REPORT

OAKDALE EAST ESTATE

HORSLEY PARK, NSW

STAGE 2 CONCEPT PLAN ASSESSMENT - NOISE
RWDI # 2201866
8 June 2022

SUBMITTED TO

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NOTE

WILKINSON MURRAY

In October 2020, Wilkinson Murray Pty Ltd merged with RWDI Group, a leading international consulting firm. Wilkinson Murrays core practice areas of noise, acoustics, vibration and air quality consulting built since 1962 servicing Australia and Asia-Pacific region will complement RWDI practice areas. Combined, RWDI+Wilkinson Murray is one of the largest teams globally specialising in the area of noise, acoustics, vibration and air quality.

RWDI

RWDI is a team of highly specialised consulting engineers and scientists working to improve the built environment through three core areas of practice: building performance, climate engineering and environmental engineering. More information is available at www.rwdi.com.

AAAC

This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

QUALITY ASSURANCE

RWDI Australia Pty Ltd operates a Quality Management System which complies with the requirements of AS/NZS ISO 9001:2015. This management system has been externally certified by SAI Global and Licence No. QEC 13457 has been issued for the following scope: The provision of consultancy services in acoustic engineering and air quality; and the sale, service, support and installation of acoustic monitoring and related systems and technologies.

GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

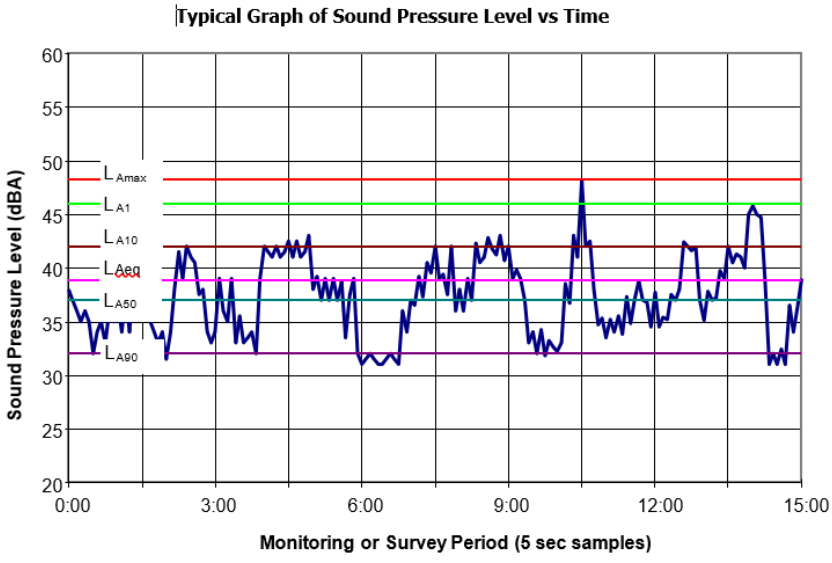
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



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1 INTRODUCTION

RWDI has been commissioned by Goodman Property Services (Aust) Pty Limited (Goodman) to undertake an operational noise assessment for the proposed Oakdale East Industrial Estate (OEE), Horsley Park, NSW.

This assessment considers the operational noise produced by the development as a whole and the potential noise and vibration impacts to surrounding receivers.

1.1 Oakdale East Proposal

This application seeks approval for a Concept Plan across Goodman's Oakdale East Industrial Estate ("Estate") and approval for Stage 2 of works at the Estate.

The site is located within the Fairfield Local Government Area and is legally described as Lot 102 and Lot 103 in DP1268366.

Stage 1 of the works were completed in September 2021 and included Precinct 1 building and infrastructure works as indicated on the proposed Estate Masterplan.

The Concept Plan is proposed to set the development controls for the Estate which will override the Development Control Plan ("DCP") that is currently with Department of Planning and Environment (DPE) for consideration. This DCP has been lodged with DPE to support the Rehabilitation Development Application that is currently with Fairfield City Council for consideration.

The Rehabilitation Development Application seeks approval for works only to Precinct 1 expansion, Precincts 2, 3 and 4 and includes the following (this application excludes works to Precinct 5):

- Cut and Fill works to provide bulk pad levels;
- Provision of Estate stormwater infrastructure including completion of detention basins and swales;
- Removal of 2.58 ha of vegetation;
- Demolition of the Brick Factory and rehabilitation of the surrounding land;
- Installation of 1 x retaining wall on the eastern portion of Precinct 3;
- Consideration for Aboriginal Heritage and Geotech assessments

The proposed Concept Plan approval seeks approval for:

- The proposed Estate masterplan allowing development of 303,009 sqm of GLA;
- 24/7 hours of operation;
- Building Height of 43m for Precinct 3 (excluding roof-top plant and solar) and 15m (excluding roof-top plant and solar) to the remainder of the Estate;
- Estate subdivision;
- Estate wide planning controls as shown in the EIS
- Construction hours 7 am to 6 pm Monday to Friday, 8 am to 1 pm Saturday
- Geotech and Aboriginal heritage considerations for Precinct 5

The Stage 2 works considered under this application include the following:

- Cut and fill works to Precinct 5 only to provide bulk pad level;

- Completion of lead-in infrastructure works including intersection upgrades at Millner Ave / Old Wallgrove Road and Lenore Drive / Old Wallgrove Road;
- Clearing of 2.3 ha of native vegetation;
- Completion of the internal road network (excl. the proposed private driveway providing access to Precinct 5 but including all other roads shown on the proposed masterplan);
- Reticulation of services infrastructure to provide serviced development pads to all precincts;
- Completion of retaining walls across the entire Estate; and
- Completion of Building works to Precinct 1 expansion and Precinct 3 including any ancillary on lot infrastructure and detailed civil works required.

1.1.1 Precinct 1 Expansion:

- Construction, operation, fit-out and use approval of a warehouse with ancillary office spanning 3,122 sqm of GLA;
- 24/7 hours of operation; and
- 15m building height (excluding solar and rooftop plant).

1.1.2 Precinct 3:

- Construction, operation, fit-out and use approval of a temperature controlled automated distribution centre;
- Total GLA of 96,810 sqm including 10,009 sqm of which is for future expansion;
- In addition to this, 38,050 sqm of mezzanines will be installed within the premises;
- 43m building height (excluding solar and rooftop plant);
- Storage of dangerous goods and flammable goods that exceed the SEPP33 threshold; and
- 24/7 hours of operation.

1.2 Overview of Noise Generation

The proposed Oakdale East Estate will primarily consist of warehousing and distribution operations. Operational noise emissions from site will be primarily generated by heavy vehicle movements on estate roads and within each precinct. Assumptions surrounding variations in speed and manoeuvring are discussed in Section 4.6. Other noise sources included in our assessment include:

- Mechanical plant; and
- Light vehicle movements and noise associated with carparks.

1.3 SEARs

The planning Secretary's Environmental Assessment Requirements (SEARs) were issued for the project on 1 March 2022. The requirements for noise and vibration are summarised in **Table 1-1** below, including a reference where these have been addressed in our report.

Table 1-1 SEARs

Requirement	Reference
A quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards.	This report
The identification of impacts associated with operation.	Section 2.1
The identification of impacts associated with traffic.	Section 5
Provision of operational noise contours.	Appendix A
Detailed sleep disturbance assessment.	Section 4
Details of noise monitoring survey and background noise levels.	Section 3
Details of noise inventory.	Sections 4.3 and 4.4
Details of worst case noise emission scenarios.	Sections 4.3 and 4.4
Consideration of annoying characteristics of noise.	Section 4.7.1
Consideration of prevailing meteorological conditions in the study area.	Section 4.2
A cumulative impact assessment inclusive of impacts from other developments.	Section 4.1.2
Details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts.	Section 4.8
Clear identification of residual noise and vibration following application of these mitigation measures.	Section 4.7
Details of any proposed compliance monitoring programs.	Section 4.10

1.4 Assessment Guidelines

The following NSW Environment Protection Authority (EPA) guidelines have been adopted for this assessment.

- Noise from on-site operations (including on-site vehicle movements) has been assessed in accordance with the NSW *Noise Policy for Industry (NPfI)*, NSW EPA, 2000, with guidance on sleep disturbance criteria taken from this Policy.
- Noise from off-site vehicle movements has been assessed in accordance with guidance provided by the EPA in the NSW *Road Noise Policy (RNP),* NSW EPA, 2011.
- Construction noise has been assessed in accordance with the *Interim Construction Noise Guideline (ICNG)*, DECC, 2009.
- Vibration from construction has been considered in accordance with *Assessing Vibration: A Technical Guideline*, DEC, 2006.

2 SITE DESCRIPTION

Figure 2-1 shows the Oakdale East Estate site layout and closest sensitive receivers (R01 to R11 and I01 to I04).

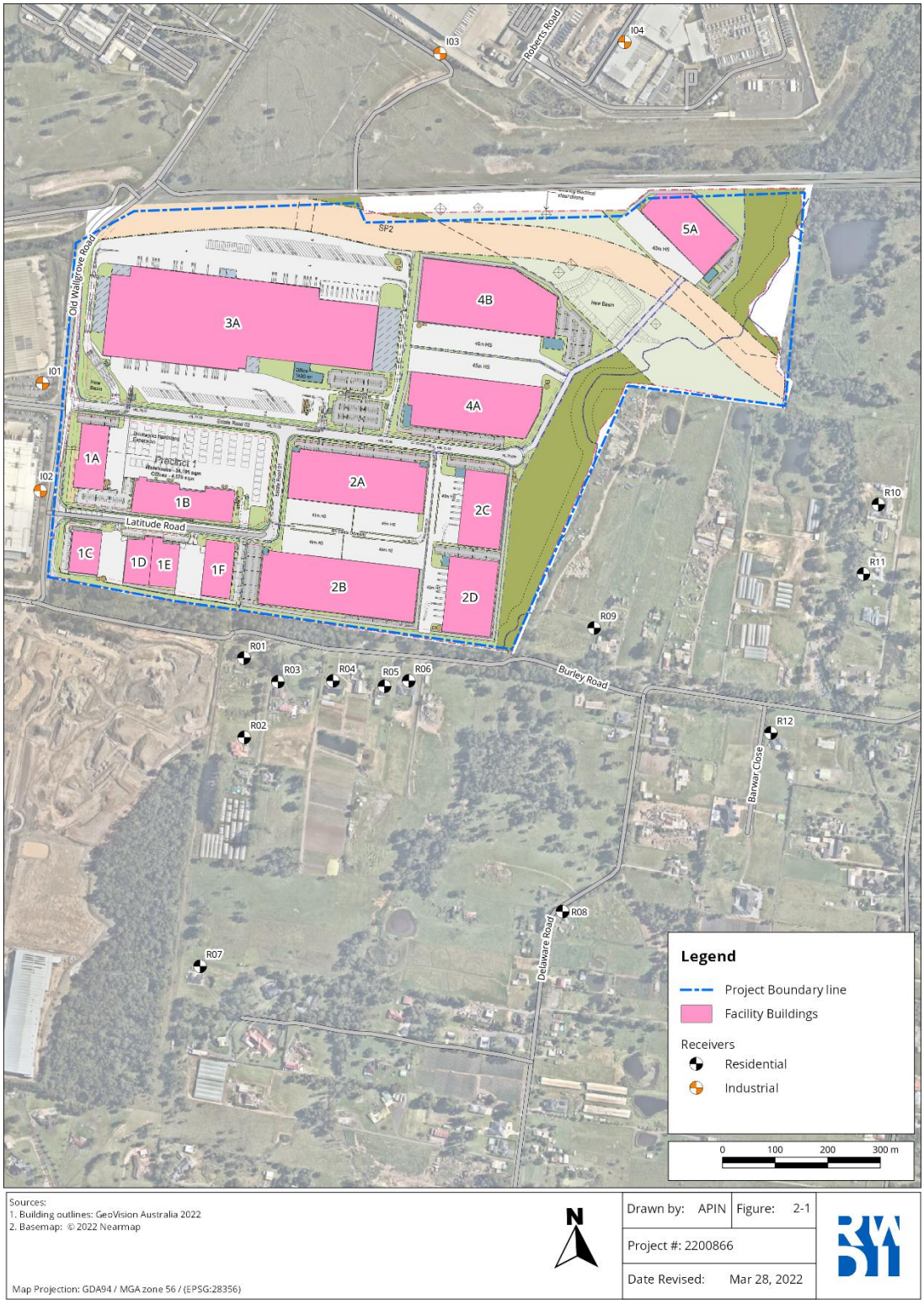


Figure 2-1 Site Layout and Receivers

The closest and potential worst affected residential receiver is R01, located near the southern boundary of the development. Receivers R10 and R11 on the eastern side of the development are further away but have a less impeded view of traffic movements on site.

2.1 Potential Noise Impacts

The following sources of noise and vibration have been considered in our report.

- **Operational noise** – Includes traffic movements on site, forklifts, and mechanical plant.
- **Off-site traffic noise** – additional traffic on surrounding roads.
- **Construction noise and vibration.**

3 EXISTING NOISE ENVIRONMENT

Due to the impact of COVID-19 and unusual heavy rainfall in the area, we have not been able to conduct a representative background noise monitoring campaign in accordance with the NPfI. To enable us to progress this assessment, we have adopted background noise monitoring results conducted for the nearby Oakdale West development (RWDI reference: 2102730D, Version C, 3 September 2021). The RBLs calculated for the 'South' location (most representative of the OEE receivers) in accordance with the NPfI for data obtained between 1 May 2021 and 29 June 2021 is shown in **Table 3-1**.

Table 3-1 Calculated RBLs

Location	RBL (dBA)		
	Day	Evening	Night
South	42	37	37

4 OPERATIONAL NOISE

4.1 Criteria

The NSW *NPfI* provides a framework and process for deriving noise criteria that enable the EPA and others to regulate premises that are scheduled under the Protection of the Environment Operations Act 1997. Whilst specifically aimed at assessment and control of noise from industrial premises regulated by the EPA, the policy is also appropriate for use by the DPI&E when assessing major development proposals.

The *NPfI* documents a procedure for assessment and management of industrial noise which involves the following steps:

- Determining the project noise trigger levels for a development. The project noise trigger level is a benchmark level above which noise management measured are required to be considered. They are derived by considering short-term intrusiveness due to changes in the existing noise environment (applicable to residential receivers only) and maintaining noise level amenity for particular land uses for residents and other sensitive receivers;
- Predicting or measuring noise produced by the development (having regard to any associated annoying characteristics and prevailing meteorological effects);
- Comparing the predicted or measured noise level with the project noise trigger level and assessing impacts and the need for noise mitigation and management measures;
- Considering any residual noise impacts following the application of feasible and reasonable noise mitigation measures;
- Setting statutory compliance levels that reflect the best achievable and agreed noise limits for development; and
- Monitoring and reporting environmental noise levels from the development.

The project noise trigger level represents the level that, if exceeded, may indicate a potential noise impact upon a community. It is a benchmark or objective and is not intended for use as a mandatory requirement.

4.1.1 Intrusiveness Noise Level

For assessing intrusiveness, the background noise level (L_{A90}) is measured, and the Rating Background Level (RBL) determined. The intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous noise level (L_{Aeq}) of the source (measured over a 15-minute period) does not exceed the background noise level (RBL) by more than 5dBA.

4.1.2 Amenity Noise Level

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise (when on public transport corridors), noise from motor sport, construction noise, community noise, blasting, shooting ranges, occupational workplace noise, wind farms, amplified music/patron noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5dBA below the recommended amenity noise level. This accounts for any potential noise impacts from existing or future developments.

The following exceptions apply to determining the project amenity noise level:

- For high traffic areas the amenity criterion for industrial noise becomes the $L_{Aeq,period(traffic)}$ minus 15dBA.
- In proposed developments in major industrial clusters.
- If the resulting project amenity noise level is 10dB or more lower than the existing industrial noise level, the project amenity noise level can be set at 10dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.
- Where cumulative industrial noise is not a consideration because no other industries are present in, or likely to be introduced into the area, the relevant amenity noise level is assigned as the project amenity noise level for the development.

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess mitigation options and determine achievable noise requirements.

An extract from the NSW *NPfI* that relates to the amenity noise levels for surrounding receivers is given in **Table 4-1**.

Table 4-1 Amenity Noise Levels

Receiver	Noise Amenity Area	Time of Day[1]	Recommended Amenity Noise Level L_{Aeq} (dBA)
Residence	Rural	Day	50
		Evening	45
		Night	40
Commercial	All	Anytime	65

Note 1: Daytime 7.00am–6.00pm; Evening 6.00pm–10.00pm; Night 10.00pm-7.00am.

4.1.3 Maximum Noise Level Events

Noise sources of short duration and high level that may cause disturbance to sleep if occurring during the night time need to be considered.

The approach recommended by the *NPfI* is to apply the following initial screening noise levels:

- $L_{Aeq,15min}$ 40dBA or the prevailing RBL + 5dB, whichever is the greater; and/or
- L_{AFmax} 52dBA or the prevailing RBL + 15dB, whichever is the greater.

The sleep disturbance screening noise levels apply outside bedroom windows during the night time period.

Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. It may also be appropriate to consider other guidelines including the NSW *Road Noise Policy* (RNP) which contains additional guidance relating to potential sleep disturbance impacts.

A review of research on sleep disturbance in the *RNP* indicates that in some circumstances, higher noise levels may occur without significant sleep disturbance. Based on currently available research results, the *RNP* concludes that:

- "Maximum internal noise levels below 50dBA to 55dBA are unlikely to cause awakening reactions."
- "One or two noise events per night, with maximum internal noise levels of 65dBA to 70dBA, are not likely to affect health and wellbeing significantly."

4.1.4 Project Noise Trigger Levels

The amenity and intrusiveness noise levels and resulting project trigger levels (shown in bold) for continuous nature operational noise emissions associated with the proposed development are detailed in **Table 4-2**.

Table 4-2 Project Noise Trigger Levels for Continuous Operational Noise Emissions

Location	Area Classification	Period	ANL[1] $L_{Aeq,period}$ dBA	RBL[2] dBA	Project Noise Trigger Levels	
					Intrusive[3] $L_{Aeq,15min}$	Amenity[4] $L_{Aeq,15min}$
Residential	Rural	Day	50	42	**47**	48
		Evening	45	37	**42**	43
		Night	40	37	42	**38**
Industrial	All	All	65	-	**-**	**63**

Note 1: Recommended amenity noise level.
Note 2: RBL – Rating Background Level.
Note 3: Intrusiveness noise level is $L_{Aeq,15min} \leq$ RBL +5 and is only applicable to residential receivers.
Note 4: Project amenity noise level (ANL) is rural ANL plus 3dBA to convert from a period level to a 15-minute level.

For maximum noise level events (night-time period only) the following screening noise levels apply:

- $L_{Aeq,15min}$ 40dBA; and/or
- L_{AFmax} 52dBA.

4.2 Modelling Methodology

Operational noise emissions from the site have been predicted with a model prepared using the SoundPLAN V8.2 noise modelling software, implementing the CONCAWE prediction method. The model incorporates the OEE Masterplan design, including the civil design, buildings, and sensitive receivers shown in Figure 2-1**.** Operational noise sources included in the model comprise fixed rooftop plant, loading activities (forklifts) and on-site light and heavy vehicles movements.

Predictions have been undertaken with consideration to neutral meteorological conditions for the daytime, evening and night-time periods and additionally under adverse meteorological conditions during the night-time period (F-class temperature inversion with a 2 m/s source to receiver drainage flow). The parameters used in the Noise modelling have been detailed in Table 4-3 below.

Table 4-3 Noise model details

Data	Description
Terrain data	1m elevation contours obtained from DEM made available by Geoscience Australia have been used for all terrain outside the OEE site. Elevation for OEE site were obtained from the relevant masterplan drawings (OAK E MP 02 (D) dated 15 February 2022)
Buildings	Proposed OEE buildings were hand drawn based on the architectural drawings provided by Goodman. Buildings surrounding the OEE were obtained from Geovision.
Aerial images	Obtained from Nearmaps
Ground absorption	0.2 within the OEE site 0.75 outside the OEE site
Building reflection loss	2.5 dB
Receivers	1.5 m above ground level
Meteorological conditions	F-class temperature inversion with a 2 m/s source to receiver drainage flow Humidity 70% Temperature 10ºC Air Pressure 101.3 kPa

4.3 Assumed On site Traffic Volumes

Table 4-4 details the assumed light and heavy vehicle movements on site. These are representative of the typical worst case hour in each time period.

Table 4-4 Assumed Traffic Movements

Lot	Day		Evening		Night	
	LV	HV	LV	HV	LV	HV
1A	60	12	0	0	10	2
1B	10	4	6	2	2	2
1C	10	4	6	2	2	2
1D	10	4	6	2	2	2
1E	10	4	6	2	2	2
1F	10	4	6	2	2	2
2A	44	15	44	15	13	4
2B	54	18	54	18	16	5
2C	21	7	21	7	6	2
2D	24	8	24	8	7	2
3A	340	64	170	53	170	39
4A	53	18	53	18	16	5
4B	43	14	43	14	13	4
5A	27	9	27	9	8	3

4.4 Adopted Sound Power Levels

The following noise level data for vehicle-related noise sources has been used for the assessment. These noise levels are taken from RWDI's internal database and external assessments and measurements of similar subject sites.

4.4.1 Vehicular Sources

Adopted sound power levels for vehicular sources are shown in **Table 4-5**.

Table 4-5 Sound Power Reference Levels

Noise Source	Noise Characteristic	Sound Power Level SWL, dBA
Forklift operational on hardstand[3]	Quasi-steady	93 L_{Aeq}
Light Vehicles[6] on site, up to speed of 40km/h	Quasi-steady	90 L_{Aeq}
Heavy Vehicle[1] @25 km/h	Quasi-steady	106 L_{Aeq}

Noise Source	Noise Characteristic	Sound Power Level SWL, dBA
Heavy Vehicle[1], unloaded @ 10 km/h	Quasi-steady	106 L_{Aeq}
Heavy Vehicle[1], loaded @ 10 km/h	Quasi-steady	107 L_{Aeq}
Heavy Vehicle[1], reversing[4] @ 5 km/h	Quasi-steady	111 L_{Aeq}
Truck Idling[5]	Quasi-steady	95 L_{Aeq}
Truck Engine Starting	Instantaneous	100 L_{Amax}
Truck Airbrake Release[2]	Instantaneous	115 L_{Amax}
16m trailer (Refrigerated Trucks) – Stationary Cooling (Diesel Power)[7]	Instantaneous	96 L_{Aeq}

Note 1: Heavy vehicle defined as any cargo vehicle with three or more axles with gross vehicle weight > 12,000 kg.

Note 2: Consistent with measurements taken at Woolworths Customer Fulfillment Centre Brookvale by Renzo Tonin and Associates (Report: TL496-03F03 FP3 Wetherill Park NVIA R5), 16 March 2021.

Note 3: Consistent with assessment of Woolworths Moorebank Distribution Centre by Renzo Tonin and Associates (Report: TL265-01F04 DA ACOUSTIC ASSESSMENT _CONSTRUCTION AND OPERATION R10), 16 October 2020.

Note 4: Assume that reversing operation will not take more than 30 seconds for each vehicle, includes reversing alarm and air brake release.

Note 5: Consistent with measurements taken at Woolworths Distribution Centre Minchinbury by Renzo Tonin and Associates (Report: TL496-03F03 FP3 Wetherill Park NVIA R5), 1 April 2021.

Note 6: Considered conservative when compared to previous assessment of Woolworths Moorebank Distribution Centre by Renzo Tonin and Associates (Report: TL265-01F04 DA ACOUSTIC ASSESSMENT _CONSTRUCTION AND OPERATION R10).

Note 7: Consistent with measurements at Big W Distribution Centre, Hoxton Park by Renzo Tonin and Associates (referenced in Report: TL496 03 F02 FP3 Wetherill Park NVIA (R5), 1 April 2021.

The noise levels presented above are consistent with US-FHWA-TNM 2.5 technical model and are considered to be a conservative for the purposes of this assessment. Note the increased level for a truck reversing is to account for audible reversing alarms and air brake releases.

4.4.2 Fixed Sources

Table 4-6 presents the mechanical services / fixed plant noise source assumptions for the OEE Lots. The assumptions have been updated having regard to the operational requirements of the committed customers. Where there are not customers committed to development lots, assumptions have been made that are consistent with other industrial estates given the size and type of customer likely to be attracted to the building.

Table 4-6 Mechanical Services / Fixed Plant Noise Sources throughout OEE

Precinct	Lot	Day (7am -6pm)	Evening (6pm-10pm)	Night (10pm -7am)
Precinct 1	1A	No Operation	No Operation	No Operation
	1B	No Operation	No Operation	No Operation
	1C	No Operation	No Operation	No Operation
	1D	No Operation	No Operation	No Operation
	1E	No Operation	No Operation	No Operation
Precinct 2	2A	SWL 88 dBA Cumulative	SWL 88 dBA Cumulative	SWL 88 dBA Cumulative
	2B	SWL 88 dBA Cumulative	SWL 88 dBA Cumulative	SWL 88 dBA Cumulative
	2C	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative
	2D	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative
Precinct 3	3A	SWL 109 dBA Cumulative	SWL 109 dBA Cumulative	SWL 109 dBA Cumulative
Precinct 4	4A	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative
	4B	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative	SWL 85dBA Cumulative
Precinct 5	5A	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative	SWL 85 dBA Cumulative

Cooling for all building will be minimal (office areas only) with the exception of building 3A, which will be equipped for refrigerated logistics. Increased noise emissions from mechanical services is anticipated. Additional sources have been included in our model to accommodate the current design as shown in Figure 4-1. This has been informed by the current mechanical design provided by Iseco Engineering Services (drawings: ISE-SK-REF-NSW01,02,03,10, and SAG-REWF-100 dated October 2021) and subsequent discussions with design staff. This has not been finalised and final equipment has not been selected. Total sound power levels shown in Table 4-6 above represent the best information available at the time of our assessment.

The primary noise source will be two evaporative coolers located in the plant area on the northern side of the building. Secondary sources will be a series of insulated air coolers located on a platform above the docks on the northern façade. These will be screened individually to provide further acoustic attenuation and visual amenity. All residential receivers will benefit from significant acoustic shielding provided by the façade of the building.

All other mechanical services will be located within the building envelope. This will provide substantial acoustic attenuation and noise breakout from these sources (assuming doors remain closed) will not be significant.

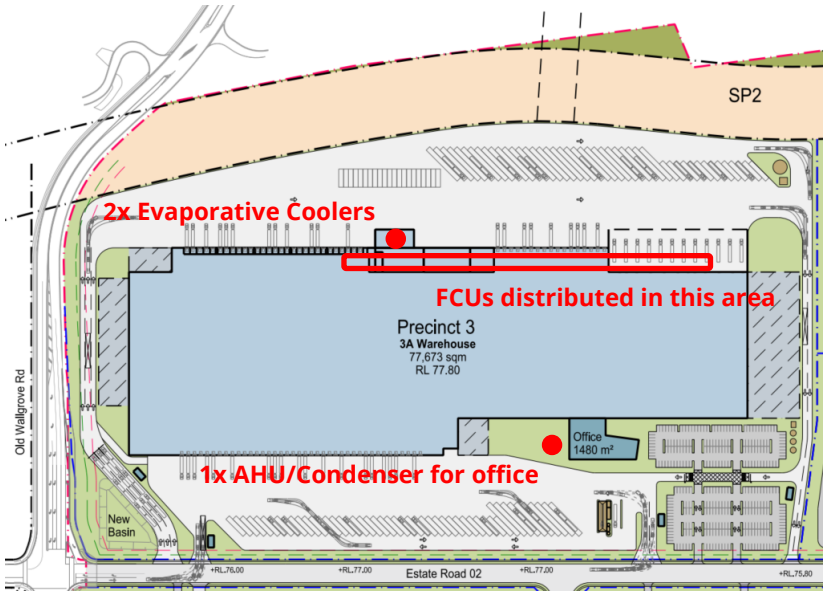


Figure 4-1 Location of Mechanical Sources

4.5 Forklift Loading Activities

On-site forklift loading activities have been assumed based on information provided by Goodman. Table 4-7 shows the number of forklifts assumed to be operating for each lot, where information is available from the customer these have been included. Remaining assumptions are consistent with other industrial estates. The majority of the forklift movements occurring at Night represent an early start for those particular users.

Table 4-7 Number of Operational Forklifts Assumed for each Lot

Precinct	Lot	Day (7am -6pm)	Evening (6pm-10pm)	Night (10pm -7am)
Precinct 1	1A	2	2	2
	1B	3	3	3
	1C	1	1	1
	1D	1	1	1
	1E	1	1	1
	1F	1	1	1
Precinct 2	2A	2	2	2
	2B	2	2	2
	2C	2	2	2
	2D	1	1	1
	2D	1	1	1
Precinct 3	3A	4	4	4
Precinct 4	4A	2	2	2
	4B	2	2	2
Precinct 5	5A	2	2	2

4.6 Operational Noise Scenarios

Our assessment has considered two scenarios, outlined as follows. The first scenario considers the existing Precinct currently in operation (Precinct 1) and the proposed facility (Precinct 3) as part of the Stage 2 works. The second scenario considers the entire estate once fully developed. Table 4-8 presents the assumptions for the noise prediction scenarios.

Table 4-8: Noise Prediction Scenarios

Scenario	Lot Operation	Description
1 - Precincts 1 & 3 only	1A, 1B, 1C, 1D, 1E, 1F 3A	Light and Heavy onsite vehicle movements. P1 and P3 mechanical operation as per Table 4-6. Loading Activities as per Section 4.5.
2 - All OEE Precincts	All Lots listed	Light and Heavy onsite vehicle movements. All Lots Mechanical Operation as per Table 4-6. Loading Activities as per Section 4.5.

The first scenario was considered to understand the impacts of the Stage 2 works only. Building 3A, the dominant noise source, is likely to be completed in 2025 but not reach operational status until a substantial period thereafter. It's likely that precincts 2 and 4 will be developed by that time, or at least to the point where acoustic shielding provided by these buildings will take effect.

The second scenario considers the full completion and operation of the site.

Light vehicle and heavy vehicle traffic movements have been modelled as line sources with varying speed. Heavy vehicles are expected to enter the estate at 50km/h, reduce speed to 25km/h on estate roads, and reduce speed again to 10km/h when manoeuvring on site. For instances where heavy vehicles will be side loaded, these will park up within the bays allocated with engine off whilst loading/unloading. For rear loaded semi-trailers, these will reverse into the recessed docks where indicated. Sound power levels have been applied as per Table 4-5, accounting for reversing alarms.

This modelling strategy as used for Lot 3A is presented in Figure 4-2 below as an example.

Note that building 3A will contain refrigerated trucks. To account for this in the noise model, we have allowed for 8x additional refrigerated trailers (i.e., 4 on the Inbound goods side & 4 on the outbound goods side. Noise from the truck engines will be significantly louder than the refrigeration units when being transported.

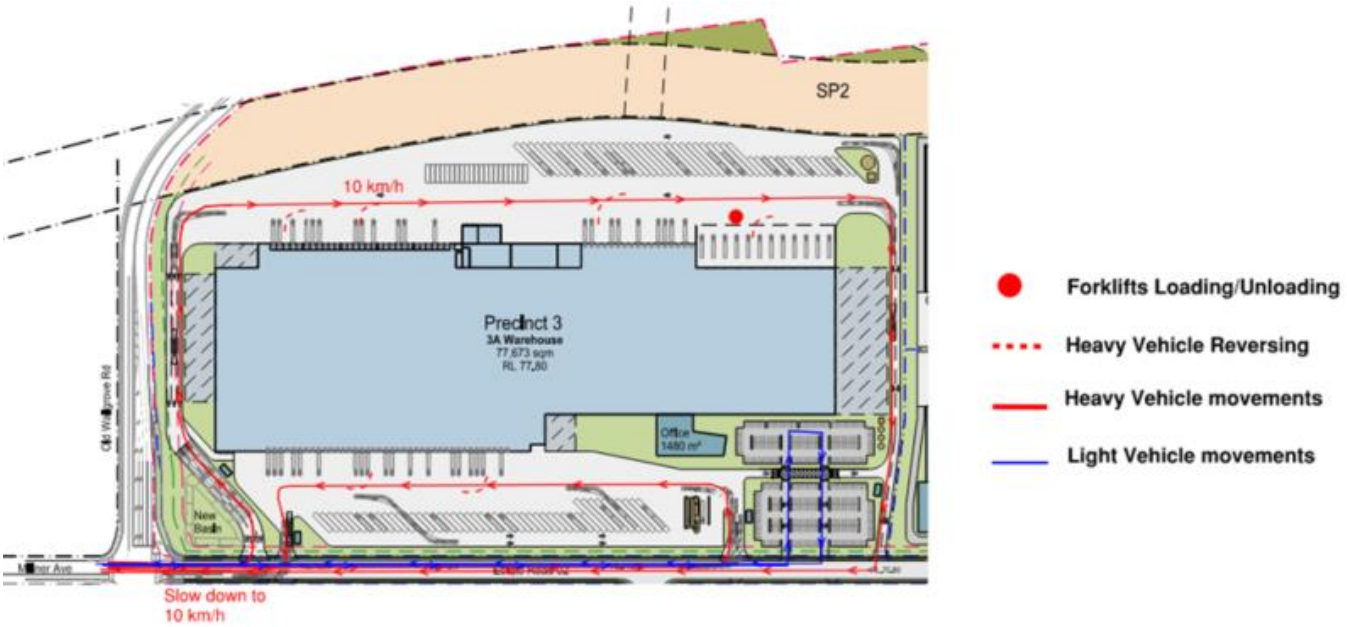


Figure 4-2 Source Layout for 3A

4.7 Predicted Noise Levels – No Mitigation

4.7.1 Continuous Noise Levels

Table 4-9 below presents the predicted operational noise levels under the worst case assumptions details above.

Table 4-9 Predicted $L_{Aeq,15min}$ Operational Noise Levels – All Precincts

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Limit	$L_{Aeq,15min}$ (dBA) Precincts 1 & 3A only[1]	$L_{Aeq,15min}$ (dBA) All Precincts[1]
R01	Day	47	43 (OK)	44 (OK)
	Eve	42	41 (OK)	**43 (+1)**
	Night	38	**40 (+2)**	**40 (+2)**
	Night(Adverse)	38	**44 (+6)**	**42 (+4)**
R02	Day	47	38 (OK)	39 (OK)
	Eve	42	37 (OK)	38 (OK)
	Night	38	36 (OK)	36 (OK)
	Night(Adverse)	38	**39 (+1)**	**39 (+1)**
R03	Day	47	42 (OK)	39 (OK)
	Eve	42	41 (OK)	38 (OK)
	Night	38	**40 (+2)**	36 (OK)
	Night(Adverse)	38	**43 (+5)**	**43 (+5)**
R04	Day	47	42 (OK)	37 (OK)
	Eve	42	41 (OK)	37 (OK)
	Night	38	**40 (+2)**	33 (OK)
	Night(Adverse)	38	**43 (+5)**	**43 (+5)**
R05	Day	47	41 (OK)	41 (OK)
	Eve	42	40 (OK)	41 (OK)
	Night	38	**39 (+1)**	37 (OK)
	Night(Adverse)	38	**43 (+5)**	**43 (+5)**
R06	Day	47	42 (OK)	46 (OK)
	Eve	42	41 (OK)	**46 (+4)**
	Night	38	**40 (+2)**	**41 (+3)**
	Night(Adverse)	38	**43 (+5)**	**42 (+4)**

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Limit	$L_{Aeq,15min}$ (dBA) Precincts 1 & 3A only[1]	$L_{Aeq,15min}$ (dBA) All Precincts[1]
R07	Day	47	30 (OK)	29 (OK)
	Eve	42	29 (OK)	29 (OK)
	Night	38	28 (OK)	27 (OK)
	Night(Adverse)	38	31 (OK)	31 (OK)
R08	Day	47	32 (OK)	33 (OK)
	Eve	42	31 (OK)	32 (OK)
	Night	38	30 (OK)	30 (OK)
	Night(Adverse)	38	34 (OK)	34 (OK)
R09	Day	47	40 (OK)	39 (OK)
	Eve	42	38 (OK)	38 (OK)
	Night	38	37 (OK)	34 (OK)
	Night(Adverse)	38	**41 (+3)**	**41 (+3)**
R10	Day	47	34 (OK)	39 (OK)
	Eve	42	33 (OK)	39 (OK)
	Night	38	32 (OK)	35 (OK)
	Night(Adverse)	38	35 (OK)	35 (OK)
R11	Day	47	33 (OK)	37 (OK)
	Eve	42	32 (OK)	37 (OK)
	Night	38	31 (OK)	34 (OK)
	Night(Adverse)	38	35 (OK)	35 (OK)
R12	Day	47	33 (OK)	35 (OK)
	Eve	42	32 (OK)	34 (OK)
	Night	38	31 (OK)	31 (OK)
	Night(Adverse)	38	35 (OK)	35 (OK)
I01	When in use	63	52 (OK)	55 (OK)
I02	When in use	63	48 (OK)	49 (OK)
I03	When in use	63	44 (OK)	44 (OK)
I04	When in use	63	39 (OK)	39 (OK)

Note Exceedance is indicated in brackets next to the predicted noise levels

For the first scenario where only Precincts 1 and 3 were operating, continuous operational noise was found to exceed the adopted criteria at locations R01 to R06 and R09. The worst of these was residential receiver R01 with a 6dB exceedance under adverse conditions at night. The remaining buildings yet to be built in this scenario provide significant acoustic shielding.

For the second scenario of all precincts being complete and operating, continuous operational noise was found to exceed the adopted criteria at locations R01 to R06 and R09. The worst of these exceedances were at residential receiver R03 to R05 with a 5dB exceedance under adverse conditions at night.

We do not believe that noise emissions from site would be considered annoying or a modifying factor correction is warranted at this stage. We would normally apply an intermittent modifying factor to $L_{Aeq,15min}$ noise levels where all noise being assessed suddenly increases or reduces where the difference between the total $L_{Aeq,15min}$ (including all other non-industrial sources) at the receiver with the source present and not present results in a difference in L_{Aeq} of 5dB or more during a 15 minute period. It should be noted that given the number of sources at OEE, total noise emissions will not suddenly change.

Further, we believe air brake releases and reversing beepers would be defined as 'Impulsive noise' under the following NPfI definition:

Noise with a high peak of short duration, or a sequence of such peaks

An impulsive correction was dropped from the NPfI in favour of the Maximum Noise Level Event Assessment (MNLEA), included in Section 4.7.2 below.

4.7.2 Maximum Noise Levels

Table 4-10 shows the $L_{A1,1min}$ maximum operational noise predictions. Note that for the sources assessed, the difference between the $L_{A1,1min}$ and L_{AMax} descriptors is negligible.

Table 4-10 Predicted Maximum Operational Noise Levels

Receiver	Period	Screening Criterion (dBA)	Predicted $L_{A1,1min}$ (dBA) 1 & 3A only	Predicted $L_{A1,1min}$ (dBA) All Precincts
R01	Night	52	**56 (+4)**	**57 (+5)**
	Night^{Adverse}	52	**59 (+7)**	**60 (+8)**
R02	Night	52	44 (OK)	44 (OK)
	Night^{Adverse}	52	48 (OK)	45 (OK)
R03	Night	52	52 (OK)	**53 (+1)**
	Night^{Adverse}	52	**56 (+4)**	**56 (+4)**
R04	Night	52	44 (OK)	48 (OK)
	Night^{Adverse}	52	48 (OK)	51 (OK)
R05	Night	52	42 (OK)	**57 (+5)**

Receiver	Period	Screening Criterion (dBA)	Predicted $L_{A1,1min}$ (dBA) 1 & 3A only	Predicted $L_{A1,1min}$ (dBA) All Precincts
	Night^{Adverse}	52	45 (OK)	**61 (+9)**
R06	Night	52	42 (OK)	59 (OK)
	Night^{Adverse}	52	46 (OK)	**62 (+10)**
R07	Night	52	31 (OK)	34 (OK)
	Night^{Adverse}	52	34 (OK)	37 (OK)
R08	Night	52	31 (OK)	39 (OK)
	Night^{Adverse}	52	34 (OK)	43 (OK)
R09	Night	52	38 (OK)	42 (OK)
	Night^{Adverse}	52	41 (OK)	45 (OK)
R10	Night	52	31 (OK)	39 (OK)
	Night^{Adverse}	52	34 (OK)	43 (OK)
R11	Night	52	31 (OK)	37 (OK)
	Night^{Adverse}	52	34 (OK)	41 (OK)
R12	Night	52	31 (OK)	35 (OK)
	Night^{Adverse}	52	35 (OK)	38 (OK)

Note Exceedance is indicated in brackets next to the predicted noise levels

R01, R03, R05, and R06 all exceed the NPfI screening criterion by up to 10dB. These exceedances are considered further in the following sections.

4.8 Proposed Noise Mitigation Measures

4.8.1 Scenario 1 – Precincts 1 and 3 Only

In this scenario, buildings in precincts 2, 3, 4 and 5 would not be constructed, meaning that the acoustic shielding afforded by these buildings would not be present. In the unlikely event this scenario would transpire, we propose a temporary noise barriers in the areas shown **Figure 4-3** below. This would be required to be at least 5m higher than the natural terrain or the RL of site (whichever is higher).

Figure 4-3 Noise Barrier – Scenario 1

If this scenario were to arise, the design of such a barrier should be reviewed in detail, taking into account all site sources and features at the appropriate time to provide the optimal design outcome.

4.8.2 Scenario 2 – All Precincts

Two noise barriers located along the southern boundary will be required to ensure operational noise criteria are achieved at all receivers once all precincts are at full operational capacity. The location of these is shown in **Figure 4-4** below and included in noise contours attached in Appendix A.

Figure 4-4 Noise Barriers – Scenario 2

The western barrier should extend 4m above the natural terrain level, note this is higher than the RL of site. The eastern barrier should extend 4m above the hardstand level, noting that this is higher than the natural RL at this point. It is expected that these barriers may be fine tuned as the design of these lots progresses in future stages of the project. These barriers may not be required if the design of buildings 2B and 2D change.

4.9 Predicted Noise Levels – With Mitigation

4.9.1 Continuous Noise Levels

Table 4-11 below presents the predicted operational noise levels under the worst case assumptions details above. This includes the acoustic barriers discussed in Section 4.8.

Table 4-11 Predicted $L_{Aeq,15min}$ Operational Noise Levels – All Precincts

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Limit	$L_{Aeq,15min}$ (dBA) Precincts 1 & 3A only[1]	$L_{Aeq,15min}$ (dBA) All Precincts[1]
R01	Day	47	38 (OK)	38 (OK)
	Eve	42	36 (OK)	37 (OK)
	Night	38	35 (OK)	35 (OK)
	Night(Adverse)	38	37 (OK)	38 (OK)
R02	Day	47	33 (OK)	38 (OK)
	Eve	42	32 (OK)	38 (OK)
	Night	38	31 (OK)	35 (OK)
	Night(Adverse)	38	34 (OK)	38 (OK)
R03	Day	47	37 (OK)	38 (OK)
	Eve	42	36 (OK)	38 (OK)
	Night	38	35 (OK)	35 (OK)
	Night(Adverse)	38	38 (OK)	38 (OK)
R04	Day	47	37 (OK)	37 (OK)
	Eve	42	36 (OK)	37 (OK)
	Night	38	35 (OK)	33 (OK)
	Night(Adverse)	38	38 (OK)	36 (OK)
R05	Day	47	36 (OK)	38 (OK)
	Eve	42	35 (OK)	38 (OK)
	Night	38	34 (OK)	34 (OK)
	Night(Adverse)	38	38 (OK)	36 (OK)
R06	Day	47	37 (OK)	37 (OK)
	Eve	42	36 (OK)	37 (OK)
	Night	38	35 (OK)	32 (OK)
	Night(Adverse)	38	37 (OK)	35 (OK)

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Limit	$L_{Aeq,15min}$ (dBA) Precincts 1 & 3A only[1]	$L_{Aeq,15min}$ (dBA) All Precincts[1]
R07	Day	47	25 (OK)	27 (OK)
	Eve	42	24 (OK)	27 (OK)
	Night	38	23 (OK)	25 (OK)
	Night(Adverse)	38	26 (OK)	28 (OK)
R08	Day	47	27 (OK)	32 (OK)
	Eve	42	26 (OK)	32 (OK)
	Night	38	25 (OK)	29 (OK)
	Night(Adverse)	38	29 (OK)	33 (OK)
R09	Day	47	37 (OK)	39 (OK)
	Eve	42	35 (OK)	39 (OK)
	Night	38	34 (OK)	34 (OK)
	Night(Adverse)	38	38 (OK)	37 (OK)
R10	Day	47	34 (OK)	39 (OK)
	Eve	42	33 (OK)	39 (OK)
	Night	38	32 (OK)	35 (OK)
	Night(Adverse)	38	35 (OK)	38 (OK)
R11	Day	47	33 (OK)	38 (OK)
	Eve	42	32 (OK)	37 (OK)
	Night	38	31 (OK)	34 (OK)
	Night(Adverse)	38	35 (OK)	37 (OK)
R12	Day	47	33 (OK)	35 (OK)
	Eve	42	32 (OK)	34 (OK)
	Night	38	31 (OK)	31 (OK)
	Night(Adverse)	38	35 (OK)	34 (OK)
I01	When in use	63	52 (OK)	54 (OK)
I02	When in use	63	48 (OK)	49 (OK)
I03	When in use	63	44 (OK)	45 (OK)
I04	When in use	63	39 (OK)	40 (OK)

Note Exceedance is indicated in brackets next to the predicted noise levels

Once the proposed noise mitigation/barriers were applied, continuous operational noise was found to comply at all receiver locations for both operating scenarios.

As mentioned in Section 4.6, Precinct 3 is unlikely to be operational prior to the development of Precinct 2 and 4. Thus, noise walls will not be required until Precinct 3 is operational. As it is likely the design of the buildings at Precincts 2 and 4 will change, it is proposed that no permanent noise walls are construction until the design of these buildings are known.

By comparing the results before and after mitigation is applied, the proposed noise barriers for each scenario are providing between 3 and 7dB of attenuation overall depending on receiver, time period, and meteorological conditions.

4.9.2 Maximum Noise Levels

Table 4-12 shows the $L_{A1,1min}$ maximum operational noise predictions. Note that for the sources assessed, the difference between the $L_{A1,1min}$ and L_{AMax} descriptors is negligible.

Table 4-12 Predicted Maximum Operational Noise Levels

Receiver	Period	Screening Criterion (dBA)	Predicted $L_{A1,1min}$ (dBA) 1 & 3A only	Predicted $L_{A1,1min}$ (dBA) All Precincts
R01	Night	52	51 (OK)	**57 (+5)**
	Night^{Adverse}	52	**54 (+2)**	**60 (+8)**
R02	Night	52	39 (OK)	42 (OK)
	Night^{Adverse}	52	43 (OK)	48 (OK)
R03	Night	52	50 (OK)	**53 (+1)**
	Night^{Adverse}	52	52 (OK)	**56 (+4)**
R04	Night	52	39 (OK)	48 (OK)
	Night^{Adverse}	52	43 (OK)	51 (OK)
R05	Night	52	37 (OK)	47 (OK)
	Night^{Adverse}	52	40 (OK)	50 (OK)
R06	Night	52	37 (OK)	47 (OK)
	Night^{Adverse}	52	41 (OK)	49 (OK)
R07	Night	52	26 (OK)	34 (OK)
	Night^{Adverse}	52	29 (OK)	37 (OK)
R08	Night	52	26 (OK)	39 (OK)
	Night^{Adverse}	52	29 (OK)	43 (OK)
R09	Night	52	35 (OK)	42 (OK)

Receiver	Period	Screening Criterion (dBA)	Predicted $L_{A1,1min}$ (dBA) 1 & 3A only	Predicted $L_{A1,1min}$ (dBA) All Precincts
	$Night^{Adverse}$	52	38 (OK)	45 (OK)
R10	Night	52	31 (OK)	39 (OK)
	$Night^{Adverse}$	52	34 (OK)	43 (OK)
R11	Night	52	31 (OK)	37 (OK)
	$Night^{Adverse}$	52	34 (OK)	40 (OK)
R12	Night	52	31 (OK)	35 (OK)
	$Night^{Adverse}$	52	35 (OK)	38 (OK)

Note Exceedance is indicated in brackets next to the predicted noise levels

R01 and R03 both exceed the NPfI screening criterion for these scenarios by up to 8dB. As discussed in Section 4.1.3, the RNP offers additional guidance for sleep disturbance:

- "Maximum internal noise levels below 50dBA to 55dBA are unlikely to cause awakening reactions."

Assuming windows are open at the residence to provide ventilation to the room during the night time, this corresponds to an external noise level of 60 to 65dBA. Given that the predicted noise levels are below this range, we expect sleep disturbance associated with this development will be unlikely.

4.10 Noise Monitoring

Compliance monitoring should be conducted once all warehouses have been constructed and the site is operating normally. This should be conducted at locations representative of the most affected receivers to the south and east of the site. A monitoring plan will be informed by information provided by the future tenants.

All monitoring should be conducted by an accredited member firm of the Association of Australasian Acoustical Consultants (AAAC).

5 OFF-SITE TRAFFIC NOISE

5.1 Criteria

The *RNP* requires noise mitigation where new land use developments increase road traffic noise by more than 2 dB. An increase of greater than 2 dB requires an increase in traffic volumes of approximately 60% or higher.

5.2 Off-Site Traffic Noise Impact Assessment

The main access route to the development site is via Old Wallgrove Road then the arterial road of Lenore Drive. The forecast traffic daily traffic volumes on Lenore Drive are approximately 28,000 vehicles (refer to SLR report 610.16083-R1). The daily traffic volume from the OEE is estimated to be approximately 8,041 vehicles, which equates to an increase in traffic volumes of approximately 29%.

Therefore, an increase in traffic noise due to the OEE of greater than 2 dB is not considered likely. No mitigation is likely to be required as a result.

6 CONSTRUCTION NOISE AND VIBRATION

6.1 Criteria

Construction works will be undertaken within the standard construction hours (7.00am-6.00pm Monday to Friday and 8.00am-1.00pm Saturdays).

Adopting the measured background noise levels determined in Section 3 above, the Construction Noise Management Levels NMLs derived for the project in accordance with the NSW *Interim Construction Noise Guideline (ICNG)* are detailed in **Table 6-1**.

Table 6-1 *ICNG* Construction Noise Management Levels (CNMLs)

Receiver	Period	$L_{Aeq,15min}$ Construction NMLs (dBA)	
		Standard Hours	Highly Noise Affected
R01 to R11	Day	52	75
I01 to I04	Day	75	-

6.2 Modelling Methodology

Construction noise emissions from the site have been predicted with a model prepared using the SoundPLAN V8.2 noise modelling software, implementing the CONCAWE prediction method. The model incorporates the OEE Masterplan design, including the civil design, buildings, and sensitive receivers shown in Figure 2-1**.** Construction noise sources included in the model comprise fixed plant, mobile plant, and dump trucks. Construction is only expected to occur during the daytime.

The parameters used in the Noise modelling have been detailed in Table 6-2 below.

Table 6-2 Noise model details

Data	Description
Terrain data	1m elevation contours obtained from DEM made available by Geoscience Australia have been used for all terrain.
Buildings	Buildings surrounding the OEE were obtained from Geovision. Buildings 1A to 1F were included in the model and hand drawn from architectural drawings provided by Goodmans
Aerial images	Obtained from Nearmaps
Ground absorption	0.2 within the OEE site 0.75 outside the OEE site
Building reflection loss	2.5 dB

Data	Description
Receivers	1.5 m above ground level
Meteorological conditions	F-class temperature inversion with a 2 m/s source to receiver drainage flow Humidity 70% Temperature 10ºC Air Pressure 101.3 kPa

6.3 Adopted Sound Power Levels

The sound power levels and scenarios detailed in **Table 6-3** have been adopted for this assessment.

Table 6-3 Sound Power Levels for Construction Equipment

Construction Activity	Equipment	Operating minutes in 15-min period	No of Items in each Work Area	Sound Power Level (dBA)		
				$L_{Aeq,15min}$		L_{Amax}
				Item	Activity	Activity
Site Clearing, Earthworks, road construction & retaining walls	Dozer	15	1	110	116	121
	Dump Truck	15	3	100		
	Excavator	15	1	102		
	Front End Loader (FEL) 962	15	1	112		
	Grader	15	1	108		
Pad and Hardstand Works - 3A & 2D	Concrete Pump	7.5	2	106	116	118
	Concrete Truck / Agitator	7.5	2	106		
	Concrete Vibrator	15	2	102		
	Paving Machine	15	2	104		
	Plate Compactor	5	2	108		
	Vibratory Roller (12 tonne)	15	2	109		
Construction of Warehouse and Office Structures - 3A & 2D	Elevated Working Platform	15	4	97	110	112
	Flatbed Truck	15	2	100		
	Hand Tools (electric)	15	8	96		
	Mobile Crane (100 tonne)	15	2	101		
	Welding Equipment	15	2	97		

Note 1: In accordance with the *ICNG*, for activities identified as particularly annoying (such as jackhammering, rock breaking and power saw operations), a 5 dB 'penalty' is added to the source sound power level when predicting noise using the quantitative method.

6.4 Predicted Construction Noise Levels

Table 6-4 details predicted construction noise levels for each scenario.

Table 6-4 Predicted Construction Noise Levels

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Level (dBA)				
		CNML	Highly Affected NML	Predicted		
				Earthworks	Hardstand	Construction
R01	Day (neutral)	52	75	**54**	51	47
R02	Day (neutral)	52	75	52	49	44
R03	Day (neutral)	52	75	**55**	50	46
R04	Day (neutral)	52	75	**56**	**53**	47
R05	Day (neutral)	52	75	**56**	52	48
R06	Day (neutral)	52	75	**58**	52	49
R07	Day (neutral)	52	75	46	42	37
R08	Day (neutral)	52	75	48	43	38
R09	Day (neutral)	52	75	**56**	52	47
R10	Day (neutral)	52	75	47	45	39
R11	Day (neutral)	52	75	47	45	38
R12	Day (neutral)	52	75	48	45	39
I01	Day (neutral)	75	-	52	51	46
I02	Day (neutral)	75	-	40	39	38

Receiver	Period (weather)	$L_{Aeq,15min}$ Noise Level (dBA)				
		CNML	Highly Affected NML	Predicted		
				Earthworks	Hardstand	Construction
I03	Day (neutral)	75	-	48	47	42
I04	Day (neutral)	75	-	47	45	40

Note 1: Highlighted text indicates an exceedance of the *ICNG* CNML.

Construction noise scenarios are predicted to be within the daytime CNML at most receiver locations, except for R01, R03, R04, R05, R06, R09 during earthworks and for R04 during hardstand works. Noise mitigation should be implemented to minimise noise impact on the surrounding receivers, as provided in Section 6.5.

6.5 Construction Noise Mitigation

As noted, the predictions indicate general compliance with the *ICNG* standard hours criteria without any focussed mitigation requirements, except for the minor exceedances at R01, R03, R04, R05, R06 and R09.

The *ICNG* describes strategies for construction noise mitigation and control that are applicable to this proposal. The strategies are designed to minimise, to the fullest extent practicable, noise during construction.

The following construction noise mitigation measures would be applied during the works:

- Minimising the coinciding use of multiple noisy plant items;
- Equipment which is used intermittently is to be shut down when not in use;
- Equipment with directional noise emissions would be oriented away from sensitive receivers as much as practicable;
- Regular compliance checks on the noise emissions of all plant and machinery used for the proposal would indicate whether noise emissions from plant items were higher than predicted. This also identifies defective silencing equipment on the items of plant;
- Non-tonal reversing alarms should be used on all items of plants and heavy vehicles used for construction; and
- Goodman would undertake pre-construction community consultation with receivers R01, R03, R04, R05, R06 and R09 in order clearly and transparently explain the proposed works and the potential for construction noise impacts. Regular on-going updates would be provided throughout the works in order to understand and address as far as practicable any noise related concerns of the receivers.

The identified measures would be carried out to ensure the works are undertaken with minimal noise impact.

6.6 Construction Vibration Impact Assessment

The vibration generating plant items would be set back from the site boundaries by at least 120m. Given this setback distance, vibration levels would not be discernible off-site, therefore no vibration impacts would be expected.

6.7 Construction Noise & Vibration Management Plan

A Construction Noise and Vibration Management Plan (CNVMP) should be developed with the contractor prior to commencement of site works. At a minimum, this should include:

- Confirmation that the results presented here are representative of the final construction methodology;
- Identify most sensitive receivers;
- Provide details of all reasonable and feasible noise mitigation measures required; and
- Inform site staff of this sensitivity and methods to reduce construction noise.

7 CONCLUSION

RWDI has undertaken an operational noise and construction noise & vibration assessment of the proposed Oakdale Eat Estate (OEE) in Kemps Creek, NSW.

7.1 Operational Phase

The principal OEE operational noise sources comprise of light and heavy vehicle movements, loading activities and fixed mechanical service plant. Noise modelling of these sources has been undertaken to determine potential noise impacts associated with the proposed operation of the OEE.

The following outcomes have been found during the assessment:

- The initial operation of precincts 1 and 3 of the OEE is predicted to comply with the operational noise criteria with the addition of some temporary noise barriers.
- The operation of full development of the OEE is predicted to comply with the operational noise criteria during the day, evening and night time periods with the inclusion of two small noise barriers along the southern boundary.
- It is proposed for noise barriers to be installed, following the confirmation of design of the buildings within Precinct 2 and 4, and prior to operation of Precinct 3 to ensure compliance.
- An assessment of potential sleep disturbance has been undertaken considering heavy vehicle brake releases and reverse alarms. Sleep disturbance prediction indicate that noise impact would comply with the relevant guidelines.

The cumulative effect of noise from all industrial sources has been considered in assessing potential noise impacts.

7.2 Construction Phase

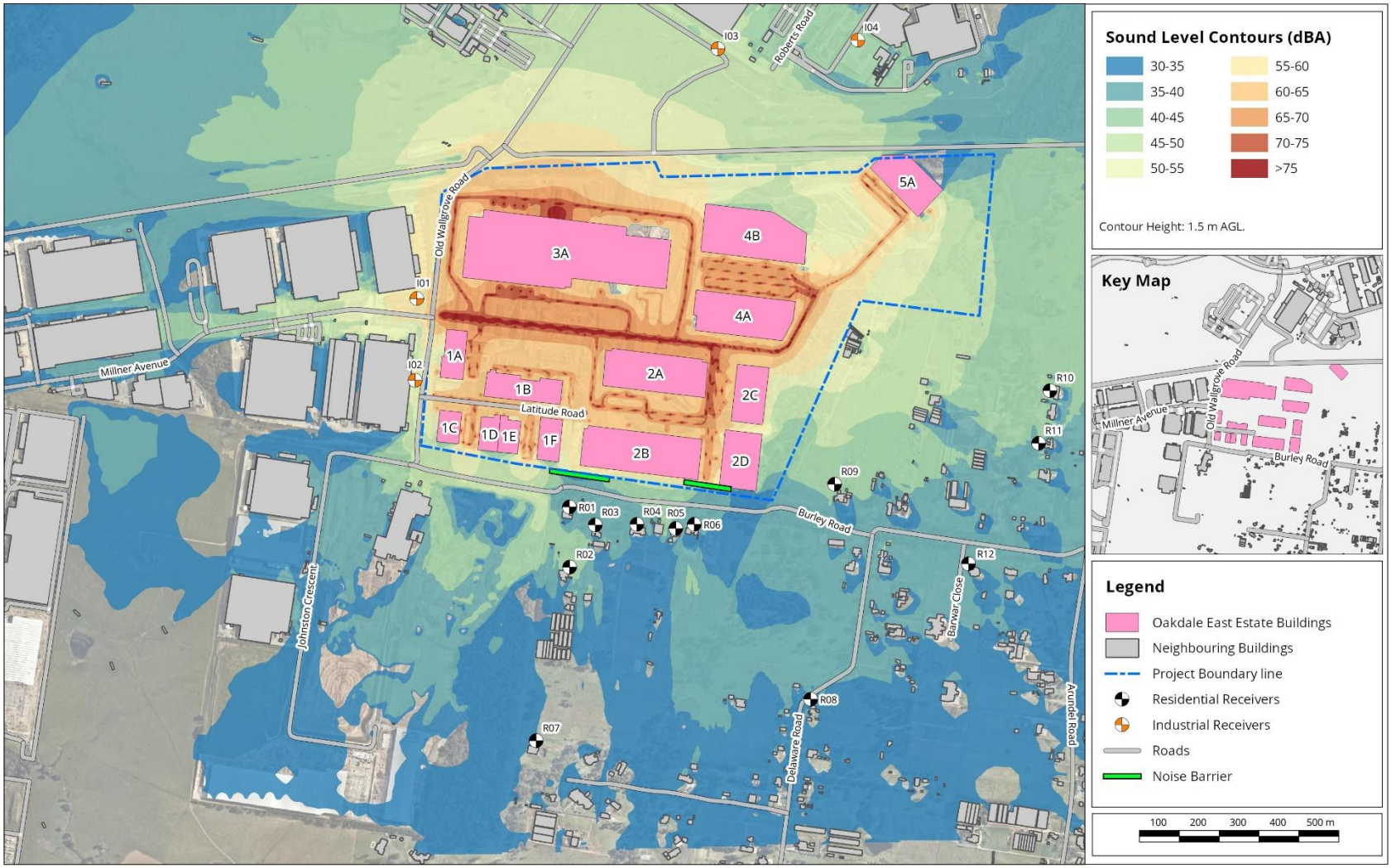
This assessment has considered construction noise and vibration impacts that have potential to arise during construction of the development.

The key construction works would involve earthworks at precincts 2, 3, and 4, pad and hardstand works at each lot, and the construction of the Building warehouse and office structures at Lot 3. All construction work scenarios include the use of the site access road for the delivery of materials to the site. The construction works are proposed to be undertaken during standard construction hours (7.00am-6.00pm Monday to Friday and 8.00am-1.00pm Saturdays).

Construction noise scenarios predict some exceedances of the daytime CNML during earthworks and hardstand works. Noise mitigation should be implemented to minimise noise impact on the surrounding receivers, as provided in Section 6.

No vibration impacts are anticipated during the proposed works.

APPENDIX A – OPERATIONAL NOISE CONTOURS



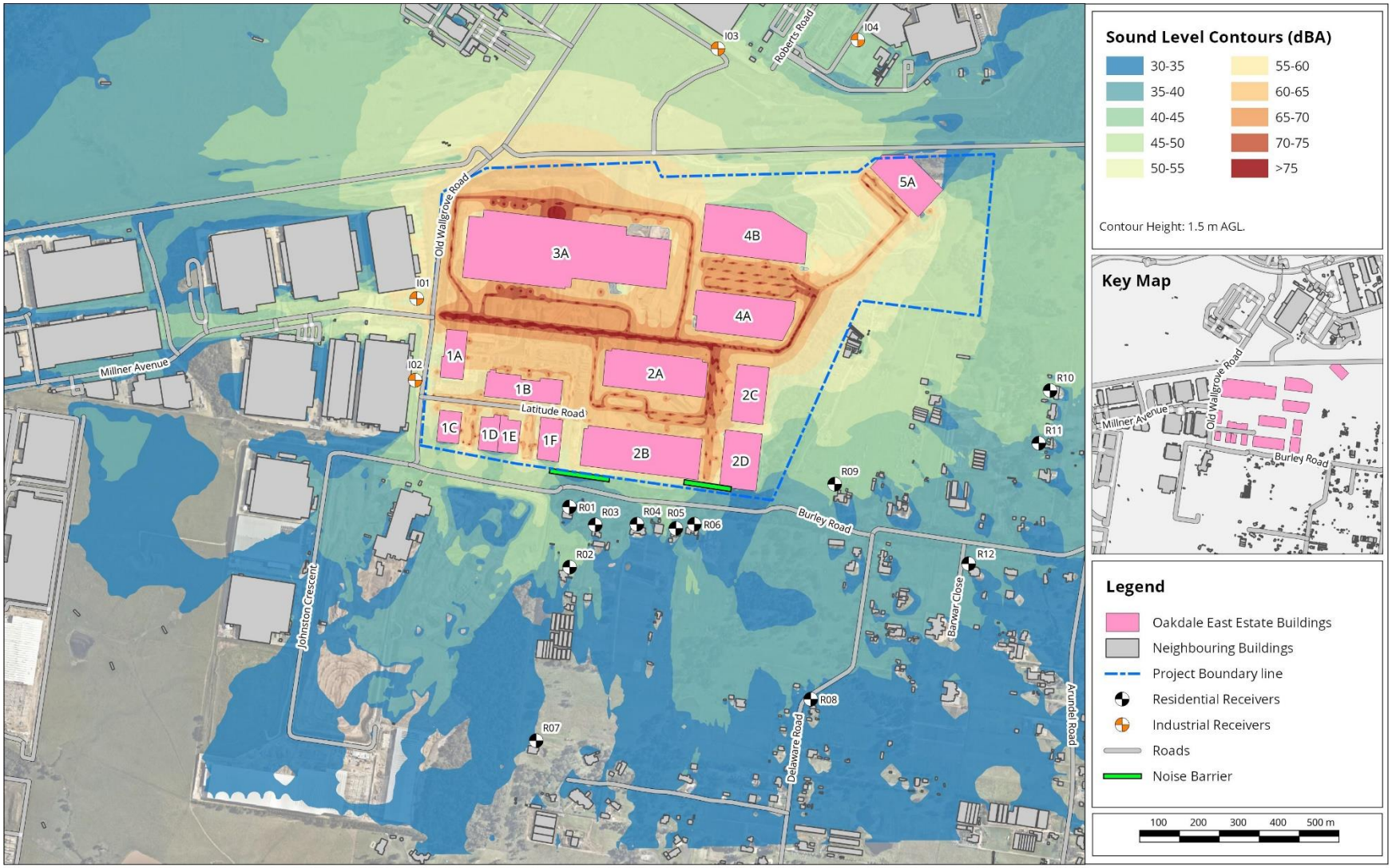
Sound Level Contours

Day time operations

Sources:
1. Building outlines: GeoVision Australia 2022
2. Basemap: © 2022 Nearmap

Map Projection: GDA94 / MGA zone 56 / (EPSG:28356)

Drawn by:	APIN	Figure:	A1
Project No.:	2200866		
Date Revised:	04 Apr 2022		



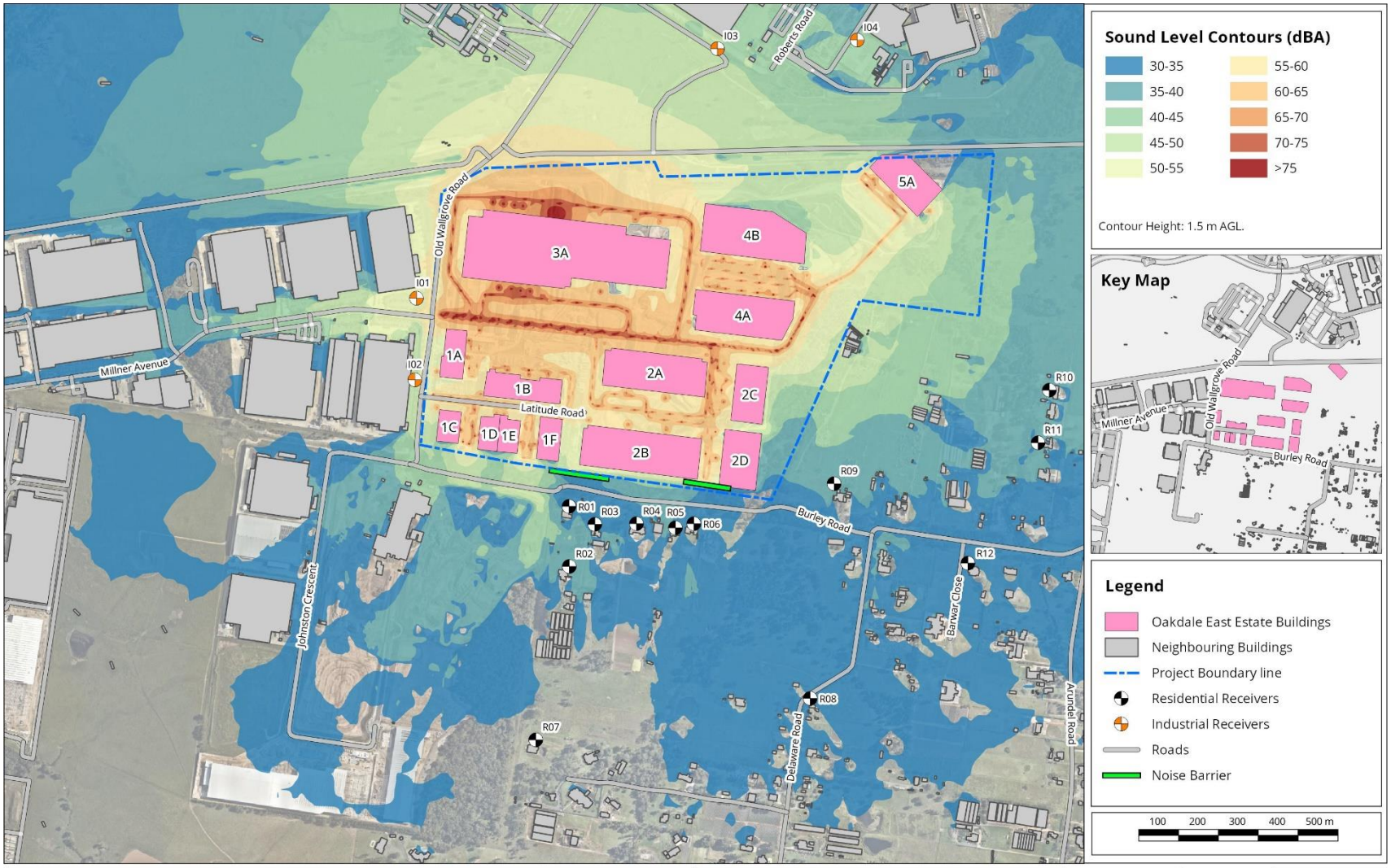
Sound Level Contours

Evening time operations

Sources:
1. Building outlines: GeoVision Australia 2022
2. Basemap: © 2022 Nearmap

Map Projection: GDA94 / MGA zone 56 / (EPSG:28356)

Drawn by: APIN	Figure: A2
Project No.: 2200866	
Date Revised: 04 Apr 2022	



Sound Level Contours

Night time operations

Sources:
1. Building outlines: GeoVision Australia 2022
2. Basemap: © 2022 Nearmap

Map Projection: GDA94 / MGA zone 56 / (EPSG:28356)

Drawn by:	APIN	Figure:	A3
Project No.:	2200866		
Date Revised:	04 Apr 2022		