

APPENDIX E

CHESTER HILL BUILDING RECYCLING OPERATIONS NOISE IMPACT ASSESSMENT

**REPORT NO. 17386
VERSION A**

APRIL 2018

PREPARED FOR

BUILDING RECYCLING OPERATIONS
191 MILLER ROAD
CHESTER HILL NSW

ACOUSTICS AND AIR

DOCUMENT CONTROL

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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.

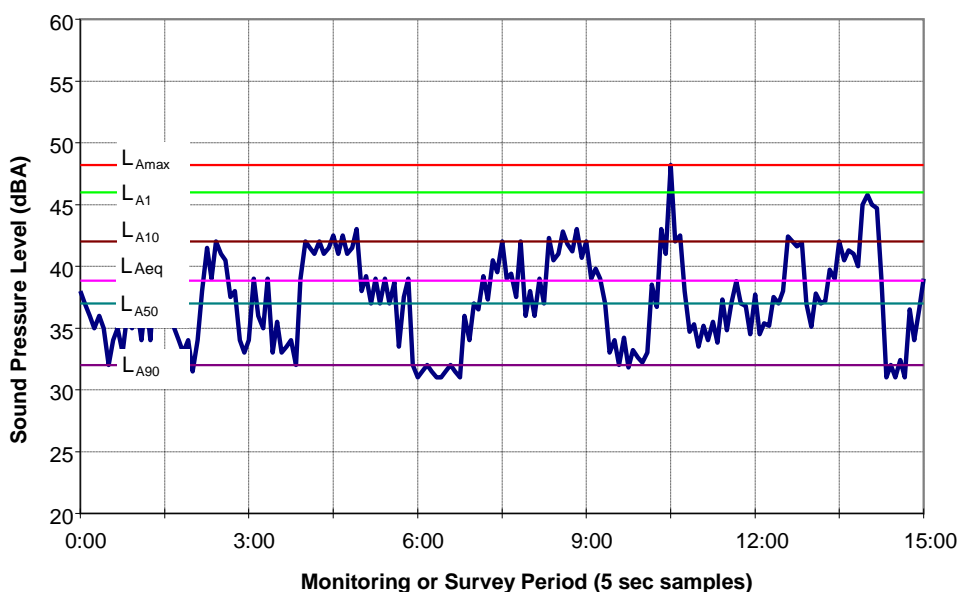
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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.

Typical Graph of Sound Pressure Level vs Time



1 EXECUTIVE SUMMARY

Wilkinson Murray have conducted a noise impact assessment to support the S75W application by BRO to modify the existing approval MP 06_0052 for the site located at 191 Miller Road Chester Hill.

The S75W seeks approval to:

- Upgrade the site to include hardstands and a partial enclosure for all future operations;
- Establish a daily processing limit of approximately 910 tonnes; and
- Increase the annual processing limit of the site to 250,000 tonnes per annum of building and demolition waste.

Modelling was conducted to assess operational noise, construction noise and traffic noise. With appropriate mitigation the project is expected to comply with all appropriate noise objectives.

The required mitigation for operational noise as discussed in this report includes a partial enclosure for the operations of the site including an 8m wall along the North-Eastern Boundary or a 6m wall and further enclosure of the facility. These are assumed to be implemented as part of the development.

2 INTRODUCTION

Building Recycling Operations Pty Ltd (BRO) operate a building waste recycling centre at 191 Miller Road Chester Hill. The facility operates under an existing approval (MP 06_0052) and Environment Protection Licence (EPL 20421). The facility is currently approved to process 100,000 tonnes of building and demolition waste per year.

BRO is proposing to construct a new enclosure to contain future operations and improve environmental controls. The main intent of this proposal is to bring the operations at the site into compliance with the current approval and licence conditions.

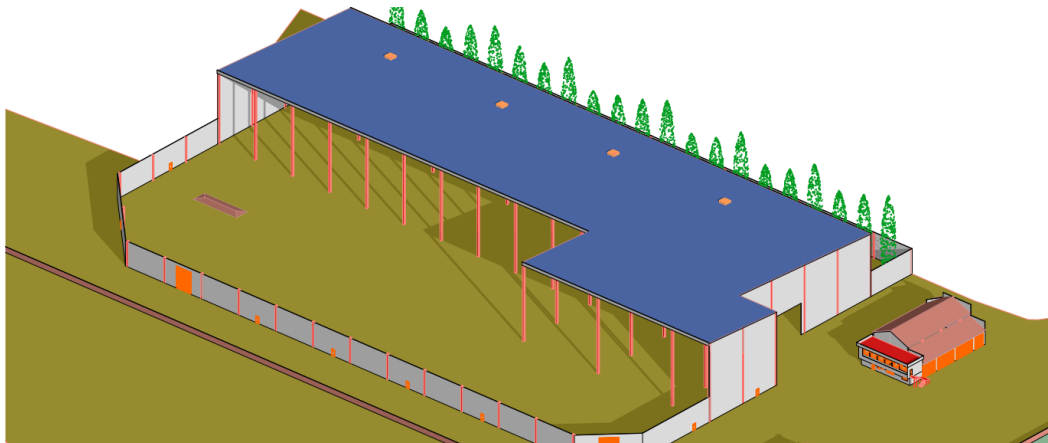
This assessment is written to support a section 75W application to modify the existing approval. The S75W seeks approval to:

- Upgrade the site to include hardstands and a partial enclosure for all future operations (building and perimeter barriers);
- Establish a daily processing limit of approximately 910 tonnes; and
- Increase the annual processing limit of the site to 250,000 tonnes per annum of building and demolition waste.

Figure 2-1 below depicts the proposed enclosure.

Wilkinson Murray Pty Ltd (WM) has been commissioned to assess potential off-site noise from the proposed development. Wilkinson Murray has assessed the potential noise impacts from the day to day operations as well as the impacts from generated traffic and construction noise.

Figure 2-1 Proposed Enclosure (Building and perimeter barriers)



2.1 Assessment requirements

This noise assessment has been prepared to support the Environmental Impact Statement (EIS) for approval of the Proposal and addresses the Secretary Environmental Assessment Requirements (SEARs) (ref: MP 06_0052 MOD 3) for the Proposal. Table 2-1 provides a summary of the SEARs which are relevant to this report and the section where they have been addressed in this report.

Table 2-1 SEARs (MP 06_0052 MOD 3) Compliance Table (Noise and Vibration)

| EARs | Where Addressed |
|--|--------------------------|
| Noise and Vibration, including a quantitative assessment of the construction, operation and transportation noise and vibration impacts on all affected receivers, prepared in accordance with relevant Environment Protection Authority Guidelines | 5.2 5.3 5.4 5.5 |

3 SITE DESCRIPTION

The site is located on Miller Road, Chester Hill. The site is bordered to the West by Miller Road and to the North by the T3 train line. The land use surrounding the site is predominantly industrial, with the nearest and most potentially affected residences located:

- approximately 120m to the north of the site, across the train line on Waldron Road;
- approximately 150m to the East on Orchard Road; and
- approximately 380m to the Southwest at the intersection of Miller Road and Biloela Street.

Figure 3-1 below shows the site layout and the relative location of the nearest residential and non-residential receivers. Table 3-1 gives the address of the closest receivers and their approximate distance to the site. Table 3-2 identifies the nearby industrial receivers and the current tenants.

The northern part of the site is tenanted by a separate business, GQM Logistics, a Container hire, storage and sales firm. The two businesses, BRO and GQM Logistics, are separated by a concrete driveway with a concrete divide to separate entering and exiting traffic.

The BRO site is currently surrounded by shipping containers, emplaced to act as noise barriers. These containers will be removed as part of the development and replaced by concrete barriers.

The site is located on an area of relatively flat terrain. The terrain rises gently towards the North and the East beyond the site.

The site is currently unpaved aside from the drive-way separating BRO with GQM Logistics.

Table 3-1 Residential Receivers and distances

| Receiver | Address | Approximate distance to site (m) |
|----------|----------------------|----------------------------------|
| R1 | 153-155 Waldron Road | 110 |
| R2 | 151 Waldron Road | 115 |
| R3 | 147 Waldron Road | 130 |
| R4 | 280 Miller Road | 385 |
| R5 | 116 Orchard Road | 135 |
| R6 | 14 Hughes Places | 130 |
| R7 | 2 Hughes Place | 130 |
| R8 | 11 Goodstate Place | 135 |
| R9 | 7 Goodstate Place | 160 |
| R10 | 259 Wellington Road | 170 |
| R11 | 1 Biloela Street | 390 |

Table 3-2 Non-residential industrial receivers

| Receiver | Name |
|----------|-----------------------------------|
| R12 | KU Chester Hill Children's centre |
| R13 | QGM Logistics |
| R14 | 173 Orchard Industrial Estate |
| R15 | Integrated Packaging |
| R16 | Display and Rack |

Figure 3-1 Site Overview



4 PROPOSED DEVELOPMENT

4.1 Project overview

Since BRO has taken ownership of the facility in 2016, it was found that the facility has a number of non-compliances in relation to the consent conditions in terms of environmental and amenity performance.

A Section 75W (S75W) application is to be submitted to address the legacy compliance issues. The S75W will seek approval to:

- Staged upgrade of the site including the erection of an enclosure for the sorting of materials;
- Establishment of a daily processing limit of approximately 910 tonnes; and
- Increase in the annual processing limit from 100,000 tonnes per annum to 250,000 tonnes per annum.

The key element of the proposed development is the creation of continuous hardstand areas and the construction of an enclosure work site. In addition to this, the site will implement systems to convert the facility into a state of the art purpose built facility including a superior screening process and modern dust suppression systems.

The project involves the removal of large quantities of potentially Asbestos Contaminated Materials (ACM) known as the legacy stock pile and clearing the site for a large, continuous concrete slab. The construction of an enclosed facility will follow. The facility will be 200m long and broken down into 14 separate bays with each bay spanning 12.5 meters in width. The new facility will provide a stream-lined layout of the site that will be more environmentally responsible and compliant.

The two distinct phases of the project are:

- Phase 1 – Removal of Legacy stock pile, site establishment works for all phases of the project;
- Phase 2 – Operations will be ceased whilst hardstand and enclosure are constructed. Operations to recommence after new processing equipment is in place and commissioned.

Figure 4-1, Figure 4-2 and Figure 4-3 below show the footprint and elevations of the proposed enclosed site. Entry to the enclosed site is located on Miller road and the exit is located on the North-West edge with trucks driving down the existing driveway.

The proposed development will include a 3m wall around the entire building foot print and will include an 8m high enclosed section covering approximately half of the building footprint.

All operations, including stockpiling, screening and dumping will occur behind the wall. Screening, picking and pre-sorting and sorting will occur under the covered section along the southern wall of the development. Truck deliveries, and excess stockpiling will occur in the uncovered section on the northern side of the development.

Figure 4-1 Footprint of proposed enclosure

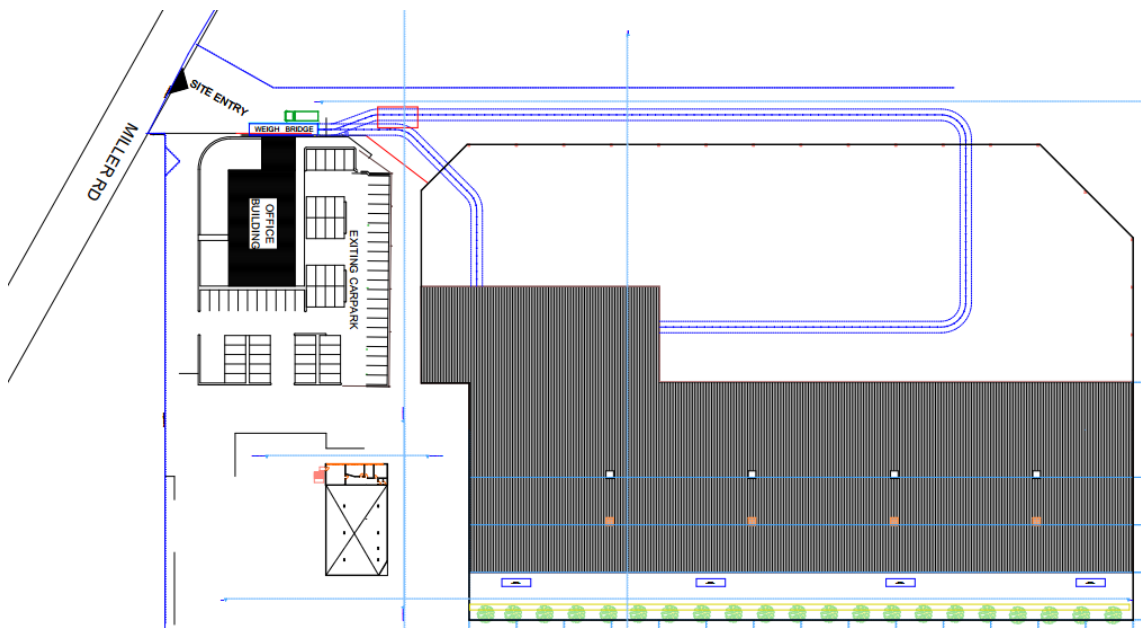


Figure 4-2 North Elevation

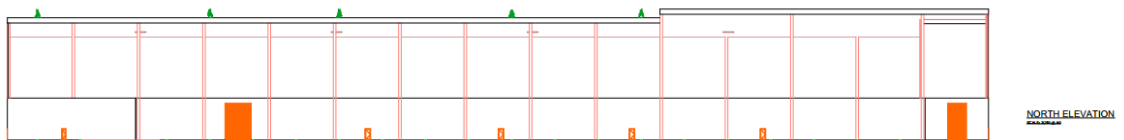
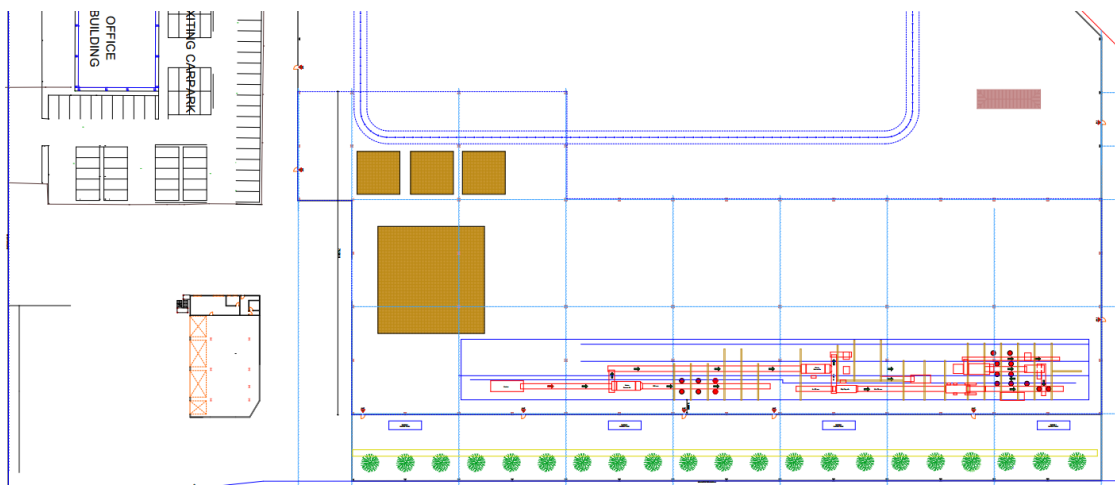


Figure 4-3 Site layout including processing equipment



The following equipment is proposed to be used to sort and screen the incoming material:

- 4 over band magnets to remove ferrous materials;
- 5 screens including 2 waste screens, a rotary screen and 2 flip flow screens;
- 3 sifters including a zig zag sifter and 2 wind sifters; and
- 2 manual picking stations.

The process can be described by the following 12 steps:

1. Trucks unload waste into designated areas and staff conduct preliminary checks for contaminated materials e.g asbestos;
2. Transfer of Material to Pre-Sort using two excavators;
3. A pre-sort is conducted to remove oversize objects. the pre-sorted material is loaded into a dosing bunker;
4. Primary Screening and Sorting to separate the material in 0-220mm and >220mm. The >220mm fraction is fed to manual picking station to sort items for either recovery or disposal;
5. Separation of Ferrous Metals from 0 to 220mm using overband magnet;
6. Secondary Screening using a second waste screen and two flip flow screens to separate materials into 4 fractions: 0 - 10mm, 10 - 20mm, 20 - 70mm and 70 -220m;
7. Recovery of Fines 0 – 10mm fraction;
8. Separation of Ferrous Materials from 10 to 20mm fraction using overband magnet;
9. Aggregate Decontamination of the 10 to 20mm using rotary screen, zig zag wind sifter and optical sorter;
10. Aggregate Decontamination of the 20 to 70mm using an overband magnet and wind sifter;
11. Sorting and decontamination of the 70 to 220mm using an overbelt magnet, wind sifter, manual sorting station, optical scanner and NIR scanner; and
12. All product is transported to bunkers prior to being loaded into trucks for sale or disposal.

The plant is equipped with dust extraction points for the manual sorting stations and transition points of materials, that will generate excessive dust. The extracted air and exhaust air from the wind sifters is filtered through a bag house before being vented to atmosphere.

Additionally, dust suppression misting system in use at various points along the process flow and the entry and exit points of the building to minimise dust emissions on the site.

5 NOISE AND VIBRATION IMPACT ASSESSMENT

5.1 Noise and Vibration Assessment Criteria

5.1.1 Operational Noise criteria

The site currently operates under licence EPL 20421, issued by the NSW EPA. The existing licence noise limits are set in section L3.1 of the EPL. These criteria have been adopted for this assessment to ensure that future operations comply with the current licence. The criteria set out in the licence are based on the original approval for the site. The limits set out in the licence are shown in the following Table 5-1.

Table 5-1 EPL20421 Noise limits

| Location | Day (dBA Leq 15 min) |
|--|----------------------|
| Residences in Waldron Road | 47 |
| Residences in Goodstate street/ Orchard Road | 50 |
| Any Other affected residence | 50 |

The licence does not currently specify limits at the neighbouring industrial receivers. The *NSW EPA's Noise Policy for Industry* sets an amenity Trigger Level for industrial receivers of 70dBA. This has been adopted for all industrial receivers surrounding the site.

The operating hours of the site are set out in section L4 of the licence. Table 5-2 below gives the operating hours as set out in the licence.

Table 5-2 Approved Operating hours

| Activity | Day | Time |
|---|--------------------------|-------------------|
| Normal Activities inc. construction work or transport of waste or other materials | Monday to Friday | 7:00 am to 6:00pm |
| | Saturday | 8:00am to 1:00pm |
| | Sunday or Public holiday | No time |
| Use of heavy machinery inc. 20 tonne excavator | Monday to Friday | 7:00am to 5:00pm |
| | Saturday | No time |
| | Sunday or Public holiday | No time |

5.1.2 Traffic Noise Criteria

The EPA's *NSW Road Noise Policy (RNP)* provides criteria for managing noise levels associated with traffic generating developments.

This development has the potential to increase traffic on the surrounding roads. The predominant source of traffic associated with this development will be 12.5 tonne trucks delivering waste to the facility and up to 42 tonne trucks removing waste from the facility.

Access to the premises will be via the existing driveway located on Miller Road. Movements on the site are considered under the operational noise assessment. Based on the RNP definition of Sub-arterial roads and local roads Miller Road could be classified as a Sub-Arterial road due to its connection to the Hume Highway and its traffic flows during peak hour. However due to the of the site distance from the Hume Highway and the surrounding area Miller Road has been conservatively designated a local road for the purpose of this assessment.

The *RNP* assessment criteria for residential land uses are presented in Table 5-3.

Table 5-3 Road Traffic Noise Assessment Criteria for Residential Receivers

| Road Category | Type of Proposal / Land Use | Noise Criteria | |
|---------------|---|----------------------------|----------------------------|
| | | Day (7am-10pm) | Night Time (10pm-7am) |
| Local Roads | Existing residences affected by additional traffic on existing local roads generated by land use developments | L _{Aeq,1 hour} 55 | L _{Aeq,1 hour} 50 |

With regard to the permissible increase in road traffic noise from a traffic generating development, the *RNP* states that:

"For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'."

Based on the existing traffic levels on Miller road, as discussed in section 5.3 below, traffic noise levels at the assessed receivers already exceeds 55 dBA L_{Aeq, 1hour} during the daytime. Therefore, in accordance with the RNP, any increases in road noise levels at sensitive receivers due to the project should be less than 2 dB.

5.1.3 Construction Noise Management Levels

The NSW EPA's *Interim Construction Noise Guidelines (ICNG)* recommends noise management levels (NML) for construction activities to control the impact on the surrounding community. The *ICNG* noise management levels are presented in Table 5-4.

Table 5-4 Interim Construction Noise Guidelines Management Levels

| Type of Receiver | Time of Day | Management Level $L_{Aeq,15min}$ | Measurement Point |
|--------------------|---|-------------------------------------|---|
| Residential | Recommended construction hours Monday to Friday 7am to 6pm | Noise affected RBL + 10dBA | Property boundary most exposed to construction noise. If the property boundary is more than 30m from the residence, the measurement point is the most noise affected point within 30m of the residence. |
| | Saturday 8am to 1pm | Highly noise affected 75dBA | |
| | No work on Sundays or Public Holidays | | |
| | Outside recommended standard hours | Noise affected RBL + 5dBA | |
| Industrial | Any time | 75dBA | Most affected occupied point of the premises. |

The noise affected level represents the point above which there may be some community reaction to noise. The highly noise affected level represents the point above which there may be strong community reaction to noise.

The construction Noise Management Levels (NMLS) for the development are presented in Table 5-5. The NML are based on the RBL's used to establish the EPA licence noise limits.

Table 5-5 Project-Specific Construction Noise Management Levels

| Location | Acceptable $L_{Aeq,15min}$ (Standard Daytime Construction Hours) | Highly Affected Noise Level (dBA) |
|---------------------------------------|---|-----------------------------------|
| Residential receivers Waldron Street | 52dBA | 75dBA |
| All other Residential Receivers | 55dBA | 75dBA |
| Industrial receivers surrounding site | 75dBA | - |

It is expected that construction will only occur during standard daytime construction hours.

5.1.4 Construction and Operational Vibration Criteria

When assessing vibration there are two main components that require consideration:

- Human exposure to vibration; and
- The potential for building damage from vibration.

Other aspects such as impacting sensitive equipment or heritage aspects are not relevant for this project.

Human Comfort Levels from Exposure to Vibration

Assessing Vibration: A Technical Guideline (ATG) published by the NSW Environment Protection Authority (EPA) provides guidance for assessing human exposure to vibration. The publication is based on British Standard BS 6472:1992. A review of the EPA guideline confirms that the proposed vibration intensive activities should be considered as intermittent vibration and is best assessed by the Vibration Dose Value (VDV) which is based on the *weighted* root mean quartic (rmq) acceleration.

Table 5-4 sets out VDV values as specified within ATG. Given that works will only occur during the day period, only these goals are provided. For a particular receiver type, where levels are predicted to lie between the values in Table 5-6, the impacts are considered to be minor with a low probability of adverse comment expected.

Table 5-6 Acceptable VDV values for intermittent vibration ($m/s^{1.75}$)

| Type of Receiver | Day (7am-10pm) | |
|--|----------------|---------|
| | Preferred | Maximum |
| Residences | 0.20 | 0.40 |
| Offices, Schools, Educational Institution and Places of Worship | 0.40 | 0.80 |

Building Damage from Vibration

There are currently no Australian Standards or guidelines to provide guidance on assessing the potential for building damage from vibration relating to demolition activities. It is common practice to derive goal levels from overseas standards. British Standard BS 7385:1993 and German Standard DIN 4150:1999 both provide goal levels below which vibration is considered insufficient to cause building damage. BS7385 is the most commonly used Standard and considered by WM to be the most appropriate for this project. Given that the main building types include commercial buildings using reinforced construction and residential houses and multi-storey apartment blocks potential using lightweight construction, Table 5-7 summarises the relevant guide values.

Table 5-7 Vibration Guide Values for Cosmetic Damage – BS7385-2

| Guideline Values for Velocity (peak component particle velocity) – mm/s | | |
|--|-------------------|------------------------|
| Frequency | 4 to 15 Hz | 15 Hz and above |
| Reinforced or framed structures | | |
| Industrial and heavy commercial buildings | 50 | 50 |
| <hr/> | | |
| Unreinforced or light framed structures | | |
| Residential or light commercial type building | 15 to 20 | 20 to 50 |

Note 1: Values referred to are at the base of the building.

Note 2: The values refer to the peak component particle velocity.

Note 3: At frequencies < 4 Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded.

5.2 Operational Noise Assessment

5.2.1 Methodology

Noise levels due to the proposed operation of the Project at the identified noise sensitive receiver locations have been predicted using a model created with the Cadna-A acoustic noise prediction software (Version 4.6). This program is used and recognised internationally and is also recognised by the EPA as a preferred computer noise model.

Factors that are addressed in the noise modelling are:

- Equipment noise level emissions and location;
- Screening from structures;
- Receiver locations (the closest residential boundaries were considered to represent the residential receivers);
- Ground topography;
- Noise attenuation due to geometric spreading;
- Ground absorption; and
- Atmospheric absorption.

For this assessment the typical worst-case scenario has been considered to be when the development is completed and the site will be operating at its new capacity of 250,000 tonnes per annum.

Noise source levels for the plant were based on measurements conducted by WM on site on the 29th November 2017 and WM's existing database of noise levels. A worst case 15 minute scenario was developed using the following noise sources presented in Table 5-8.

Table 5-8 Operational Noise Sources

| Source | SWL (dBA) | Reference |
|---|-----------|--|
| Front End Loader Moving Stock | 110 | Measured WMPL |
| Trucks movements within barrier | 107 | WMPL Database |
| Truck dumping load | 108 | Measured WMPL |
| 2 x Picking station and small generator | 93 | Measured WMPL |
| Large generator and conveyor circuit | 112 | Measured WMPL |
| 5 x screens (various types) | 113 | Measured WMPL |
| 2 x wind sifters (including wind source) | 111 | Acoustic Logic 20170598.1/0308A/R1/JL |
| Dust extraction circuit | 101 | Acoustic Logic 20170598.1/0308A/R1/JL |
| 2 x 20 tonne Excavator | 105 | Defra |
| Truck movements external to shed at 10km/hr | 107 | WMPL Database |

The walls of the structure were treated as barriers and an overhang was included to cover the enclosed portion. The was assumed there is no absorption in the shed and the noise sources were treated as free field.

5.2.2 Predicted Operational Noise Levels

The following Table 5-9 shows the predicted noise levels at the receivers

Table 5-9 Predicted operational noise levels

| Receiver | Trigger Level dBA L _{Aeq} 15min | Predicted level dBA L _{Aeq} 15min | Exceedance | Complies? |
|----------|---|---|------------|-----------|
| R1 | 47 | 52 | 5 | - |
| R2 | 47 | 51 | 4 | - |
| R3 | 47 | 53 | 6 | - |
| R4 | 50 | 33 | - | Yes |
| R5 | 50 | 39 | - | Yes |
| R6 | 50 | 39 | - | Yes |
| R7 | 50 | 40 | - | Yes |
| R8 | 50 | 40 | - | Yes |
| R9 | 50 | 41 | - | Yes |
| R10 | 50 | 41 | - | Yes |
| R11 | 50 | 33 | - | Yes |
| R12 | 70 | 48 | - | Yes |
| R13 | 70 | 56 | - | Yes |
| R14 | 70 | 42 | - | Yes |
| R15 | 70 | 47 | - | Yes |
| R16 | 70 | 48 | - | Yes |

A 4-6 dBA exceedance is predicted at the multi-storey receivers on Waldron Road. This exceedance is considered to be a moderate to significant impact and therefore requires noise mitigation.

5.2.3 Noise Mitigation

In order to reduce the noise levels at receivers on Waldron Road to the appropriate criteria mitigation is required. Due to the large footprint of the operations and elevated height of the affected receiver's mitigation options are limited. Two potential options are presented below, namely:

- Option 1: Increase the height of the wall to shield the receivers on Waldron Road. A 8m high perimeter wall along North Eastern corner of site would reduce predicted levels to meet the required trigger levels; or
- Option 2: Increase the height of the North Eastern section of wall to 6m AND add a partial enclosed section to covered portion of the facility.

Figure 5-1 shows the required extent of the 8m wall for option 1 and Figure 5-2 shows the extent of the wall and enclosed section for option 2. Table 5-10 and Figure 5-3 show the results after inclusion of the 8m wall. Figure 5-4 and Table 5-11 show the results after inclusion of a 6m wall

and a partial enclosure.

Figure 5-1 Mitigation option 1: 8m wall on NE perimeter

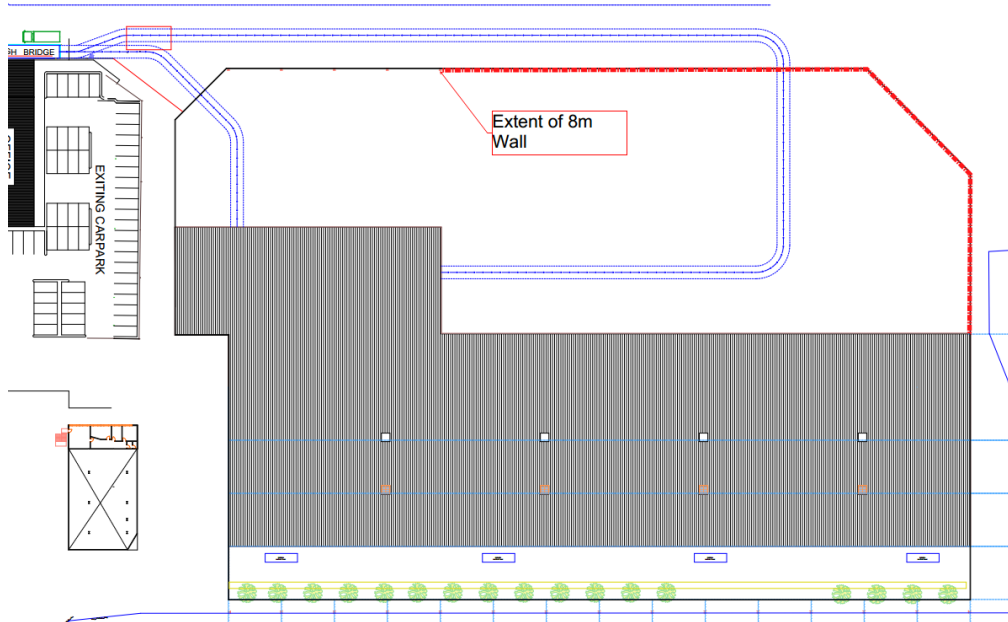


Figure 5-2 Mitigation option 2: 6m Wall with partially enclosed plant

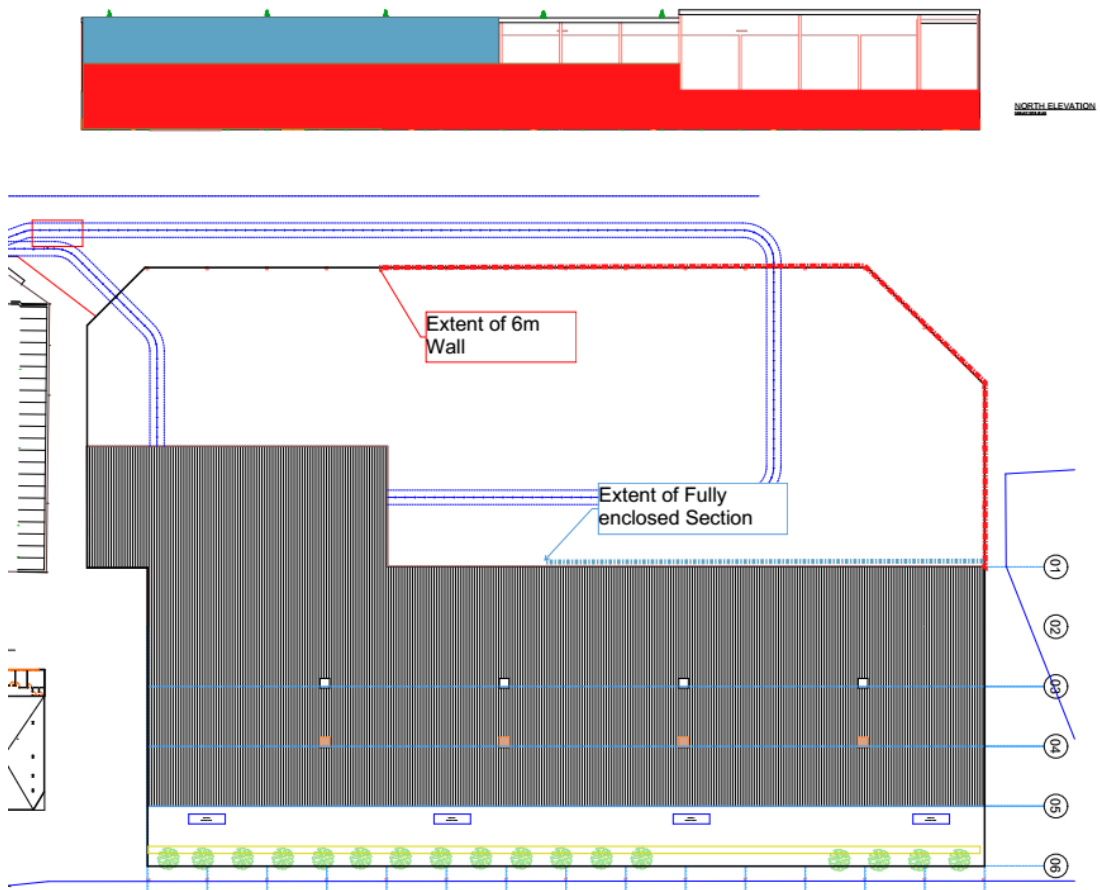


Table 5-10 Predicted operational noise levels Mitigation option 1

| Receiver | Trigger Level | Predicted level L _{Aeq 15min} | Exceedance | Complies? |
|----------|---------------|---|------------|-----------|
| R1 | 47 | 47 | - | Yes |
| R2 | 47 | 47 | - | Yes |
| R3 | 47 | 47 | - | Yes |
| R4 | 50 | 33 | - | Yes |
| R5 | 50 | 38 | - | Yes |
| R6 | 50 | 38 | - | Yes |
| R7 | 50 | 39 | - | Yes |
| R8 | 50 | 40 | - | Yes |
| R9 | 50 | 41 | - | Yes |
| R10 | 50 | 41 | - | Yes |
| R11 | 50 | 33 | - | Yes |
| R12 | 70 | 43 | - | Yes |
| R13 | 70 | 55 | - | Yes |
| R14 | 70 | 42 | - | Yes |
| R15 | 70 | 47 | - | Yes |
| R16 | 70 | 48 | - | Yes |

Table 5-11 Predicted operational noise levels Mitigation option 2

| Receiver | Trigger Level | Predicted level L _{Aeq 15min} | Exceedance | Complies? |
|----------|---------------|---|------------|-----------|
| R1 | 47 | 47 | - | Yes |
| R2 | 47 | 47 | - | Yes |
| R3 | 47 | 47 | - | Yes |
| R4 | 50 | 33 | - | Yes |
| R5 | 50 | 38 | - | Yes |
| R6 | 50 | 38 | - | Yes |
| R7 | 50 | 39 | - | Yes |
| R8 | 50 | 39 | - | Yes |
| R9 | 50 | 41 | - | Yes |
| R10 | 50 | 41 | - | Yes |
| R11 | 50 | 33 | - | Yes |
| R12 | 70 | 41 | - | Yes |
| R13 | 70 | 55 | - | Yes |
| R14 | 70 | 40 | - | Yes |
| R15 | 70 | 48 | - | Yes |
| R16 | 70 | 48 | - | Yes |

Figure 5-3 Noise Contours with mitigation option 1, L_{Aeq} 15min

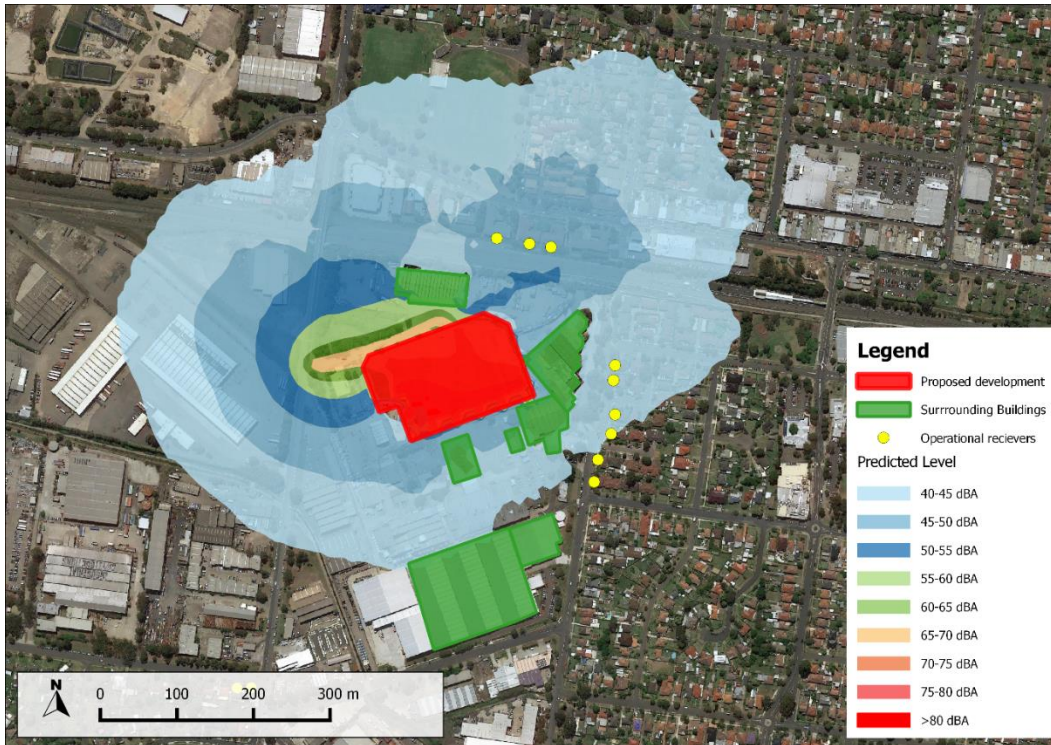
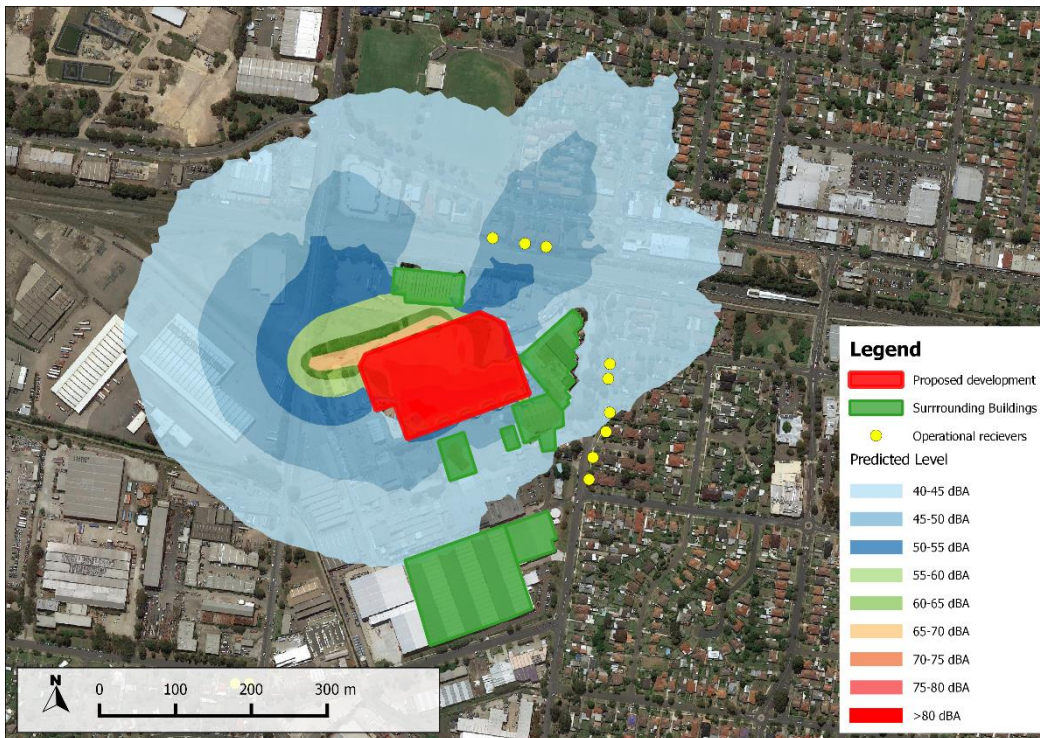


Figure 5-4 Noise contours with mitigation option 2, L_{Aeq} 15min



5.3 Traffic Noise Assessment

The proposed development is expected to generate traffic associated with the increase in throughput. Figure 5-5 shows the locations of residential receivers potentially affected by traffic noise. A Traffic Impact Assessment has been completed by 'The Transport Planning Partnership'. The TIA indicates that traffic is likely to arrive and depart from the site along the following routes:

- Hume Highway via Miller Road;
- Christina Road via Miller Road; and
- Gurney Road via Miller Road.

Based on these routes two areas potentially affect by traffic noise have been identified. Figure 5-5 shows the two areas on Miller road which have been considered for this traffic noise assessment.

Figure 5-5 Potential traffic impacted areas

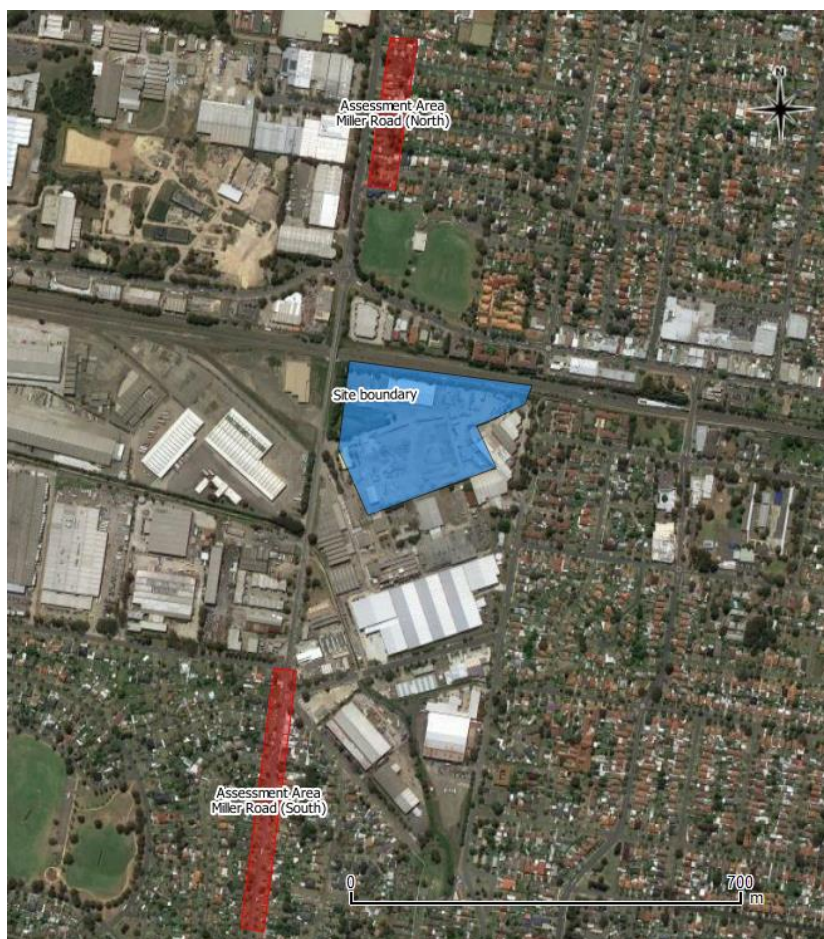


Table 5-12 below gives the address of representative impacted receivers and their setback from the road.

Table 5-12 Representative receivers for traffic impact

| Receiver | Impacted road | Minimum Setback distance |
|-----------------|---|--------------------------|
| 280 Miller Road | Miller Road (North) between Christina Road and Gurney Road | 10m |
| 183 Miller Road | Miller Road (South) between Biloela Street and Hume Highway | 12m |

Traffic noise levels have been predicted using the *Calculation of Road Traffic Noise (CoRTN)* model developed by the Welsh Office of the UK Department of Transport, 1988. The *CoRTN* method calculates the $L_{A10,18hr}$ noise level and takes into account the following factors:

- Traffic flow volumes;
- Average vehicle speed;
- Percentage of heavy vehicles;
- Gradient of road;
- Type of road pavement;
- Distance from receiver location to road;
- Shielding from barriers / building and intervening topography;
- Angle of view;
- Building facade reflection correction; and
- Ground absorption.

Table 5-13 below gives the traffic flows used for this assessment as per the TIA. For the purpose of being conservative in this assessment, it will be assumed that existing traffic flows are entirely light vehicles.

Table 5-13 Existing and additional peak traffic flows

| Location | Existing Traffic | Traffic with Development | |
|---------------------|------------------|--------------------------|--------|
| | | Volume | %Heavy |
| Miller Road (North) | 876 | 907 | 1% |
| Miller Road (South) | 1081 | 1112 | 1% |

Table 5-14 below gives the increase in noise levels experienced at the assessment locations due to the additional traffic generated by the proposed development.

Table 5-14 Increase in Road Noise Levels with development

| Location | Existing Calculated Traffic Noise Levels (dBA) | Predicted Increase (dBA) |
|---------------------|--|--------------------------|
| Miller Road (North) | 61 | 0.5 |
| Miller Road (South) | 62 | 0.5 |

The additional 22 truck movements and 40 light vehicles per hour results in an increase in the $L_{Aeq,1hr}$ of 0.5dB. This is below the 2dB criterion limit established in the RNP for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments. In accordance with the RNP, no mitigation of traffic noise levels, due to the operation of the Proposal, is warranted.

5.4 Construction Noise Assessment

Noise from the construction of the facility has the potential to impact on nearby receivers. Noise source levels for the plant were based on measurements conducted by WM and WM's database of noise levels. A worst case 15 minute scenario was developed using the following noise sources presented in Table 5-15.

Table 5-15 Construction Noise Sources

| Equipment | Sound Power Level (dBA) |
|--------------------------------|-------------------------|
| Excavator (approx. 20t) | 105 |
| Backhoe/FE Loader | 111 |
| Dump Truck (approx. 15t) | 108 |
| Truck delivery | 107 |
| Concrete Truck | 112 |
| Concrete Pump | 109 |
| Concrete Vibrator | 105 |
| Vibratory Roller (approx. 10t) | 114 |
| Generator | 104 |
| Cherry Picker | 102 |
| Mobile Crane | 110 |
| Hand Tools | 102 |
| Grader | 110 |

Note: Noise Level from DEFRA, AS2436-2010 and Wilkinson Murray database.

The majority of the construction work will occur either at a distance from the worst affected receivers or behind the existing shipping container noise barriers. However there will be some periods where the containers will provide no shielding either due to location or them having been removed as required for construction.

As with the operational noise, the Apartments on Waldron Road are the most likely affected receivers. A worst-case construction noise scenario was developed based on the following assumptions:

- No shielding from barriers;
- Hand tools used at a height;
- Telehandler located on site;
- Mobile Crane located in driveway;
- Concrete truck and concrete pump located on site; and
- Noise source located at northern end of site, closest to receivers on Waldron Road.

The predicted noise from the worst-case construction scenario were calculated using Cadna-A. The results are presented in Table 5-16.

Table 5-16 Predicted Construction Noise Levels

| Receiver | NML | Predicted level L _{Aeq} 15min | Exceedance |
|----------|-----|---|------------|
| R1 | 52 | 58 | 6 dBA |
| R2 | 52 | 57 | 5 dBA |
| R3 | 52 | 54 | 2 dBA |
| R4 | 55 | 46 | - |
| R5 | 55 | 41 | - |
| R6 | 55 | 42 | - |
| R7 | 55 | 42 | - |
| R8 | 55 | 41 | - |
| R9 | 55 | 42 | - |
| R10 | 55 | 42 | - |
| R11 | 55 | 46 | - |
| R12 | 75 | 50 | - |
| R13 | 75 | 67 | - |
| R14 | 75 | 63 | - |
| R15 | 75 | 65 | - |
| R16 | 75 | 60 | - |

Noise will need to be managed on a stage by stage basis. The use of the proposed equipment without mitigation measures has the potential to exceed the noise management level set out in 5.1.3. Mitigation measures should be used to manage exceedances of the noise management levels in accordance with the ICNG.

Under this worst case scenario, exceedances of the 'Noise Affected' Level of up to 6dBA are expected at the residences located on Waldron Road. This indicates that there may be some community reaction to noise and therefore construction noise needs to be managed using a construction noise management plan.

During construction activities, the following construction noise management and mitigation strategies should be adopted where feasible:

- Plant, where possible, to be strategically positioned to provide shielding where noise generation at a site is predicted to be above criteria at surrounding receptors;
- Limitation of use of acoustically significant plant (reticulation pumps) to minimise exposure to nearby residences (where possible);
- Undertake regular maintenance of machinery to minimise noise emissions.
- Consultation with residences immediately adjacent to proposed works will include letter box drops and verbal communication prior to works;
- Noise monitoring during activities predicted to generate maximum impacts;
- All contractors and staff will undergo noise awareness training.

BRO will maintain a community complaints line that will be available throughout the construction activities. Records of all community complaints will be maintained on an up-to-date complaints register. The records will include:

- Date and time of the complaint;
- The means by which the complaint was made (telephone, mail or email);
- Any personal details of the complainant that were provided, or if no details are provided, a note to that effect;
- The nature of the complaint;
- Any actions taken by the construction contractor in relation to the complaint, including any follow up contact with the complainant and the timing for implementing action; and
- If no action was taken by the construction contractor in relation to the complaint, the reason why no action was taken.

Maintenance will be confined to standard daytime construction hours and where possible, away from noise sensitive receivers.

5.5 Operational and Construction Vibration

None of the operations conducted on the site are expected to cause any significant vibration. However the following plant may be used during construction and could typically be expected to induce minor vibration:

- Truck movements;
- Excavator movements;
- Piling Rig; and
- Vibratory roller.

The nearest potentially affected commercial receivers are 15m away and are of heavy concrete construction. The nearest residential receivers are 100m away and are conservatively classified as typical lightweight construction.

Vibration goals have been provided in Section 5.1.4 of this report. As a guide, indicative working distances for typical items of vibration intensive plant are listed in Table 5-17. The indicative working distances are quoted for both "structural" damage and human comfort.

Table 5-17 Typical Vibration Emission Levels from Construction Plant

| Plant Item | Rating / Description | Indicative Working Distance | |
|------------------------|----------------------------------|--------------------------------|------------------------------|
| | | Structural Damage (BS 7385) | Human Response ¹ |
| Small Hydraulic Hammer | (300 kg – 5-12t Excavator) | 2 m | 10 m |
| Vibratory Roller | < 50 kN (Typically 1-2 tonnes) | 5 m | 15 m |
| | < 100 kN (Typically 2-4 tonnes) | 6 m | 20 m |
| | < 200 kN (Typically 4-6 tonnes) | 12 m | 40 m |
| | < 300 kN (Typically 7-13 tonnes) | 15 m | 60 m |
| Excavator | ≤ 30 t | 10 m | 15 m |
| Compactors | - | 15 m | 100 m |
| Dozer | - | 2 m | 10 m |
| Jackhammer | Hand held | 1 m (Nominal) | Avoid contact with structure |
| Trucks | - | - | 10 m |

Note: 1. The working distances for Human Response assume that the source of the vibration is continuous throughout the 16-hour daytime period. Section Error! Reference source not found. indicates that higher levels of vibration are acceptable when the vibration levels are intermittent or impulsive. The safe working distances are therefore considered to be conservative and it is likely that the safe working distances corresponding to a "low probability of adverse comment" would be less than indicated.

5.5.1 Human Comfort

The minimum distance from any residence to the location of construction plant operation exceeds that required for the human comfort criteria to be achieved. Vibration levels at industrial neighbours may possibly be felt.

5.5.2 Building Damage

The distances to residential receivers (and to surrounding industrial premises) exceed those applicable to safe working distances for building damage. Vibration levels due to construction works are not predicted to result in damage to buildings.

The vibration caused by any equipment either in construction or in operation of the facility is expected to be well below the recommended levels for cosmetic damage and human comfort.

6 CONCLUSION

Wilkinson Murray have conducted and Noise impact assessment to support the S75W application by BRO to modify the existing approval MP 06_0052 for the site located at 191 Miller Road Chester Hill.

The S75W seeks approval to:

- Upgrade the site to include hardstands and a partial enclosure for all future operations;
- Establish a daily processing limit of approximately 910 tonnes; and
- Increase the annual processing limit of the site to 250,000 tonnes per annum of building and demolition waste.

The noise emissions associated with the daily operation is predicted to have a minor to moderate impact on receivers on Waldron Road. With mitigation the levels can be reduced to the appropriate trigger levels. Several options for mitigation have been discussed including increasing the height of the North Eastern section of wall to 8m or increasing the height of the North Eastern section of wall to 6m and adding a partial enclosed section to covered portion of the facility.

The increase in road traffic noise is predicted to comply with the relevant noise criteria.

Noise Management levels were established for the construction of the site. Minor exceedances of the noise management levels could potentially be experienced during a worst-case scenario. Noise levels will be managed using all feasible and reasonable measures as per the Interim Construction Noise Guideline.

Vibration criteria were established for both construction and operation of the site. No vibration impact from either construction or operation is expected.

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