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SAND QUARRY, 60 VALLEY ROAD & 150 QUARRY ROAD, LANGWARRIN

Acoustic Report for Quarry Extension Application

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Prepared For

HEIDELBERG MATERIALS AUSTRALIA

DOC. REF: V1716-01-P ACOUSTIC REPORT (R1)
19 JUNE 2025

Enfield Acoustics Pty Ltd
ABN 15 628 634 391
Ph: +61 3 9111 0090
PO Box 920
North Melbourne, VIC 3051

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Project Sand Quarry, 60 Valley Road & 150 Quarry Road, Langwarrin
Subject Acoustic Report for Quarry Extension Application
Client Heidelberg Materials Australia
Document Reference V1716-01-P Acoustic Report (r1).docx
Date of Issue 19 June 2025

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1 Introduction & Scope

Enfield Acoustics has been engaged by Heidelberg Materials Australia (formerly Hanson Construction Materials Pty Ltd) to assess potential noise impacts from the proposed sand quarry extension at 150 Quarry Road & 60 Valley Road, Langwarrin (Subject Land).

The extension was statutorily endorsed under Work Authority WA13 on 10 March 2022 with the following Work Plan Specific Conditions:

Noise
5. Prior to commencement of works approved under Work Plan Variation PLN001130, the authority holder must assess compliance with the relevant noise limits in accordance with the Environment Protection Regulations 2021 and Noise Protocol and consistent with the Technical guide: Measuring and analysing industry noise and music noise (EPA Publication 1997); and
6. Within 3 months of completion of the assessment required under Condition 5, the authority holders must provide ERR with a report, including risk treatment plan (as applicable), demonstrating (in consultation with the EPA) that noise levels are in line with relevant standards and that the risks have been minimised as far as reasonably practicable.

The adjoining land surrounding the proposed area of extension already operates as a quarry with processing and sales. To avoid doubt, we will refer to this extension proposal as the Extension Site.

Earth Resources Regulator (ERR) has endorsed Work Plan Variation to extend the existing Hanson Langwarrin Quarry WA13 boundary to include the Valley Road site (Extension Site). The amended Work Authority will give Hanson the right to extract sand subject to planning approval and a Work Plan and Work Authority approved by ERR.

1.1 Planning Application

This acoustic report is written in support of a planning permit application under the Development Facilitation Program (DFP), noting that this would also satisfy WA Condition 5 above.

In relation to noise impacts under the Planning Scheme, the relevant trigger is:

- Clause 52.09 – Extractive Industry and Extractive Industry Interest Areas.

The relevant extracts of Clause 52.09 are as follows:

52.09
24/01/2020
VC160

EXTRACTIVE INDUSTRY AND EXTRACTIVE INDUSTRY INTEREST AREAS

Purpose

To ensure that use and development of land for extractive industry does not adversely affect the environment or amenity of the area during or after extraction.

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52.09-1
24/01/2020
VC160

Application

This clause applies to an application to use or develop land:

- For extractive industry;
- Within an Extractive Industry Interest Area; or
- Within 500 metres of an existing or proposed extractive industry operation.

52.09-4
24/01/2020
VC160

Decision guidelines

Before deciding on an application to use and develop land for extractive industry, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The ability of the proposed extractive industry to contain any emissions within the boundaries of the land in accordance with relevant legislation.
- The effect of vehicular traffic, noise, blasting, dust and vibration on the amenity of the surrounding area.

This assessment is inclusive of minor amendments to plans we have received, as follows:

- Figure WP04 (extraction pit contours), dated 14 February 2024.
- Figures WP02 & WP03 (cross sections), dated 25 October 2024.

A site plan of the quarry expansion (in purple) is shown below, taken from the Work Plan:



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This assessment will assess the likely noise impacts from the proposal and whether it can comply with statutory noise limits, inclusive of any mitigation measures and/or controls that may be required or already considered within the Work Plan.

1.2 Work Plan

The Work Plan was supported by an acoustic assessment prepared by a different consultant, Watson Moss Growcott (WMG). The WMG report was included as Appendix 10 with the Work Plan, which has been statutorily endorsed by the ERR.

A number of minor changes have occurred since the WMG report was prepared. While the WMG report did not assess noise impacts specifically with respect to a planning application, the assessment methodology and key recommendations in that report carry over to the planning assessment because:

- Noise limits are regulated under statutory legislation and regulations.
- Those regulated noise limits apply under both a Work Authority and Planning Permit, only the Authority and administration of conditions varies.

The key recommendation from the WMG report is that extraction within the Extension Site should be limited to the Day period, as defined in the Regulations, 7am-6pm Monday to Saturday. We have carried over this recommendation for the purpose of the planning assessment.

It is noted that WA13 and the Work Plan refer to slightly different hours of operation for extraction, as follows:

Operating Hours (24 Hour)			
	Above Ground Operations	Sales	Processing
Mon-Fri Start	7:00	6:00	0:00
Mon-Fri End	18:00	18:00	24:00
Sat Start	7:00	6:00	0:00
Sat End	19:00	18:00	24:00
Sun Start	N/A	N/A	N/A
Sun End	N/A	N/A	N/A
Public Holiday Activity	No	No	No
Operational hours Clarification			

For this assessment, we are only concerned with the 'Above Ground Operations' defined above, noting that a 7pm finish on Saturday has been approved on the Work Plan. Regardless, our assessment proceeds on the basis of the recommended hours in the WMG report, limiting extraction to 6pm on a Saturday.

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It is understood that blasting will not be required in the Extension Site, otherwise relying on the following extraction method:

- Dredge located at base of pit, transferring materials to stockpile/processing areas
- Bulldozer and excavator working on benches at pit face, pushing sand into pit base to feed dredge
- When required, dump trucks moving sand from bench to pit

The existing pit on-site is shown in the following photograph:



2 Site Context

Based on our review of the site, the nearest sensitive uses were identified as follows:

Tag	Location of Sensitive Use	Zoning
R1	Northern dwellings	RLZ
R2	Eastern dwelling	RLZ

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Given that the sensitive uses identified above are the closest to the Subject Land, it is intrinsic that compliance at these locations would also result in compliance at all other possible sensitive uses proximate to the Subject Land that are setback further away (>600m in all other directions).

Further, the identified sensitive uses are adjacent to other existing and potential future industrial uses. Appropriately, our assessment will also consider the risks of cumulative noise impacts that could potentially occur as a result of the expansion.

3 Policy Requirements

3.1 Planning Scheme

Clause 52.09 has already been referred to above as relevant to the planning application. It is noted that there are no noise policy documents referenced at Clause 52.09. *Commercial, Industrial and Trade Premises* is inclusive of extractive industry, as defined under the *Environmental Protection Regulations 2021* (Regulations). To that end, it is reasonable to consider that where the noise limits prescribed by the Regulations are complied with, Clause 52.09 is also satisfied with regard to noise impacts.

3.2 Noise Protocol (Publication 1826)

Noise from any *Commercial, Industrial and Trade Premises* must comply with the Regulations as prescribed in accordance with EPA Publication 1826: *Noise Limit and Assessment Protocol for the*

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Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Noise Protocol).

The methodology for determining the applicable noise limits under the Noise Protocol is dependent on several factors, in particular for this site whether a sensitive uses within the Rural area are located within a Major Urban Area (MUA).

Given that Receivers R1 and R2 are both located outside the MUA boundary, the applicable limits have been derived based on Section 2.7 of the Noise Protocol, which stipulates specific noise limits for earth resources, as follows:

Receiver R1 & R2

Period	Zone Levels / Noise Limit RLZ
'Day' Period 7am to 6pm (Monday to Saturday)	45 dB(A)
'Evening' Period 6pm to 10pm (Monday to Saturday) 7am to 10pm (Sundays)	N/A – Not Operating
'Night' Period 10pm to 7am (All days)	

The Noise Protocol considers 30-minute average energy noise emissions, meaning that the relevant assessment metric being considered is $L_{Aeq-30min}$, dB(A).

It is noted that site clearing and preparation works are exempt from noise limits during the 'Day' period under Table 4 of the Noise Protocol, in particular given that the removal of topsoil and overburden will be used to construct acoustic mounds for the project (discussed later).

3.3 General Environmental Duty (GED)

Under the *Environment Protection Act 2017* (EP Act 2017), any industry is required to fulfill their General Environmental Duty (GED). In effect, the GED requires that environmental impacts and the risk of harm are minimised by reasonable and practicable means, however the GED does not set out prescriptive or objective targets and acceptability under the GED is at the discretion of the Authority.

Under the GED, industrial premises are required to have reasonable knowledge about the risks the proposed activities pose. Ultimately, ongoing compliance with the GED required operators to take reasonable, proactive steps and employ good environmental work practices, which includes minimising noise impacts where practicable.

In effect, the GED makes it clear that operators are responsible for managing their use and reducing their impact to surrounding sensitive uses.

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4 Assessment

4.1 Benchmark Noise Measurements and Proposed Equipment

To obtain noise emission data, Enfield Acoustics carried out benchmark testing of the Applicant's similar operation at 760 McDonalds Track, Lang Lang.

Measurements and observations were made of the dredge in wet pit conditions. Sound power levels have otherwise been taken from the WMG report for dozers, excavators and dump trucks.

The Lang Lang dredge operation is shown in the following photograph:



The following 30-minute Sound Power Levels were used in our assessment:

Item	dB(A)	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Dredge	104	103	97	101	98	95	90	83
Dozer and Excavator	111	109	118	111	109	106	102	97
Dump Truck	112	110	108	108	110	107	105	99

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4.2 Noise Modelling

To assess the proposal, a 3D computational noise model has been generated using the software package CadnaA to predict noise levels at all sensitive uses identified.

The following inputs and assumptions were included in our noise model:

- Pit depths and elevations based on Figure WP04 (refer Appendix A).
- Land topography surrounding the site imported from publicly available resources
- Dozer and excavator working in tandem at the top of the pit face at locations representative of 'worst-case' conditions
- Dredging activities occurring at the pit base
- All activities within the Extension Site operating continuously and cumulatively
- ISO9613 noise modelling algorithm, assuming worst-case meteorological conditions, favourable to sound propagation in all directions

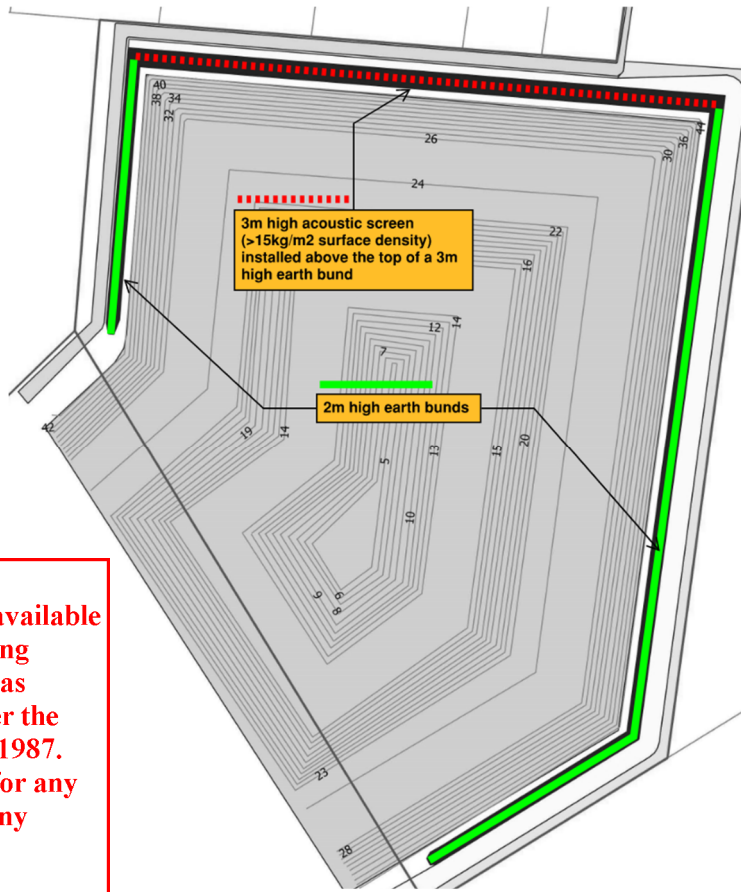
We consider the above assumptions to be conservative as we have assumed all operations, equipment, and machinery to be occurring simultaneously at worst-case locations. In effect, the noise model considers excavation activities (dozer and excavator) occurring at the closest point to each dwelling, as well as the highest point within the Extension Site.

In order to meet the regulated noise limits, the following acoustic mitigation strategies are required as shown on the following plans:

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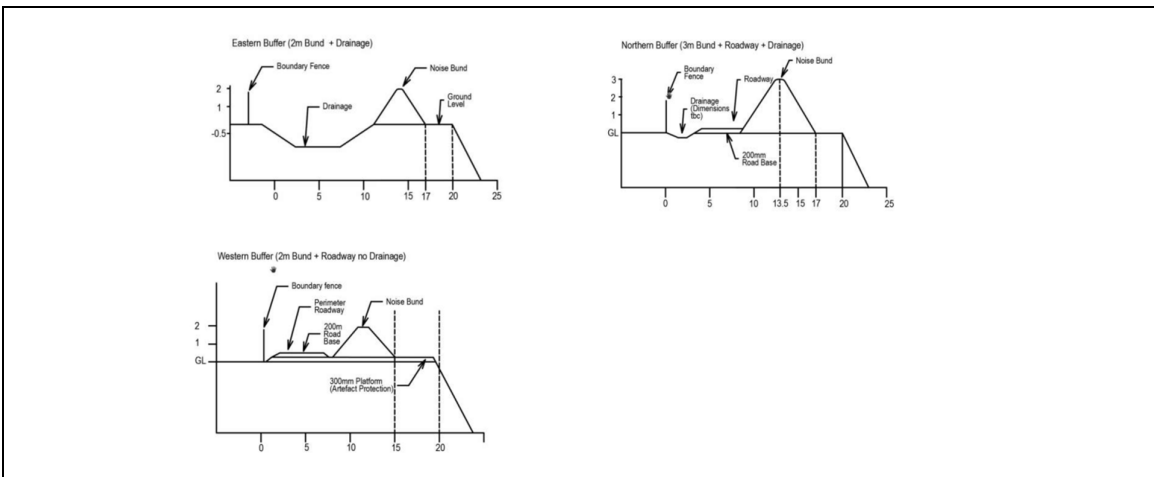
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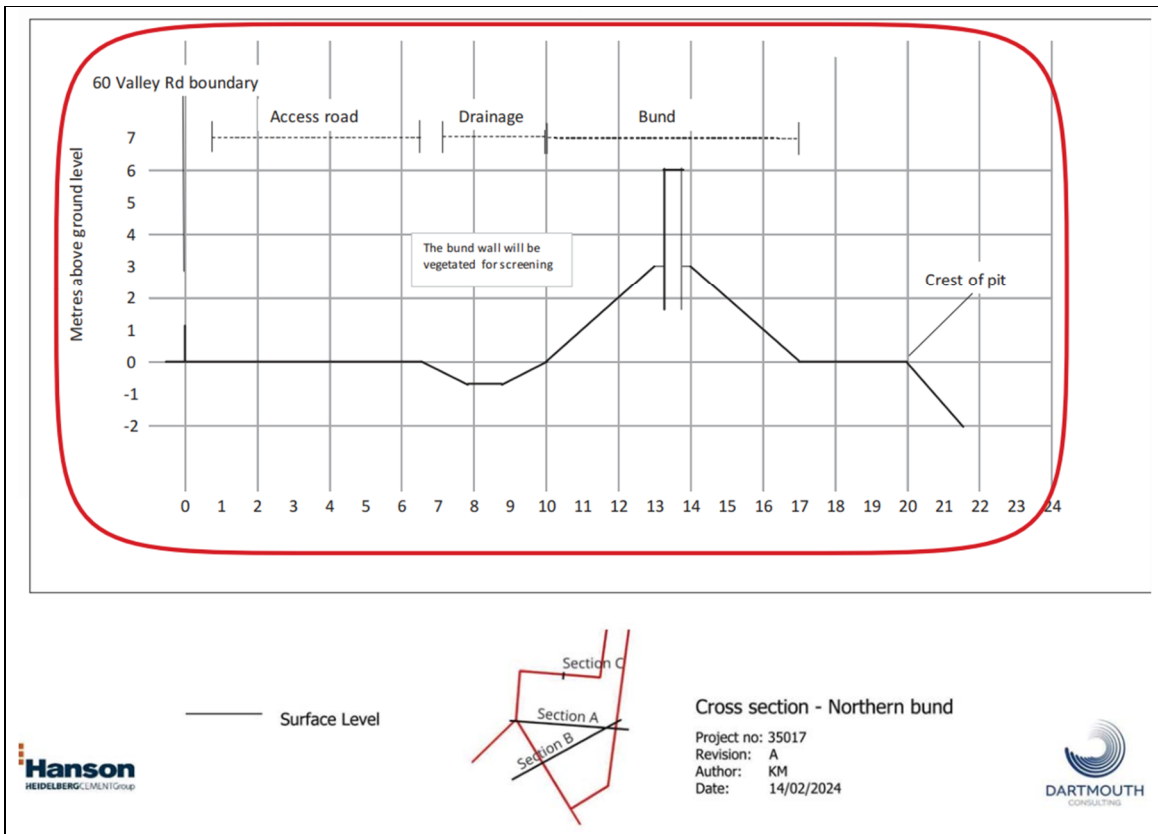
It is noted that the earth bunds have already been incorporated into the endorsed work plan, as shown below:



For the northern bund, a 3m high acoustic screen is required above the top of the bund to the following requirements:

- Using fibre cement sheeting, treated timber, lightweight aerated concrete, transparent acrylic panels, glass and profiled sheet cladding as long the selected material (or combined skins) has a mass of at least 15kg/m²;
- The fence shall have no gaps or holes in it, or the likelihood of such occurring through natural causes or deformations, thus allowing noise to pass through;
- The fence must be designed and built in an acceptable manner so that noise will not pass underneath it;
- Any butt joints shall be sealed with a fire-rated weather proof mastic or an overlapping piece of material meeting the mass requirements of 15kg/m² (minimum 35mm each side of the butt joint); and
- Where multiple cladding layers are used (e.g. FC sheeting over timber paling fence), joints in the cladding materials shall not coincide.

This acoustic screen is not shown on the endorsed work plan, however is indicated on the amended plans (see below).



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Inclusive of the required acoustic treatments above, the following 'worst-case' noise levels have been modelled:

Quarrying Activities, Leq-30min

Receiver	Effective Noise Level $L_{Aeq-30min}$	Noise Limit	Exceedance/comply?
Receiver R1	40 dB(A)	45 dB(A) - 'Day'	✓ ≥ 5 dB(A) margin
Receiver R2	31dB(A)		✓ ≥ 14 dB(A) margin

The results of our noise modelling indicate that noise emissions would comply with the Noise Protocol by a margin of at least **5dB(A)** during the 'Day' period, inclusive of the recommended acoustic mitigation above.

A map of the noise model is presented in Appendix B of this report.

The noise levels we have modelled are again consistent with the WMG report, with the exception that our results are marginally lower because additional noise mitigation has been incorporated into the design, when compared to what WMG assumed in 2019.

It is noted that the margin of 5dB in an intended outcome from the proposed mitigation to allow for:

- Potential cumulative noise impacts from existing industries (+3dB)
- Potential tonal noise character from quarrying activities (+2dB)

Further, it is also noted that the margins of compliance are likely greater than predicted above where:

- The dozer and/or excavator are operating within deeper sections of the pit face (i.e. at lower elevation)
- The dozer and/or excavator are operating at positions setback from the boundary of the extraction area
- Noise emissions do not occur continuously over a 30-minute period (e.g breaks in extraction activities)

Overall, we are satisfied that the quarry extension can be managed to comply with the Noise Protocol under conservative assumptions and with sufficient margins such that noise limits are not exceeded at any point of the operation.

4.3 General Environmental Duty (GED)

Under the Environment Protection Act 2017, any industry is required to fulfil its General Environmental Duty (GED). In effect, the GED requires that environmental impacts are minimised if considered reasonable and practicable to do so.

The core principles of the GED however relate to the control of noise where:

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1. It is practicable to do so, which amongst other factors, includes the cost of these controls being implemented; and
2. It is reasonable to do so, typically meaning there would be some benefit to impacted receptors if those controls were implemented.

Regarding point 1 above, this is not normally a matter that can be addressed by an acoustic expert; however we note that there may be some benefit if the Applicant is able to demonstrate that either:

- The cost of implementing additional controls would be significant to the business.
- Implementing additional controls would result in unreasonable operational constraints

Guidance on what is reasonably practicable is also provided in EPA Publication 1856, which requires the consideration of six factors (see below).

<ol style="list-style-type: none"> 1. Eliminate first: Can you eliminate the risk? 2. Likelihood: What's the chance that harm will occur? 3. Degree (consequence): How severe could the harm be on human health or the environment? 4. Your knowledge about the risks: What do you know, or what can you find out, about the risks your activities pose? 5. Availability and suitability: What technology, processes or equipment are available to control the risk? What controls are suitable for use in your circumstances? 6. Cost: How much does the control cost to put in place compared to how effective it would be in reducing the risk?
--

Our office has prepared commentary to address the above factors, as follows:

Item	Commentary
Eliminate First	The facility relies on plant and equipment to operate and noise emissions cannot be eliminated entirely. It may be possible to eliminate tonal alarm noise for on-site mobile plant, where practicable to do so and where not otherwise required by safety provisions. Where possible, replace beepers with broadband alarms.
Likelihood	The likelihood of harm occurring is low given that noise emissions will occur only during less sensitive 'Day' hours. The site is also particularly well suited for the operation proposed given that quarrying activities are already occurring within the surrounding area.
Degree	Given that noise emissions can comply with the Noise Limits by a margin of 5dB(A), we consider the degree of harm to human health to be low.
Knowledge About the Risks	Our modelling relies on empirical benchmark data from sand quarries operated by the Applicant and comparable benchmark sites to raise the state of knowledge of the proposal, that is:

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	<ul style="list-style-type: none"> • Characteristically similar in operation • Operated by the Applicant <p>This helps inform impacts from the proposed site and is considered more reliable than non-benchmarked noise data, assisting in eliminating some risk from inconsistent assumptions in noise modelling.</p>
Availability and Suitability	Generally, newer plant and equipment relies on more current technologies as a general approach to improve the efficiency of the operation. This inherently compliments efforts in reducing noise impacts as newer equipment tend to have lower noise emissions, compared to older equipment with older technologies (such as the equipment used in the benchmark site)
Cost	Given that noise emissions are expected to comply by reasonable margins, we do not consider that any cost imposition for mandatory mitigation to the Applicant would be reasonable in this context, as the risk of impact has already been sufficiently addressed by the proposed mitigation acoustic bunding and screening.

In efforts to further demonstrate compliance with the GED however, several measures can be considered by the Applicant, including:

- Installing broadband squawker alarms to all mobile plant to eliminate the risk of tonality impacts (as recommended above)
- Turning off engines and/or equipment when not in use
- Selecting 'low-noise' options for equipment where available

The above is considered general guidance to further minimise the risk of harm, however as above, the practicality of the implementation of the above recommendations is outside the scope of an acoustic expert as it may result in unsatisfactory operational constraints and/or not be reasonably practicable.

5 Conclusion and Recommendations

Enfield Acoustics is satisfied that the proposed sand quarry expansion can be approved on the basis of the plans we have assessed. The use is expected to comply with the Noise Protocol by a reasonable margin to account for cumulative impacts from other industry in the area during the hours 7am-6pm Monday to Saturday.

It is again noted that the statutorily endorsed Work Plan would allow 7am-7pm extraction on a Saturday. WMG's recommendation to limit extraction to 7am-6pm would reduce this by 1-hour on a Saturday. Our assessment is also that extraction needs to be limited to 7am-6pm to meet the regulated noise limits.

Additional measures to satisfy the requirements of the GED have been presented in Section 4.3, however, it is tentative whether any further mitigation could be considered reasonable or practicable given the open air operation, confined hours of operation and significant acoustic screening that has been implemented into the design.

On this basis, we are satisfied that the proposal can be approved, providing that the following mitigation measures and controls are adopted:

Item	Recommendations/Controls
Excavation and dredging within the Extension Site	Permitted to occur between 7.00am and 6.00pm, Monday to Saturday.
Acoustic Screening	Earth bunds and acoustic screening to be installed in accordance with Section 4.2, prior to excavation and dredging works occurring.

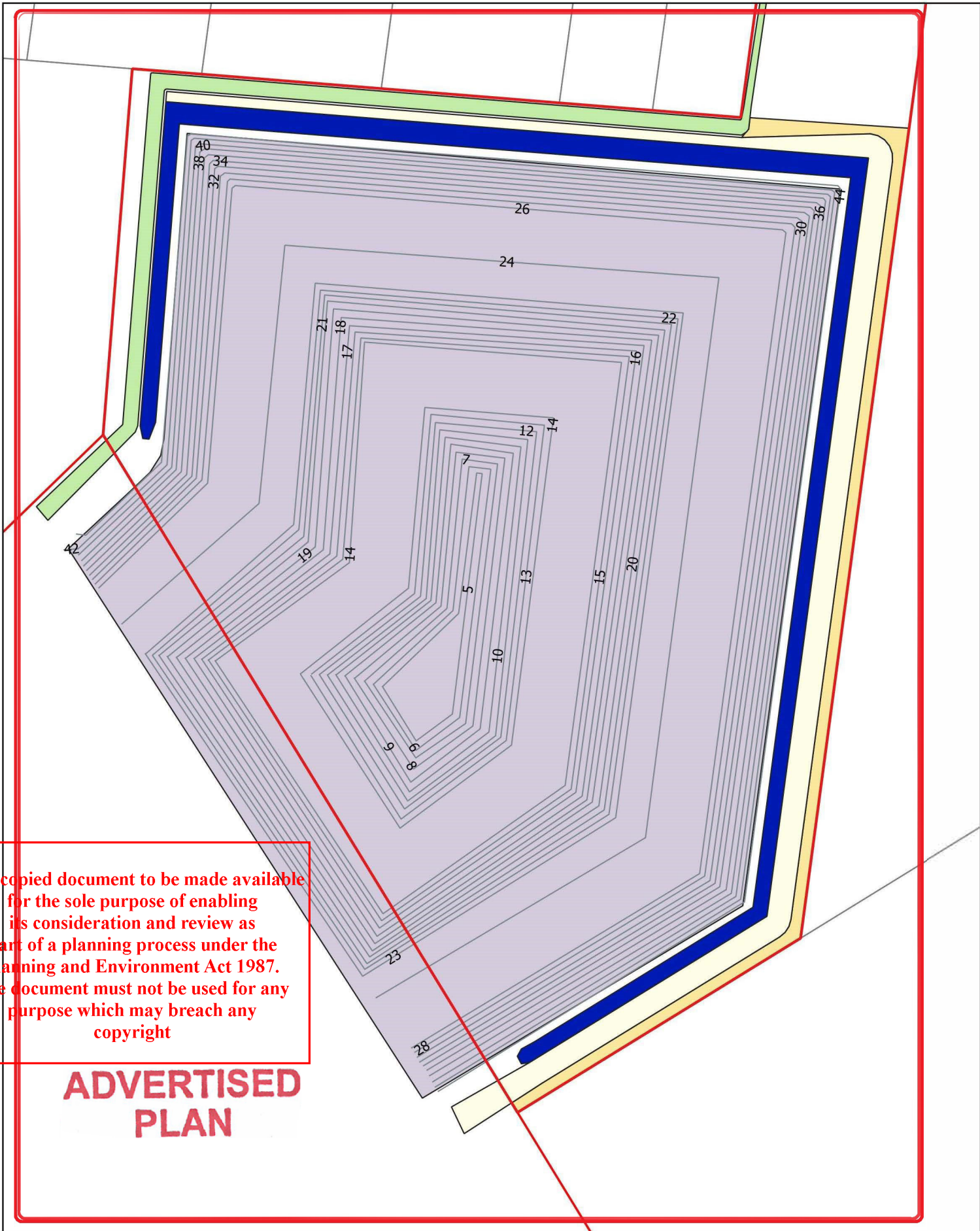
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Appendix A: Site Plan

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Legend








-  Site Boundary
-  Pit contours
-  Drainage
-  Vehicle access track
-  Bund
-  Pedestrian access
-  Extraction area

Figure WP04 Extraction

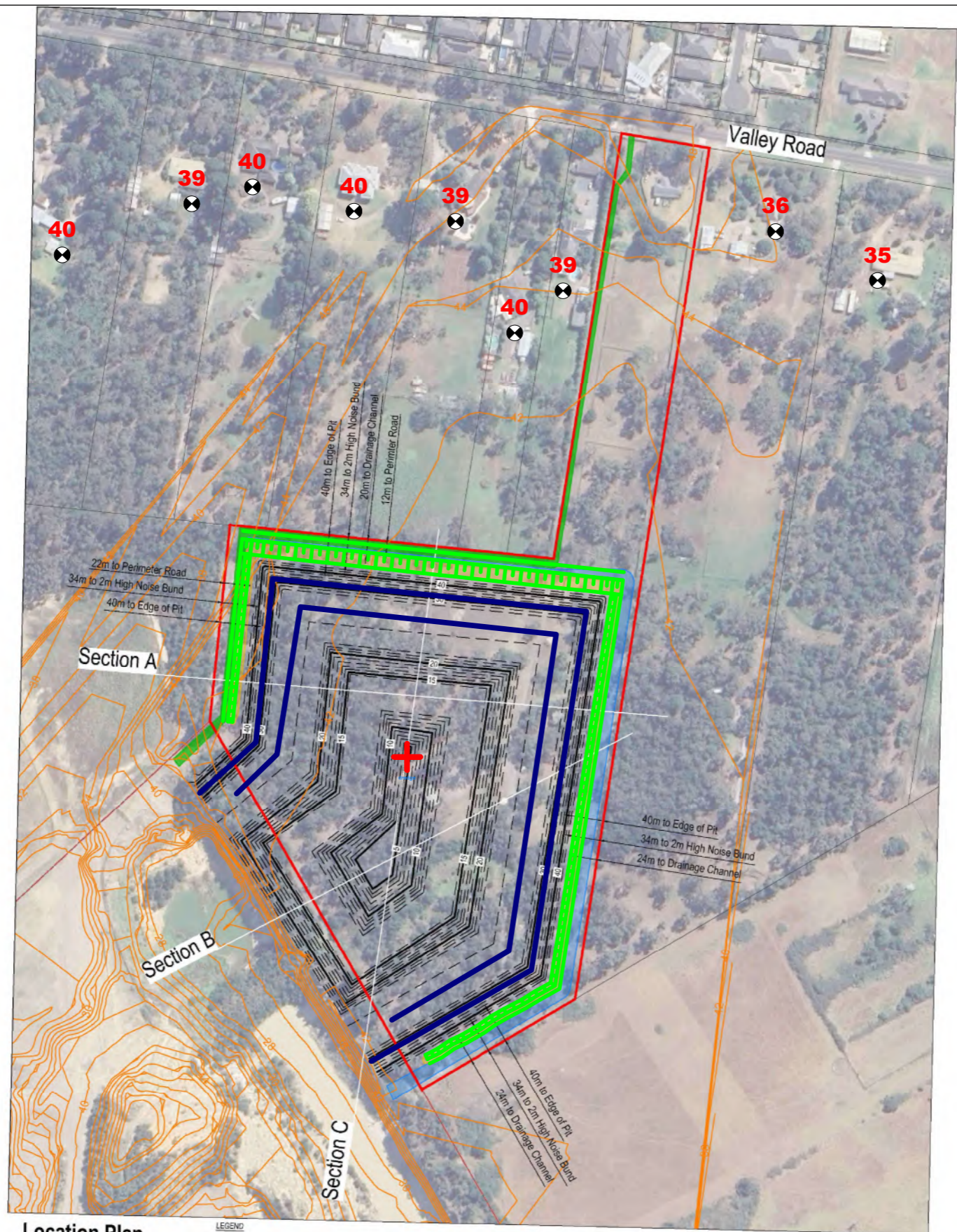
Project no: 35017
 Revision: B
 Author: KM
 Date: 14/02/2024



Appendix B: Noise Modelling Map

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Scale: 1: 3271 @ A3

Legend:

- + Point Source
- Line Source
- Embankment
- Contour Line
- ⊗ Receiver
- ⊕ Building Evaluation
- Calculation Area

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PO Box 920
North Melbourne, VIC 3051
P: 03 9111 0090

NOISE EMISSIONS LEVELS - NOISE PROTOCOL ASSESSMENT

LAeq-30min Noise Levels

'Day' Period

Project No: V1716

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Drawing No: MAP-01 Date: 21.03.2025

NOTES:

*Propagation in accordance with ISO9613