH concreting and supporting works. PLM will ensure compliance with EPL, including any variations resulting from this application.

ID	Condition	DNVIS Reference
L5.14	Works outside standard construction hours - 24-hour works a) The following works are permitted to be undertaken 24 hours a day, 7 days per week for activities at the St Marys Station Site, Claremont Meadows services shaft site, Orchard Hills Station site, Bringelly services shaft site, and Bradfield Station site: i. Tunnel and underground station box fit out works and ancillary surface support works ii. Haulage and delivery of materials to the Claremont Meadows services shaft site and Bringelly services shaft site. b) The licensee is required to undertake attended noise monitoring: 1. on the first two occasions of 24-hour works at each site: i. St Marys Station site, ii. Claremont Meadows services shaft site, iii. Orchard Hills Station site, iv. Bringelly services shaft site, v. Bradfield Station site, and 2. noise monitoring must occur in the night time period. 3. the licensee is required to provide the EPA with a Noise Monitoring Report within 30 days of the end of the month in which noise monitoring was undertaken.	The relevant activities at Claremont Meadows Services Shaft Site are assessed as part of this DNVIS. PLM will adhere to complying with the EPL noise monitoring requirements.
M4.1	All noise and vibration monitoring for the purposes of determining compliance with the conditions of this licence must be undertaken by a suitably qualified and experienced person as defined in the special dictionary of this licence.	**Section 7.3.1**
M4.2	All noise monitoring for the purposes of determining compliance with the conditions of this licence must consider and be generally undertaken in accordance with; (a) Australian Standard AS 1055: 2018 Acoustics - Description and measurement of environmental noise; and (b) the compliance monitoring guidance provided in the chapter 7 'Monitoring Performance' of the Noise Policy for Industry (EPA, 2017).	**Section 7.3.1**
M4.3	All vibration monitoring must be: a) undertaken in accordance with the technical guidance provided in the Assessing Vibration: a technical guideline (DEC, 2006); and b) assessed and reported against the acceptable and maximum values of human exposure to vibration set out in Tables 2.2 and 2.4 of this guideline.	NA to this DNVIS. No vibration intensive works.
M4.4	The licensee must undertake noise and vibration monitoring as directed by an authorised officer of the EPA. Where the monitoring is requested to take place on private land (for example a residential property) the licensee must request permission to access the premises in advance and keep a record of permission requests and responses. If a licensee is unable to obtain permission, the licensee must undertake the monitoring at an indicative location where possible and they must provide the response (including any nil response) to the EPA.	Noted. PLM will adhere to complying with the EPL requirements.
M4.5	Additional Monitoring Conditions The licensee must undertake monitoring, sampling, video recording and/or take photographs: a) if the EPA or licensee reasonably suspects that an event has occurred at the premises or in connection with the carrying out of the activities that has caused, is causing, is likely to cause or has the potential to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies); b) as soon as practicable; and c) as directed by an authorised officer.	**Section 7.3.1**

ID	Condition	DNVIS Reference
E1.1	Work outside standard construction hours - community consultation and agreement The licensee may work outside standard construction hours (as defined in L5.1) in circumstances other than those permitted under conditions L5.3, L5.5, or any other condition of this licence if the Licensee: a) undertakes community consultation and agreement as described in E1.2; b) submits to the EPA a written request to work outside the standard construction hours attaching information set out in E1.3; and c) obtains approval by the EPA to work outside standard construction hours. The EPA may, in exercising its discretion to approve the works outside standard construction hours, review whether the licensee has obtained community agreement. Specifically, whether a substantial majority of the individual Noise Sensitive Receivers who together comprise the Community Affected Catchments and were contacted has consented to the planned works out of standard hours.	NA to this DNVIS.
E1.2	Requirements for community consultation and agreement Any community consultation and agreement undertaken with respect to the proposed out of hours works (OOHW) must: a) be prepared and implemented in accordance with the Interim Construction Noise Guidelines (DEC 2009), the Noise Policy for Industry (EPA, 2017) and AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites; b) include consultation of all noise sensitive receivers within the Community Affected Catchments. This includes Noise Sensitive Receivers that have declined to participate in previous agreements unless a community member has explicitly requested not to be involved in any future consultation about future OOHW; c) ensure that the noise sensitive receivers understand the nature of the works and any predicted impacts, including that consideration is made of additional requirements relevant to the needs of culturally and linguistically diverse Noise Sensitive Receivers, and include details for interpreting services for languages other than English where required. d) include in the community consultations with Noise Sensitive Receivers the following information: i. the actual works proposed; ii. any expected impacts in clear, plain English based on noise modelling; iii. the expected duration of the works; iv. any expected benefits for receivers; v. any other known concurrent OOHW that will be occurring; and vi. any other OOHW that will be occurring on the nights preceding and following the proposed works or, if the proposed work precedes or follows a weekend period, any other OOHW that will be occurring on the weekend. e) request consent from the Noise Sensitive Receiver for their responses to be provided to the EPA; f) ensure that a record is kept when a licensee is unable to contact a noise sensitive receiver after three attempts, including leaving "sorry I missed you" cards explaining the reason for the visit and requesting a return phone call; and g) demonstrate, where the OOHW is predicted to go on longer than 28 calendar days, that the licensee has consulted the community in relation to re-engagement periods for the purpose of determining agreement from the community is maintained and continuing. Detailed records are to be maintained by the licensee of all community consultations, including attempts to contact Noise Sensitive Receivers, and must be maintained for the duration of the licence. Any Noise Sensitive Receiver who requests a copy of the record of conversations must be supplied with one.	NA to this DNVIS.

ID	Condition	DNVIS Reference
E1.3	The licensee must report to the EPA the community consultation and agreement process that was undertaken with the Community Affected Catchments. This report to the EPA must be: a) prepared in writing; b) detail the steps taken to fulfil the requirements of condition E1.2; c) demonstrate that the Noise Sensitive Receivers understood the nature of the works and any predicted impacts, including that consideration was made of additional requirements relevant to the needs of culturally and linguistically diverse Noise Sensitive Receivers; d) provide the script used during the community consultation with Noise Sensitive Receivers; e) report community response and consent rates (including where no contact could be made) against the total community affected catchments, and must be broken down into response and consent rates based on sub-catchments that are delineated by affectation levels; f) include a noise validation monitoring plan as required by E1.4; and g) be submitted to the EPA at least 15 business days prior to any works that are the subject of the agreement being undertaken unless prior arrangements have been made with the EPA. A copy of the report must be: a) kept by the licensee for the duration of this licence including on the premises, and made available to an EPA authorised officer on request; and b) be made available on the licensee's project website or another website approved in writing by the EPA for the duration of the OOHWs permitted under condition E1.1. (Personal details of Noise Sensitive Receivers must be omitted).	NA to this DNVIS.
E1.4	Noise Validation Monitoring A noise validation monitoring plan must be submitted to the EPA for approval as part of the community agreement documentation prior to any OOHW occurring.	NA to this DNVIS.
E1.5	Validation monitoring must be undertaken for any OOHW that are the approved under condition E1.1 and must: a) be undertaken in accordance with the monitoring plan prepared under condition E1.4; b) be performed by a Competent Person; c) be performed on at least the first 2 occasions (day, evening, nights) where OOHW will be undertaken and are likely to impact Noise Sensitive Receivers; d) be performed on any other occasion (day, evening, night) where the nature of the works is likely to cause greater noise impacts than the first 2 occasions; e) be representative of the impacts in terms of monitoring locations, time and duration of measurements; and f) be recorded and provided to an EPA officer upon request.	NA to this DNVIS.
E1.6	If validation monitoring undertaken under Condition E1.5 shows that noise levels are higher than those predicted by any noise modelling undertaken as part of the community agreement, work practices must be modified immediately so that measured noise levels do not exceed predicted levels. Where it has been determined that works cannot be modified to achieve the predicted noise levels: a) the licensee must report immediately to the EPA; and b) after considering the circumstances EPA may withdraw its permission under E1.1.	NA to this DNVIS.
E1.7	Ongoing community engagement and agreement a) For any approval of OOHW under E1.1 predicted to take longer than 28 calendar days to remain valid, the licensee must be able to demonstrate agreement from the community is maintained and continuing. b) To demonstrate agreement from the community is maintained and continuing the licensee must: i. engage the community to determine if a substantial majority of Noise Sensitive Receivers continue to consent to the OOHW pursuant to the re-engagement period determined under condition E1.2(d); ii. provide the EPA with a report within 7 calendar days of the end of each re-engagement period summarising the community response including ongoing consent rates of the Noise Sensitive Receiver; and c) Where the licensee is unable to demonstrate a substantial majority of agreement from Community Affected Catchment is maintained and continuing: i. the licensee must report immediately to the EPA; and ii. after considering the circumstances EPA may withdraw its permission under E1.1	NA to this DNVIS.

ID	Condition	DNVIS Reference
REMMs		
ONV1	An Operational Noise and Vibration Review would be prepared during design to confirm the mitigation measures required to manage: airborne and ground-borne noise impacts from rail operations airborne noise impacts from the stabling and maintenance facility airborne noise impacts from fixed industrial sources, including stations and services facilities The Operational Noise and Vibration Review would consider existing and potential future land use to establish Project Noise Trigger Levels. The EPA would be consulted during preparation of the Operational Noise and Vibration Review.	NA. DNVIS addresses construction impacts only.
NAH6	The following heritage items would be monitored for potential vibration impacts during construction: St Marys Railway Station Group Queen Street Post-War Commercial Building St Marys Munitions Workers Housing McGarvie Smith Farm McMaster Farm	NA to this DNVIS. No vibration intensive works.

3 Existing Noise Environment and Receivers

3.1 Noise Catchment Areas

A total of 12 Noise Catchment Areas (NCAs) were nominated along the alignment of SMWSA Project in the EIS. NCAs are most useful in determining the NMLs for residential receivers as these are based on the measured existing background noise levels in the area.

For Claremont Meadows Shaft, the noise-sensitive receivers within four catchments, NCA03 to NCA06 are most relevant, as such the overview of these NCAs are described in **Table 2** and presented in **Figure 3**.

Table 2 Relevant Noise Catchment Areas

NCA	Description of the Area
NCA03	Predominantly medium density single and multi-storey residential dwellings, with commercial receivers located along Queen Street. Ambient noise conditions are dominated by traffic along the existing heavy rail line through St Marys Station, and traffic along Queen Street.
NCA04	Medium density residential dwellings are grouped around Werrington Station to the north of the project, with Wollemi College and Cobham Detention to the west.
NCA05	Predominantly medium density single and multi-storey residential dwellings. Ambient noise conditions are dominated by traffic along Mamre Road.
NCA06	Predominantly medium density residential dwellings to the east of Gipps Street and south of Caddens Road. Ambient noise conditions are dominated by traffic along M4 Western Motorway and Gipps Street.

Source: NVMP.

Figure 3 Relevant Noise Catchment Areas

Source: VMS.

3.2 Nearest Sensitive Receivers

Receivers have been categorised based on their use as follows:

- Noise-sensitive receivers including:
  - Residential.
  - Commercial.
  - Industrial.
  - Other noise-sensitive receivers.
- Vibration-sensitive receivers including:
  - Residential.
  - Commercial.
  - Industrial.
  - Heritage.
  - Critical working areas (such as operating theatres, labs).
  - Critical utilities.

Receivers potentially impacted by noise and vibration from construction activities have been identified following a detailed land use survey that was completed to address CoA E37.

Following consultation with PLM, VMS was not made aware of any recent developments in the area that would require updates to the land use survey.

On this basis, and with reference to **Appendix B**, the nearest noise-sensitive receivers to the Project site are residences in close proximity to the site including:

- To the west, approximately 40 m from the Site, across Gipps Road and behind a traffic noise barrier that is approximately 3.6 m in height.
- To the east, approximately 240 m from the Site (isolated residence at 2 to 52 Putland Street, Claremont Meadows).

4 Construction Noise Management Levels

4.1 Airborne Noise from Site

The Project-specific Noise Management Levels (NMLs) for noise-sensitive receivers are nominated in the NVMP and are summarised in **Table 3** and consider the construction hours and receiver types relevant only to this DNVIS.

Table 3 Construction Noise Management Levels - Airborne Noise from Site

Receiver	Noise Management Level[1] dBA				
Residential Receivers	**Standard Hours - Day $L_{eq(15minute)}$**	**Out of Hours - Day[2] $L_{eq(15minute)}$**	**Evening[2] $L_{eq(15minute)}$**	**Night[2]**	
				$L_{eq(15minute)}$	L_{max}
NCA03	47	42	42	41	52[3] (65)[4]
NCA04	45	40	37	36	52[3] (65)[4]
NCA05	50	45	45	45	55[3] (65)[4]
NCA06	47	42	37	36	52[3] (65)[4]
Other Sensitive Receivers					
Commercial	70				
Industrial	75				
Child Care Centre	55				
Education	55				
Place of Worship	55				

Note 1: Applied externally for residential receivers and when in use for other sensitive receivers.

Note 2: Standard hours are defined as 7.00 am to 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturday.
OOH Day period is defined as 1.00 pm to 6.00 pm Saturdays.
Evening period is defined as 6.00 pm to 10.00 pm.
Night is defined as 10.00 pm to 7.00 am Monday to Saturday, and until 8.00 am on Sundays and public holidays.

Note 3: Sleep disturbance L_{max} screening level based on 52 dBA or RBL + 15 dB, whichever is the greater.

Note 4: Sleep awakening L_{max} level as per EIS.

In addition to the above, a Highly Noise Affected (HNA) level of $L_{eq(15minute)}$ of 75 dBA is defined by the ICNG as "the point above which there may be strong community reaction to noise" needs to be considered.

4.2 Construction Traffic Noise Criteria

Currently, there is no specific guideline to address the potential increase in the existing overall road traffic noise along the public road network from construction vehicles. In this regard, such noise is assessed with guidance from the RNP and from the CNVS. In the first instance, however, it is noted that the CNVS states the following:

> *"An initial screening test should first be applied by evaluating whether noise levels will increase by more than 2 dBA due to construction traffic or a temporary reroute due to a road closure. Where increases are 2 dBA or less then no further assessment is required."*

This approach is consistent with the NVMP. If the initial screen test shows that exceedances are likely, further assessment will be required considering the base RNP criteria shown in **Table 4**, which summarises the base road traffic noise criteria for the road types that will be utilised.

Both the daytime and night-time criteria are presented in **Table 4** and it should be noted that the daytime period, when considering road traffic noise, is defined as 7.00 am to 10.00 pm and not to 6.00 pm as per on-site noise which considers the NPfI and not the RNP.

It should be noted that the EIS has allowed for night movements to "support" the day works.

Table 4 Construction Traffic Noise Criteria

Road Category	Land Use	Assessment Criteria[1] (dBA)	
		Daytime[2]	Night-time[2]
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments.	$L_{eq(1hour)}$ 55[3]	$L_{eq(1hour)}$ 50[3]
Freeway/arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments.	$L_{eq(15hour)}$ 60[4]	$L_{eq(15hour)}$ 55[4]

Note 1: Applied externally to residential receivers only considering all road traffic noise sources.

Note 2: Daytime is defined as 7.00 am to 10.00 pm, and night-time is defined as 10.00 pm to 7.00 am.

Note 3: Criteria assessed over a 1-hour period during the daytime and night-time periods.

Note 4: Criteria assessed over 15-hour period during the daytime and 9-hour period during the night-time period.

5 Identification of Work Activities

5.1 Site-Related Work Activities

Table 5 provides the L_{Aeq} sound power levels (SWL) from construction plant proposed as part of this DNVIS. These levels are more in line with modern construction plant and are below those referenced in the NVMP.

Considering the scope of works outlined in **Section 2.1**, 15 distinct work activities (WA), defined as a specific construction activity that takes place within a certain assessment period, are determined and presented in **Table 6**.

Worst-case scenarios, where a scenario determines potential noise impacts to a receiver based on one or more activities taking place concurrently on-site, composed of relevant work activities, are developed in consultation with PLM and summarised in **Table 7**. A total of 4 scenarios have been considered.

Table 5 Sound Power Levels of Construction Plant

Plant	Source	SWL (L_{Aeq})
Excavator 20t	VMS database	105
Fans (axial ventilation)	Fantech	96[1]
Forklift	VMS database	106
Franna	CNVG - PTI	98
Gantry Crane (Electric)	OHE SBT DNVIS	96
Light Vehicle Movement On-site (< 20 km/hr)	OHE SBT DNVIS	89
Semi-Trailer moving on-site (< 20 km/hr)	VMS database	105
Telehandler	VMS database	106
Water pump	VMS database/PLM	84
Concrete Pump	VMS Database	105
Concrete Truck	VMS Database	105

Note 1: Includes reduction from inlet and outlet attenuator and an assumed 80% operating capacity.

Table 6 Work Activities

Work Activity ID	Description	Assessment Period	Works as Scheduled (Indicative)	Concurrently Operating Plant
WA1	Ventilation	All	January 2025 to January 2027	4 x Fans (including attenuators)
WA2	Laydown (Moving Materials/Unloading)	Standard Hours	January 2025 to January 2027	1 x 20t Excavator 2 x Telehandler 1 x Franna
WA3		OOH Day		1 x Forklift/Telehandler
WA4		Evening		
WA5		Night		
WA6	Gantry Crane and Shaft	All	January 2025 to January 2027	1 x Gantry Crane (electric)
WA7	Compound Use (Light Vehicles)	Standard Hours	January 2025 to January 2027	10 x Light Vehicles in 15 min
WA8		OOH Day		4 x Light Vehicles in 15 min
WA9		Evening		2 x Light Vehicles in 15 min
WA10		Night		
WA11	Compound Use (Heavy Vehicles)	Standard Hours	January 2025 to January 2027	2 x Heavy Vehicles in 15 min
WA12		OOH Day		1 x Heavy Vehicles in 15 min
WA13		Evening		
WA14		Night		
WA15	Water Treatment Plant (WTP)	All	January 2025 to January 2027	4 x Water Pumps
WA16	Concreting	Standard Hours	January 2025 to January 2027	4 x Concrete Trucks in 15 min 2 x Concrete Pumps
WA17		OOH Day	January 2025 to January 2027	2 x Concrete Trucks in 15 min 1 x Concrete Pump
WA18		Evening	January 2025 to January 2027	2 x Concrete Truck in 15 min 1 x Concrete Pump
WA19		Night	January 2025 to January 2027	1 x Concrete Truck in 15 min 1 x Concrete Pump

Table 7 Worst-Case Scenarios

Scenario ID	Assessment Period	Relevant Work Activity
S1	Standard Hours	WA1, WA2, WA6, WA7, WA11, WA15, WA16
S2	OOH Day	WA1, WA3, WA6, WA8, WA12, WA15
S3	OOH Day	WA1, WA8, WA15, WA17
S4	Evening	WA1, WA4, WA6, WA9, WA13, WA15
S5	Evening	WA1, WA9, WA15, WA18
S6	Night	WA1, WA5, WA6, WA10, WA14, WA15
S7	Night	WA1, WA10, WA15, WA19

6 Construction Noise Assessment

6.1 Noise from On-Site Construction

Predictions of airborne noise have been undertaken using iNoise V2024.2 and include the following main inputs:

- Ground and air absorption.
- Natural shielding from topographical data obtained from SixMaps.
- Shielding from buildings (on-site and off-site).
- Noise barriers as follows:
  - 3 m high solid barrier constructed from plywood, along the Gipps Street eastern Site boundary.
  - 3 m high solid barrier constructed from plywood + 2 m high noise blankets (equating to a total height of 5 m), along the Gipps Street eastern Site boundary.
  - 3.6 m high solid acoustic barrier along the western boundary of the residential receivers fronting Gipps Street, and a 1.8 m solid barrier around the corner and fronting Great Western Highway for the same receivers.

Typical construction octave band spectrum adjusted to consider the work activities as per **Table 6**.

With consideration of the scenarios outlined in **Table 7** and the above inputs, **Table 8** to **Table 11** provide a summary of the highest predicted $L_{Aeq(15minute)}$ noise levels for each noise-sensitive receiver type within each identified NCA for Standard Hours, OOH Day periods, Evening periods, and Night periods, respectively.

Table 8 Summary of Predicted Noise from On-Site Construction - Standard Hours

Receiver Type	NML $L_{eq(15minute)}$ dBA	Predicted[1] Airborne Noise $L_{eq(15minute)}$ dBA
		Scenario 1
NCA03		
Residential	47	37
Commercial	70	38
Place of Worship	55	<30
Education	55	37
NCA04		
Residential	45	44
Commercial	70	61
Education	55	53
NCA05		
Residential	50	43
Commercial	70	43
Industrial	75	<30
Place of Worship	55	<30
Child Care Centre	55	37
Education	55	37
NCA06		
Residential	47	**61**
Commercial	70	60
Industrial	75	41
Child Care Centre	55	40
Education	55	40

Note 1: Bolded number indicates exceedance of the NML.

Table 9 Summary of Predicted Noise from On-Site Construction - OOH Day

Receiver Type	NML $L_{eq(15minute)}$ dBA	Predicted[1] Airborne Noise $L_{eq(15minute)}$ dBA	
		Scenario 2	Scenario 3
NCA03			
Residential	42	<30	30
Commercial	70	30	31
Place of Worship	55	<30	<30
Education	55	<30	<30
NCA04			
Residential	40	36	36
Commercial	70	54	52
Education	55	45	47
NCA05			
Residential	45	35	36
Commercial	70	35	36
Industrial	75	<30	<30
Place of Worship	55	<30	<30
Child Care Centre	55	<30	30
Education	55	<30	<30
NCA06			
Residential	42	**47**	**47**
Commercial	70	52	51
Industrial	75	32	32
Child Care Centre	55	31	32
Education	55	31	32

Note 1: Bolded number indicates exceedance of the NML.

Table 10 Summary of Predicted Noise from On-Site Construction - Evening

Receiver Type	NML $L_{eq(15minute)}$ dBA	Predicted[1] Airborne Noise $L_{eq(15minute)}$ dBA	
		Scenario 4	Scenario 5
NCA03			
Residential	42	<30	30
Commercial	70	<30	31
Place of Worship	55	<30	<30
Education	55	<30	<30
NCA04			
Residential	37	35	36
Commercial	70	52	52
Education	55	44	47
NCA05			
Residential	45	34	36
Commercial	70	34	36
Industrial	75	<30	<30
Place of Worship	55	<30	<30
Child Care Centre	55	<30	30
Education	55	<30	<30
NCA06			
Residential	37	**46**	**47**
Commercial	70	51	51
Industrial	75	31	32
Child Care Centre	55	30	32
Education	55	30	32

Note 1: Bolded number indicates exceedance of the NML.

Table 11 Summary of Predicted Noise from On-Site Construction - Night

Receiver Type	NML $L_{eq(15minute)}$ dBA	Predicted[1] Airborne Noise $L_{eq(15minute)}$ dBA	
		Scenario 6	Scenario 7
NCA03			
Residential	41	<30	<30
Commercial	70	<30	31
Place of Worship	55	<30	<30
Education	55	<30	<30
NCA04			
Residential	36	35	36
Commercial	70	52	52
Education	55	44	46
NCA05			
Residential	45	34	35
Commercial	70	34	36
Industrial	75	<30	<30
Place of Worship	55	<30	<30
Child Care Centre	55	<30	30
Education	55	<30	<30
NCA06			
Residential	36	**46**	**46**
Commercial	70	51	51
Industrial	75	31	31
Child Care Centre	55	30	32
Education	55	30	32

Note 1: Bolded number indicates exceedance of the NML.

The following can be concluded from **Table 8** to **Table 11**.

- No exceedances above 75 dBA (HNA) have been predicted.
- Other than residential receivers, no exceedances above the NML have been predicted.
- Exceedances above the NML have been predicted for only residential receivers within NCA06 for:
  - Construction scenario S1, taking place during the Standard Hours assessment periods, with exceedances up to 14 dB.
  - Construction scenarios S2 and S3, taking place during the OOH Day assessment periods, with exceedances up to 5 dB.
  - Construction scenarios S4 and S5, taking place during the Evening assessment periods, with exceedances up to 9 dB and 10 dB respectively.
  - Construction scenarios S6 and S7, taking place during the Night assessment periods, with exceedances up to 10 dB.

Based on the above, all SMMs and all reasonable and feasible mitigation measures which could reduce noise impacts are to be considered for residential receivers located within NCA06, after which, if necessary, Additional Mitigation Measures (AMMs) shall be applied to further manage impacts.

6.2 Sleep Disturbance from On-Site Construction

The risk of potential sleep disturbance, as a result of night works, is assessed in accordance with the CNVS. In consideration of the noise impact predictions presented in **Table 11**, it is evident that if certain scenarios occur during the night, exceedances of the sleep disturbance screening criteria are predicted, and further analysis is necessary.

After analysis, and assuming an 8 dB conversion from L_{eq} to L_{max} for typical construction events, the following is noted:

- Maximum noise levels above the sleep awakening level of L_{max} 65 dBA are not predicted to occur externally at any residential receiver.
- Maximum noise levels above the sleep disturbance screening level of L_{max} 52 dBA are predicted to occur externally at one (1) residential receiver within NCA06 due to scenarios S6 and S7 where the predicted sleep disturbance screening noise level exceeds by 2 dB at the first storey of 5 Dolphin Close, Claremont Meadows.
- The controlling noise sources were identified to be the use of the gantry crane and the northern laydown area within scenario S6, and the use of the concrete pump and concrete truck within scenario S7.
- Based on the above and considering the NVMP, to achieve noise levels below the sleep disturbance trigger levels, the following is recommended:
  - Do not undertake scenarios 6 and 7 during the night-time, **or**;
  - Consider feasible and reasonable mitigation measures as per **Table 14**.

6.3 Construction Traffic along the Public Road Network

Construction traffic in and out of the Site will be managed by allowing heavy vehicles access via a signalised intersection at Sunflower Drive and Gibbs Street. Light vehicle access will be along Puntland Street and Reserve Road via a signalised intersection at Great Western Highway.

Figure 4 shows an aerial view of these roads, including the location of the Site.

Figure 4 Construction Traffic Routes on the Public Road Network

Source: VMS.

As advised by PLM, a low number of movements are expected and, on this basis, the following nearby roads may be impacted:

- Gibbs Street (to/from Great Western Highway).
- Gibbs Street (to/from M4).
- Great Western Highway.
- M4.
- Puntland Street.
- Reserve Road.

Construction vehicle movements have been determined following discussion with PLM considering movements within a typical worst-case 15 minute period. This is overly conservative as it assumes that each and every 15 minute period include typical worst-case movements, which will not be the case.

Nonetheless, the above conservative approach has been assessed given that more detailed information is not available. On this basis, no other conservative corrections have been made.

Where available, construction vehicle movements are compared against existing traffic movements for 2023/2024 as outlined in the EIS.

Considering the roads as identified in **Section 6.3**, and the low volumes from the Site, an assessment along both the Great Western Highway and M4 (both categorised as "freeway/arterial/sub-arterial roads" considering traffic noise criteria) is unnecessary. The increase from such a small number of movements would lead to insignificant changes to the noise from these roads.

Based on the above, the following roads will be assessed:

- Gibbs Street - categorised as "freeway/arterial/sub-arterial road" considering traffic noise criteria.
- Puntland Street - categorised as "local road" considering traffic noise criteria.
- Reserve Road - categorised as "local road" considering traffic noise criteria.

Using the TfNSW Construction Road Traffic Noise Estimator (Noise Estimator) and with consideration of the existing and additional construction traffic volumes, the predicted increase in noise level for Gibbs Street is presented in **Table 12**. Existing traffic volumes along Puntland Street or Reserve Road are not contained in the EIS and so the Noise Estimator has been used to predict noise levels from the road closest to the nearest (and only) resident in the area, this being Putland Street and 2 to 52 Putland Street. A summary of the predicted levels is shown in **Table 13**.

Table 12 Summary of Predicted Construction Traffic Noise Increase

Vehicle Type	Existing Traffic Volumes		Construction Traffic Volumes		Increase in Noise Level (dB)	
	Daytime[1]	Night-time[1]	Daytime[1]	Night-time[1]	Daytime[1]	Night-time[1]
Gibbs Street[2]						
Heavy	1,298	115	104[3]	36[3]	< 0.5	< 0.5

Note 1: Daytime is defined as 7.00 am to 10.00 pm and night-time is defined as 10.00 pm to 7.00 am.

Note 2: Counts for Kent Road (north of M4) used.

Note 3: Conservatively assumed all construction vehicles travel either north to Great Western Highway or south to M4.

As presented in **Table 12**, additional construction traffic is not predicted to increase traffic noise levels by more than 2 dB at the assessed roads and, therefore, compliant with the requirements of the RNP and CNVS.

Table 13 Summary of Predicted Construction Traffic Noise

Vehicle Type	Existing Traffic Volumes		Construction Traffic Volumes		Noise Level (dBA)	
	Daytime[1]	Night-time[1]	Daytime[1]	Night-time[1]	Daytime[1]	Night-time[1]
Puntland Street						
Light	NA	NA	30[2]	30[2]	< 45	< 45

Note 1: Daytime is defined as 7.00 am to 10.00 pm and night-time is defined as 10.00 pm to 7.00 am.

Note 2: Typical worst-case hour during a shift change.

Table 13 shows that the predicted noise level from light vehicle movements associated with construction to be at least 5 dB below the assessment criteria and, therefore, compliant with the requirements of the RNP and CNVS.

7 Mitigation Measures

In the first instance, all feasible and reasonable mitigation measures to reduce impacts will be assessed. These are considered SMMs, where mitigations will be applied at the source and/or the path to reduce noise levels. Site-specific mitigation measures have also been considered.

Following this and in the event of residual exceedances, mitigation measures to manage the impacts will be implemented following the process outlined in the CNVS.

Guidance is also sought from the ICNG when considering mitigation.

7.1 Standard Mitigation Measures

The following SMMs have been assessed by PLM following consideration of whether reasonable and feasible and will be implemented:

- Selection of quieter plants and processes to reduce noise.
- Non-tonal reversing alarms or equivalent are to be used on all plant that will regularly be used on site.
- PLM will take all reasonable steps to communicate with the proponents of other nearby works sites to minimise cumulative acoustic impacts where there is a risk that other construction projects are impacting the same receivers.
- Site induction, including, at minimum, all relevant project-specific noise mitigation measures and high-risk activities.
- Use of two-way radios for communication, no shouting or use of horns.
- Consultation with affected receivers as per CCS will be ongoing.
- Notification and complaint management as per L5.4 and in line with CCS.
- As required by the EPL, the implementation of any respite periods must consider any neighbouring concurrent construction works which may impact the same noise-sensitive receivers such that respite periods, if required, are being achieved as much as is reasonably practicable.
- Noise monitoring for periods predicted to have the highest noise level impacts as required by the EPL.
- Scheduling noisier works during the least noise-sensitive time periods.

Following the implementation of the SMMs, remaining predicted exceedances of the NMLs are managed through the implementation of AMMs as per the CNVS.

7.2 Site Specific Mitigation Measures

- Use of localised, solid and continuous barriers to reduce noise impacts. This includes the following barriers:
  - 3 m high solid barrier constructed from plywood, along the Gipps Street eastern Site boundary.
  - 3 m high solid barrier constructed from plywood + 2 m high noise blankets (equating to a total height of 5 m), along the Gipps Street eastern Site boundary.
  - 3.6 m high solid acoustic barrier along the western boundary of the residential receivers fronting Gipps Street, and a 1.8 m solid barrier around the corner and fronting Great Western Highway for the same receivers.
- Subject to performance requirements, the ventilation fans are to incorporate inlet and outlet silencers.
- Where feasible, ventilation fans to incorporate speed controllers.

7.2.1 Sleep Disturbance

Sleep disturbance impacts could be managed with the implementation feasible and reasonable measures presented in **Table 14**.

Table 14 Sleep Disturbance Mitigation Measures

Item	Mitigation Measure	Feasible	Reasonable	Project Implementation
7.2.1.1	For scenario S6, do not utilise the laydown area at the same time as the gantry crane is in operation within the same 15-minute period	Yes	No	Not reasonable as only **one single receiver** is affected by a **2 dB exceedance** which, based on scientific evidence, is considered a **minor impact** that is not discernible to the average person. The overall noise benefits do not outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measures and the project timeline, considering it is a minor 2 dB exceedance at one single receiver.
7.2.1.2	For scenario S7, partially enclose the concrete pump	Yes	No	
7.2.1.3	For scenario S7, install canopy or loaded vinyl along concrete pump intake	Yes	No	
7.2.1.4	For scenarios S6 and S7, consult with the one single receiver impacted at 5 Dolphin Close, as required	Yes	Yes	PLM to undertake when scenarios 6 and 7 are proposed to occur.
7.2.1.5	For scenarios S6 and S7, measure the range of maximum noise levels L_{max} and compare its arithmetic average against the assumed 8 dB conversion from L_{eq} to L_{max} for typical construction events	Yes	Yes	PLM to implement.

7.3 Additional Mitigation Measures

In line with the CNVS, AMMs for airborne noise will be provided based on the exceedance above the NML.

The description of each AMM in accordance with CNVS is reproduced in **Table 15**. The CNVS identifies the level of impact which triggers consideration of each measure. Refer to **Table 16** regarding Airborne Noise AMMs applicable for this Site.

During the planning of the works, the Community Liaison Team will liaise with the Project Team for the implementation of the selected measures following an assessment of the feasibility and reasonableness of each measure. The objective of these measures is to engage, inform, and provide Project-specific messages to the community, recognising that advanced warning of potential disruptions can assist in reducing the impact.

Table 15 Additional Mitigation Measures

Measure	Description
Alternative Accommodation (AA)[1]	Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts over an extended period of time. Alternative accommodation will be determined on a case-by-case basis.
Monitoring (M)	Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented.
Individual briefings (IB)	Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives from the contractor would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project.
Letter box drops (LB)	For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template.
Project specific respite offer (RO)[1]	The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise or vibration respite from an ongoing impact.
Phone calls and emails (PC)	Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within 7 days of proposed work. Phone calls and/or emails provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc.
Specific notifications (SN)	Specific notifications would be letterbox dropped or hand distributed to identified stakeholders no later than 7 days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works.

Note 1: Measures typically reserved for residential properties.

The number of receivers where NMLs are exceeded is provided in **Table 17** to **Table 20**.

Considering worst-case noise scenarios, and with reference to **Table 16**, the following exceedance categories are triggered during each of the assessment periods:

- Standard Hours - 11 to 20 dBA above NML
- OOH Day periods - 1 to 10 dBA above NML
- Evening periods - 1 to 10 dBA above NML
- Night periods - 1 to 10 dBA above NML

To inform the Communications Team, worst-case exceedance categories for each assessment period are provided graphically in **Appendix C**, and corresponding exceedance categories for each scenario are provided in **Appendix D** for each receiver where noise levels exceed the NML.

Table 16 AMM Matrix - Airborne Construction Noise

Time Period		Additional Mitigation Measures			
		Predicted $L_{Aeq(15minute)}$ Noise Level Above NML			
		1 to 10 dB	11 to 20 dB	21 to 30 dB	>30 dB
OOH (Evening)[1]	Mon-Fri (6.00 pm - 10.00 pm)	LB	LB, M	LB, M, SN, RO	LB, M, SN, IB, PC, RO
	Sat (1.00 pm - 10.00 pm)				
	Sun/Pub Hol (8.00 am - 6.00 pm)				
OOH (Night)	Mon-Fri (10.00 pm - 7.00 am)	LB	LB, M, SN, RO	LB, M, SN, IB, PC, RO, AA	LB, M, SN, IB, PC, RO, AA
	Sat (10.00 pm - 8.00 am)				
	Sun/Pub Hol (6.00 pm - 7.00 am)				

Note 1: Inclusive of OOH Day (1.00 pm to 6.00 pm Saturdays).

Table 17 Number of Receivers Where NMLs are Exceeded - Standard Hours

Scenario	Number of Receivers Where Construction NMLs Are Exceeded and AMM Category															
	1 to 10 dB				11 to 20 dB				21 to 30 dB				> 30 dB			
	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06
S1	0	0	0	123	0	0	0	5	0	0	0	0	0	0	0	0

Table 18 Number of Receivers Where NMLs are Exceeded - OOH Day

Scenario	Number of Receivers Where Construction NMLs Are Exceeded and AMM Category															
	1 to 10 dB				11 to 20 dB				21 to 30 dB				> 30 dB			
	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06
S2	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
S3	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0

Table 19 Number of Receivers Where NMLs are Exceeded - Evening

Scenario	Number of Receivers Where Construction NMLs Are Exceeded and AMM Category															
	1 to 10 dB				11 to 20 dB				21 to 30 dB				> 30 dB			
	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06
S4	0	0	0	85	0	0	0	0	0	0	0	0	0	0	0	0
S5	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0	0

Table 20 Number of Receivers Where NMLs are Exceeded - Night

Scenario	Number of Receivers Where Construction NMLs Are Exceeded and AMM Category															
	1 to 10 dB				11 to 20 dB				21 to 30 dB				> 30 dB			
	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06	NCA03	NCA04	NCA05	NCA06
S6	0	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0
S7	0	0	0	119	0	0	0	0	0	0	0	0	0	0	0	0

7.3.1 Noise Monitoring

Although verification monitoring is not triggered as part of the AMMs in this DNVIS, where required, noise monitoring shall be undertaken by suitably qualified persons in accordance with *Section 5.1* of the *Noise and Vibration Monitoring Program* (within the *Noise and Vibration Management Sub-Plan Appendices*) in order to confirm that the noise levels in the community are consistent with the predictions in this DNVIS, and that appropriate mitigation is in place or otherwise may be required.

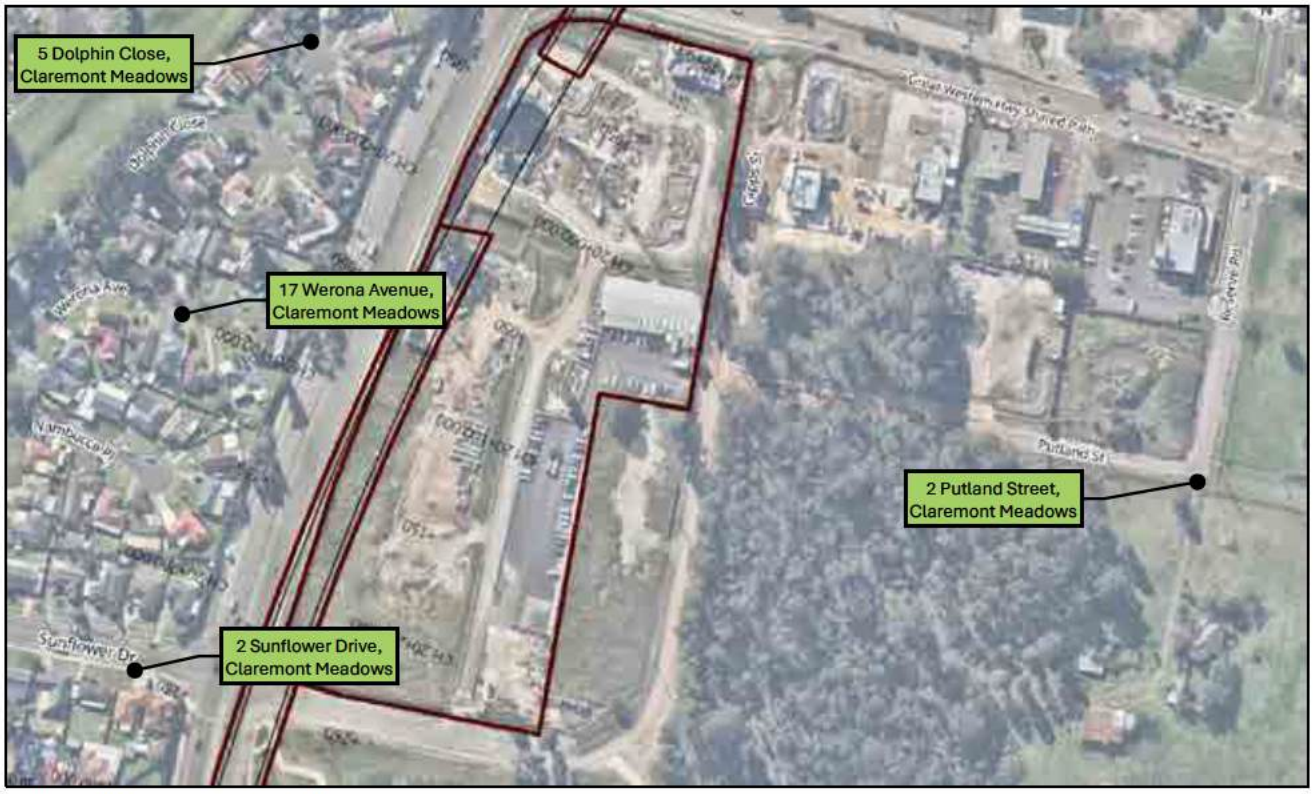
Operator attended measurements are preferred and are to be undertaken at the nearest and/or highest noise impacted sensitive receivers at the time of the survey. Measurements will be required to be undertaken at a height representative of the worst noise-impacted point within the receiver (ground level, first storey, etc.).

During the survey, and to assist in monitoring compliance, the L_{90}, L_{10}, L_{eq} and L_{max} noise descriptors are to be recorded. Notes and photos to confirm noise events associated with the works or otherwise (such as local noise sources) should be taken where permitted.

Alternatively, unattended monitoring may be undertaken which shall include real-time monitoring data (with real-time alerts if required). Monitors are to be installed at locations representative of highest potential noise impacts. Such locations may fall within private land and therefore the final location(s) are to be determined based on suitability and permission to access private land.

With consideration to the above, indicative noise monitoring locations are presented in **Figure 5**.

Figure 5 Indicative Noise Monitoring Locations



Source: PLM (marked-up by VMS)

7.3.2 Operator-Attended Plant and Equipment Noise Audits

To confirm compliance with the sound power levels presented in **Table 5**, operator-attended noise measurements will be undertaken as defined in the NVMP.

During the measurements, it is also recommended to capture the range of maximum noise levels L_{max} and compare its arithmetic average against the L_{eq}. This difference can be compared against the assumed 8 dB from L_{eq} to L_{max} for typical events.

8 Conclusion

A Detailed Noise and Vibration Impact Assessment for the proposed construction works related to Claremont Meadows Shaft associated with the Sydney Metro Western Sydney Airport (Stations, Systems, Trains, Operations and Maintenance package) has been undertaken by VMS Australia Pty Ltd.

Considering worst-case construction noise scenarios, the assessment concludes the following:

- No exceedances above the highly affected noise level of L_{eq} 75 dBA have been predicted.
- Impacts associated with airborne construction noise from Site works are predicted to exceed NMLs for residential receivers only within NCA06. Considering worst-case noise scenarios:
    - Exceedances up to 14, 5, 10 and 10 dB have been predicted during the Standard Hours, OOH Day periods, Evening periods and Night periods, respectively.
- Noise impacts are to be managed with the implementation of Standard Mitigation Measures as detailed in **Section 7.1** and Site Specific Mitigation Measures as per **Section 7.2**.
- Sleep disturbance impacts could be effectively managed by implementing the proposed mitigation measures presented in **Section 7.2.1.**
- Remaining predicted exceedances following the implementation of Standard Mitigation Measures may be effectively managed through the implementation of Additional Mitigation Measures as per the CNVS as detailed in **Section 7.3**.
- Construction traffic noise along the public road network is considered to be negligible and compliant with the requirements of the RNP and CNVS.

Appendix A

Acoustic Terminology

Abbreviations and Terminology

Term/Acronym	Definition
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
AMM	Additional Mitigation Measures.
AS	Australian Standard.
A-weighting	A frequency dependent filter applied to an instrument-measured noise. In its simplest form, the filter is designed to replicate the relative sensitivity to loudness perceived by the human ear.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{A90} noise level.
Barrier	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
CEMP	Construction Environmental Management Plan.
CNVS	Sydney Metro Construction Noise and Vibration Standard.
CoA	Conditions of Approval.
Condition	Planning Minister's Condition of Approval.
Construction	Includes all physical work required to construct the Project, as defined in the CoA including commissioning trials of equipment and temporary use of any part of the Project.
CR	Complaints Register.
dBA	A-weighted decibels is an expression of the relative loudness of sounds in the air as perceived by the human ear.
DNVIS	Detailed Noise and Vibration Impact Statement.
EIS	Environmental Impact Statement.
EM	Environment Manager.
EMS	Environmental Management System.
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings.
EPA	NSW Environment Protection Authority.
EPL	Environment Protection License.
ER	The independent Environmental Representative appointed under the Project Planning Approval.
Feasible and Reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Engineering considerations and what is practical to build. Reasonable Feasible relates to relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.
Frequency	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz). Most noise sources typically comprise of a vast, and often complex, range of frequencies.
HNA	Highly Noise Affected.
Heavy Vehicle	Has the same meaning as in the Heavy Vehicle National Law.
ICNG	Interim Construction Noise Guideline (EPA, 2009).
L_{Aeq}	The equivalent continuous sound pressure level in dBA. It is often accompanied by an additional suffix "T", which is indicative of the measurement time period. (e.g. $L_{Aeq,15minute}$, symbolising the measurement is evaluated over 15-minutes).
Land	Has the same meaning as the definition of the term in section 1.4 of the EP&A Act.
NCA	Noise Catchment Area.
Negligible	Small and unimportant, such as to be not worth considering.
NML	Noise Management Level
NPfI	Noise Policy for Industry (EPA, 2017).

Appendix A

Acoustic Terminology

Term/Acronym	Definition
Operator	The principal construction contractor responsible for delivering the Project.
Parklife Metro	Consortium comprising entities of Plenary, Siemens, RATP Dev and Webuild as the Applicant for the Sydney Metro Western Sydney Airport SSTOM Package.
Parklife Metro D&C	Parklife Metro Design and Construct. Consists of Webuild S.P.A, Siemens Mobility Pty Ltd and Richard Crookes Constructions Pty Ltd. Responsible for the construction of SSTOM Works.
Peak Particle Velocity	The peak particle velocity (PPV) is the most accepted and used indicator of vibration levels. Most regulations and standards prescribe vibrations thresholds in terms of the PPV. For each recorded waveform, the maximum particle velocity over the total recorded time is regarded as the peak particle velocity. This type of particle velocity must not be confused with the velocity with which the wave propagates through the medium. PPV is typically measured in the units of mm/s.
RBL	The Rating Background Level for each period is the medium value of the Assessment Background Level values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night).
REMM	Revised Environmental Management Measures.
Residence	Existing or approved dwelling.
Reverberation	The persistence of a sound within a space, which will naturally decay over time. Most apparent once the source signal has ceased emitting. Reverberation may have effects on speech intelligibility if not adequately controlled. Reverberation time, represented in seconds, can vary depending on the volume and surface finishes of the space.
RMS	NSW Roads and Maritime Services.
RNP	NSW Road Noise Policy (EPA ,2011).
Rw	Weighted sound reduction index. A single number value which represents the airborne sound insulation performance of a partition or building element that has been determined under laboratory testing conditions.
Sensitive Periods	Period of time determined in consultation with affected sensitive receiver.
Sensitive Receiver	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching), active recreation areas (including parks and sports grounds).Receivers that may be considered to be sensitive include commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, and retail spaces) and industrial premises, and others as identified by the Secretary.
Sound Power Level	The Sound Power Level is the sound power relative to a standard reference pressure of 1 picowatt (pW) or 10^{-12} watts. Unlike sound pressure, sound power is neither room-dependent nor distance-dependent. The SWL of a simple point source may be used to calculate the SPL at a given distance (r) using the following formula: $SPL = SWL - 10 \times Log_{10}(4 \times \pi \times r^2)$ Note that the above formula is only valid for sound propagation in the free-field.
Spectrum	The spectrum is the result of transforming a time domain signal to the frequency domain. Spectrum analysis is the procedure of doing the transformation, and it is most commonly done with an FFT analyser.
SSTOM	Stations, Systems, Trains, Operations and Maintenance.
TfNSW	Transport for New South Wales.
the Project	Sydney Metro Western Sydney Airport.
VDV	Vibration Dose Value.
VMS	VMS Australia Pty Ltd.
Works	All physical activities to construct the Project.

Appendix B

Land Use Survey

Legend

Site Area
- Surface
- Tunnel
- NCA
- Indicative Project footprint

Building Usage
- Residential
- Commercial
- Child Care Centre
- Commercial Recreational
- Education
- Industrial
- Place of Worship
- Shed
- Heritage

NCA04

NCA06

1 2 3 4

Project No.:	21239.1
Date:	01/11/2024
Drawn by:	FA
Scale:	1:5,578.064571
Sheet Size:	@A3
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Land Usage

VMS AUSTRALIA
T: 1800 867 000
E: info@vms.com.au
www.vms.com.au

Legend

Site Area
- Surface
- Tunnel
- NCA
- Indicative Project footprint

Building Usage
- Residential
- Commercial
- Child Care Centre
- Commercial Recreational
- Education
- Industrial
- Place of Worship
- Shed
- Heritage

NCA01
NCA02
NCA03
NCA04
NCA05
NCA06

1
2
3
4

Project No.:	21239.1
Date:	01/11/2024
Drawn by:	FA
Scale:	1:5,578.064571
Sheet Size:	@A3
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Land Usage

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Legend

Site Area
- Surface
- Tunnel
- NCA
- Indicative Project footprint

Building Usage
- Residential
- Commercial
- Child Care Centre
- Commercial Recreational
- Education
- Industrial
- Place of Worship
- Shed
- Heritage

NCA04

NCA06

NCA05

NCA08

Project No.:	21239.1
Date:	01/11/2024
Drawn by:	FA
Scale:	1:5,578.064571
Sheet Size:	@A3
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Land Usage

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Legend

Site Area
- Surface
- Tunnel
- NCA
- Indicative Project footprint

Building Usage
- Residential
- Commercial
- Child Care Centre
- Commercial Recreational
- Education
- Industrial
- Place of Worship
- Shed
- Heritage

NCA03

NCA05

NCA06

NCA08

Project No.:	21239.1
Date:	01/11/2024
Drawn by:	FA
Scale:	1:5,578.064571
Sheet Size:	@A3
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Land Usage

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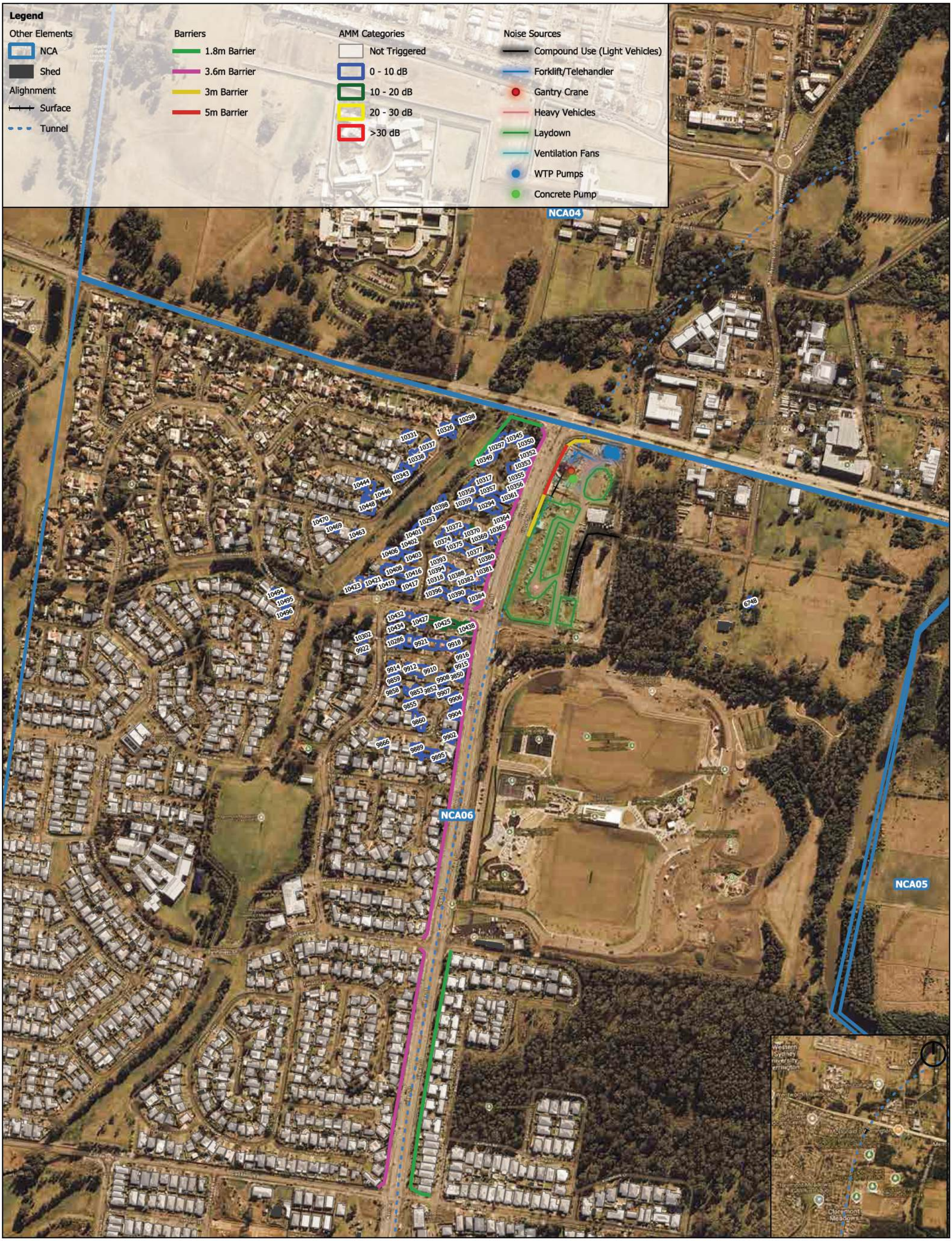
Appendix C

Airborne Noise Additional Mitigation Measure Maps



Project No.:	21239.1
Date:	23/04/2025
Drawn by:	FA
Scale:	1:5,656
Sheet Size:	@A4
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Construction Airborne Noise Assessment
Additional Mitigation Measures

Assessment Scenario: Worst Case Standard Hours

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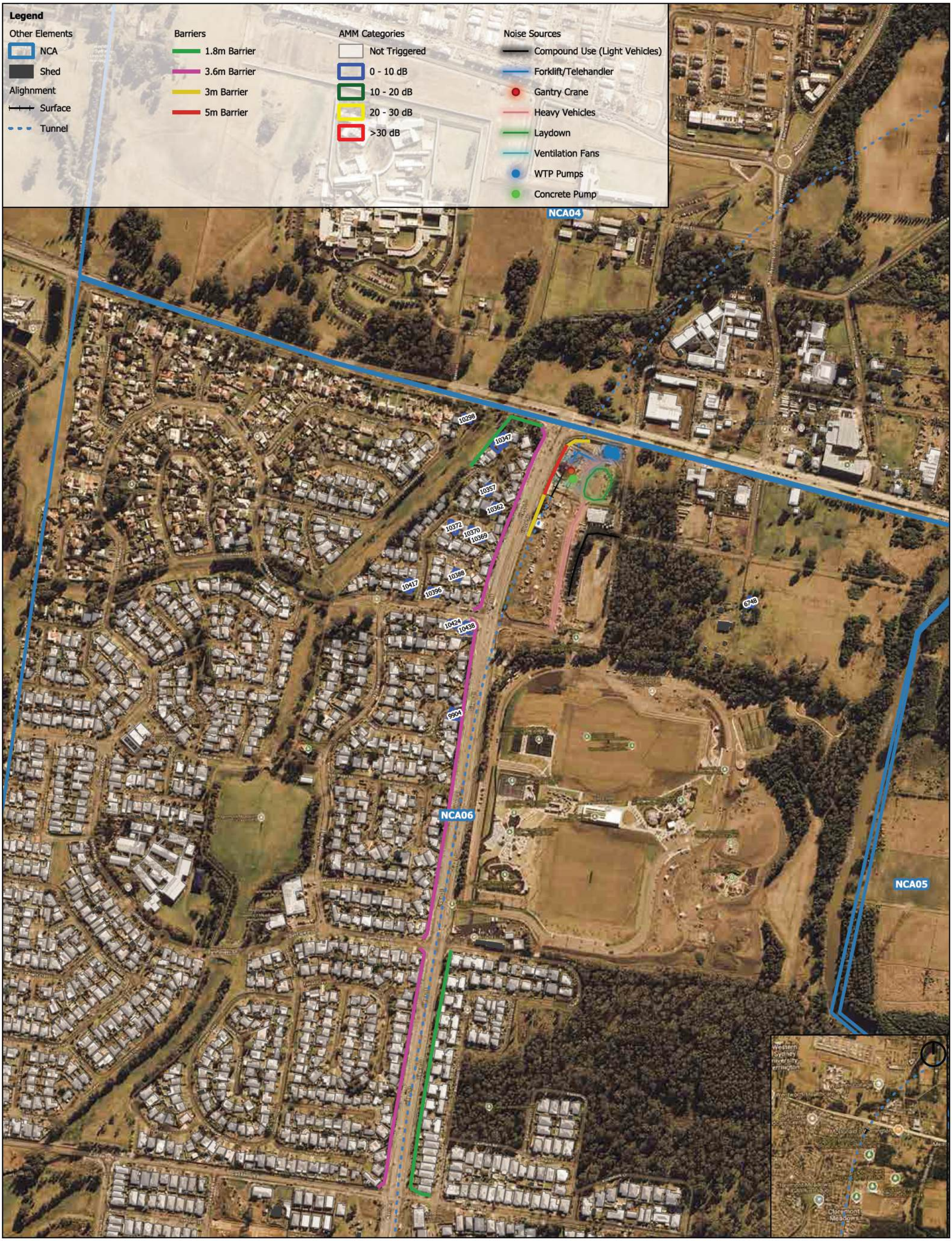

Project No.:	21239.1
Date:	23/04/2025
Drawn by:	FA
Scale:	1:5,656
Sheet Size:	@A4
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Construction Airborne Noise Assessment
Additional Mitigation Measures

Assessment Scenario: Worst Case OOH Day

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Legend

Other Elements
- NCA
- Shed

Alignment
- Surface
- Tunnel

Barriers
- 1.8m Barrier
- 3.6m Barrier
- 3m Barrier
- 5m Barrier

AMM Categories
- Not Triggered
- 0 - 10 dB
- 10 - 20 dB
- 20 - 30 dB
- >30 dB

Noise Sources
- Compound Use (Light Vehicles)
- Forklift/Telehandler
- Gantry Crane
- Heavy Vehicles
- Laydown
- Ventilation Fans
- WTP Pumps
- Concrete Pump

NCA04

NCA06

NCA05

Project No.:	21239.1
Date:	23/04/2025
Drawn by:	FA
Scale:	1:5,656
Sheet Size:	@A4
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Construction Airborne Noise Assessment
Additional Mitigation Measures

Assessment Scenario: Worst Case OOH Evening

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Legend

Other Elements
- NCA
- Shed

Alignment
- Surface
- Tunnel

Barriers
- 1.8m Barrier
- 3.6m Barrier
- 3m Barrier
- 5m Barrier

AMM Categories
- Not Triggered
- 0 - 10 dB
- 10 - 20 dB
- 20 - 30 dB
- >30 dB

Noise Sources
- Compound Use (Light Vehicles)
- Forklift/Telehandler
- Gantry Crane
- Heavy Vehicles
- Laydown
- Ventilation Fans
- WTP Pumps
- Concrete Pump

NCA04

NCA06

NCA05

Project No.:	21239.1
Date:	23/04/2025
Drawn by:	FA
Scale:	1:5,656
Sheet Size:	@A4
Projection:	GDA94 / MGA zone 56

0 100 200 m

SSTOM: Claremont Meadows Shaft

Construction Airborne Noise Assessment
Additional Mitigation Measures

Assessment Scenario: Worst Case OOH Night

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Appendix D

Receivers with Predicted Levels Above Noise Management Levels Requiring Additional Mitigation Measures

Building ID	Address	Usage	NCA	Predicted Noise Levels Where Construction NMLs are Exceeded and AMM Category, dBA																											
				AMM Category 0 to 10 dB							AMM Category 10 to 20 dB							AMM Category 20 to 30 dB							AMM Category > 30 dB						
				S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7
6748	2-52 Putland St, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	44	-	43	41	43	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9786	14 San Diego St, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9844	12 Thoar Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9850	9 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9852	7 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9853	6 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9854	6 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9855	5 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	40	38	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9858	12 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9859	10 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9860	4 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9863	2 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9866	19 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	39	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9878	33 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9887	18 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9889	16 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9894	15 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9895	14 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9902	12 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9904	10 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	43	41	43	41	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9905	10 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9906	9 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9907	8 Mundowie Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9908	10 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	38	40	38	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9910	11 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	-	39	37	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9911	12 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	39	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9912	14 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9914	8 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	40	38	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9915	8 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9916	7 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	39	42	39	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9918	6 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	38	40	38	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9919	5 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	39	37	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9920	4 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9921	3 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	38	41	38	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9922	11 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9923	13 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9933	21 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9953	8 Aldinga Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10285	2 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10286	1 Lima Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10293	6 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10294	11 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	40	39	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10295	12 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	39	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10297	4 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	43	-	42	41	42	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10298	6 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	43	-	42	41	42	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10302	5 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10317	11 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	40	41	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10318	24 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10325	6 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	40	39	40	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10326	584 Great Western Hwy, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10327	6 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	41	42	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10331	4 Carnation Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	40	40	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10337	1 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	40	41	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10338	3 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	41	42	41	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10342	7 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	39	40	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10343	7 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	39	40	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10345	6 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	39	40	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10347	5 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	47	47	46	47	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10348	3 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	40	40	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10349	2 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	40	40	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10350	7 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	40	41	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10352	8 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	40	42	40	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10353	9 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	40	42	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10354	1 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	40	40	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10355	2 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	39	42	39	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10356	3 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	40	41	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10357	6 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	43	-	42	41	42	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10358	13 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	38	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10359	14 Dolphin Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	-	38	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10360	5 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	41	42	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10361	4 Picnic Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	40	41	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10362	12 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	43	-	42	41	42	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10363	10 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	38	38	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10364	13 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	41	41	41	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10365	14 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10368	15 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	40	41	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10369	16 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	43	44	42	44	42	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10370	17 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	45	45	44	45	44	44	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10371	18 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	41	40	41	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10372	19 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	43	-	42	40	42	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10373	20 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	-	39	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10374	1 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10375	2 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10376	3 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10377	4 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	40	42	40	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10380	5 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	57	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10381	6 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	39	40	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10382	8 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	40	41	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10383	7 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	38	39	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10384	1 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	40	41	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10385	3 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	-	39	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10386	10 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	40	42	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10388	9 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	44	41	44	41	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10390	5 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10391	7 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	39	40	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10393	11 Nambucca Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	40	42	40	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10394	23 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10396	9 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	54	43	44	42	44	42	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10397	8 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	40	39	40	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10398	8 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	41	40	41	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10399	7 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	39	38	39	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10400	5 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	40	41	40	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10401	4 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	38	38	38	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10402	3 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	40	39	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10403	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	38	38	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10404	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	38	38	38	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10405	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10406	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10407	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10408	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10414	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10416	2 Werona Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10417	11 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	43	41	43	41	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10418	13 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10419	15 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10421	17 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	52	-	-	39	41	39	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10422	19 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	53	-	-	-	38	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10423	21 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10424	4 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	43	41	43	41	42	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10425	6 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	40	42	40	41	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10426	8 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	39	41	39	40	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10427	10 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	57	-	-	39	41	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10430	12 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	56	-	-	-	38	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10432	14 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	55	-	-	-	40	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10434	4 Myrtle Rd, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	-	-	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10438	2 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	45	44	44	44	44	43	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10444	3 Poppy Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	39	37	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10445	2 Poppy Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	39	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10446	1 Poppy Cl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	38	39	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10448	11 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	38	39	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10463	12 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	50	-	-	39	41	39	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: Res = Residential Receiver Type

Building ID	Address	Usage	NCA	Predicted Noise Levels Where Construction NMLs are Exceeded and AMM Category, dBA																											
				AMM Category 0 to 10 dB							AMM Category 10 to 20 dB							AMM Category 20 to 30 dB							AMM Category > 30 dB						
				S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5	S6	S7
10466	14 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10469	16 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10470	18 Mistletoe Av, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	38	40	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10473	4 Dahlia Pl, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	-	-	-	-	38	-	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10494	28 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10495	26 Sunflower Dr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10496	2 Kullaroo Cr, Claremont Meadows, Sydney, New South Wales, 2747	RES	NCA06	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: Res = Residential Receiver Type