Government of **Western Australia**
Department of **Water and Environmental Regulation**

Technical (Review) Report

Advice on the acoustic assessment report for the sand extractive industry, Lots 4 and 5 King Road, Oldbury, prepared for the Shire of Serpentine-Jarrahdale

Department of Water and Environmental Regulation

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Environmental Noise, Department of Water and Environmental Regulation.

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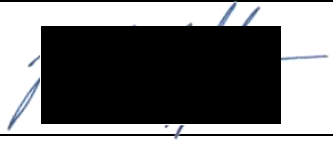
Signature 	Date 16/07/2024

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1. Introduction

This advice has been prepared for the Shire of Serpentine-Jarrahdale in response to a request for comment made to the Department of Water and Environmental Regulation (DWER) on the acoustic assessment in relation to the proposed sand extractive industry to be located at Lots 4 and 5 King Road, Oldbury.

2. Documentation

The following document was referred to and formed the basis of this technical expert advice.

Material / document name	Author	Date
Acoustic Assessment Extractive Industry Lot 5 King Road, Oldbury (Ref: 23098383-01C)	Lloyd George Acoustics	28 May 2024
Guideline for the Assessment of Environmental Factors No.3 Separation Between Industrial and Sensitive Land Uses	Environmental Protection Authority	June 2005

3. Advice

DWER's Environmental Noise Branch (ENB) has reviewed the Environmental Acoustic Assessment report prepared by Lloyd George Acoustics (LGA) for the sand extraction.

The LGA report references the prescribed standards under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations). This criteria is appropriate and represents the legislated standard noise emitters are required to comply with.

It is observed the LGA report states *overburden in addition to topsoil will be moved to the north-westerly corner of the site, with approximately 200-400mm from the surface until the viable sand resource is found*. Regulation 13 of the Noise Regulations relates to noise as a result of construction work and provides for an exemption from the assigned (or allowable) levels. It is noted regulation 13(1)(g) of the Noise Regulations defines *construction work* as including *the removal or reinstatement of vegetation or topsoil for the purpose of or in relation to a mining operation.* Therefore, whilst the removal and reinstatement of the vegetation and topsoil is not required to comply with the assigned levels, the removal and any subsequent stockpiling or use of the

overburden is considered to be part of the operational aspects of the extractive industry. Consequently, the removal, storage and reinstatement of any overburden which is outside the scope of *construction work* should be considered as part of Scenario 1. In doing so, it needs to consider equipment operating up to the boundary – as well as away from the bund.

While some aspects of bund construction may be 'exempt' from the assigned noise levels under regulation 13 the construction activity can still have an impact on amenity. The Shire may wish to request more details about the time period over which the bunds will be constructed and noise modelling for the construction activity to better understand those impacts.

Concerning Table 2-3 (Assigned Levels) within the LGA report, receivers R2 and R7 have incorrectly been identified as industrial noise receivers resulting in the highest assigned levels applying.

The LGA report assumes the dwellings at R2 to be caretakers' dwelling on industrial premises which is inconsistent with the consideration of caretakers' dwellings discussed in the Western Australian Planning Commission's (WAPC) *Planning Bulletin 70/2017 Caretakers' dwellings in industrial areas* (Planning Bulletin 70). Among other considerations, Planning Bulletin 70 notes:

- "only one caretaker's dwelling is permitted on a lot and that dwelling should be on the same lot as the associated industrial use; and

- a caretaker's dwelling is to have a total floor area that does not exceed 100 square metres measured from the external face of walls."

The R2 property appears to consist of two dwellings and poultry farming operations. The dwellings are no different to those found on any rural property where primary production activities occur. Rural properties often include things such as packing sheds and processing plant. As receivers of noise, those areas would usually be considered industrial receivers for the purpose of Table 1 (assigned noise levels) of the Noise Regulations, while the remainder of the property would usually be considered noise sensitive. The Noise Regulations allow for the consideration of different types of noise receiving premises within the same property. In this instance, areas used for industrial production and processing might be considered to be 'industrial' receivers of noise, but the dwellings and their immediate surrounds would be deemed *noise sensitive premises: highly sensitive area* under Table 1 of the Noise Regulations.

When considering the assigned levels for *noise sensitive premises: highly sensitive area* it is necessary to calculate the Influencing Factor (IF). The IF is a calculation method built into the Noise Regulations to account for any increase in ambient noise levels that can be attributed to commercial and industrial activities within a 450 metre radius, as well as the effect nearby busy roads may have. This IF is then added to the assigned levels for the day time, evening and night time periods to create an adjusted assigned levels that is specific to each noise sensitive premises receiver.

Given that the ENB considers the appropriate assigned level for the residences at R2 is *noise sensitive: highly sensitive area,* the IF needs to be calculated. In doing so, the

ENB considers the portion of lot 51 King Road directly associated with the poultry farm operations as commercial land in accordance with clause 2(7) of Schedule 3 of the Noise Regulations; while the extractive industry areas across all relevant lots are taken to be industrial land in accordance with clause 2(3). Calculations undertaken by the ENB suggest an appropriate IF for R2 is 4 dB and therefore the adjusted day time L_{A10} assigned level is 49 dB(A). Only the day time assigned levels are considered relevant as it is understood the operations are to be limited to 7am to 5pm Monday to Friday. Please refer to Appendix A for calculation methodology used and Table 1 for comparison of the calculated L_{A10} assigned level to the LGA predicted levels.

Table 1 – Assessment of the predicted noise levels at R2

	Day time L_{A10} Assigned level (dB(A))	LGA modelled level – with tonal adjustment (dB(A))	Exceedance (dB)
Scenario 1	49	63	14
Scenario 2	49	55	6
Scenario 3	49	58	9

The IF is affected by the amount of excavation area within 450 metres of noise sensitive receivers, so if the extraction area is expanded towards the receivers the IF will increase - resulting in an increase in the assigned noise levels that apply. It is to be noted that in relation to R2, the existing IF is calculated to be 1 dB. By way of comparison, the proposed expansion of the extractive industry closer to R2 will result in that IF increasing to 4 dB. Consequently, the adjusted assigned levels at R2 would be increased by 3 dB owing to the proposed extractive industry expansion. This increase in the noise levels allowed to be received at residential locations may be a relevant planning consideration.

In the case of R7, it does not appear from aerial imagery that there is a dwelling on the property, however the property was identified as containing a wholesale plant nursery. Further to this, the ENB does not believe that a plant nursery meets the classification of premises for the purposes of Part A (industrial and utility premises) or Part B (commercial premises) of Schedule 1 of the Noise Regulations. Consequently, it is considered appropriate to deem the lot as being noise sensitive for the purposes of determining the appropriate assigned level. Having said this, it is acknowledged that the modelling suggests that compliance will be achieved, even if an L_{A10} assigned level of 60 dB(A) is applied (from Table 1 of the Noise Regulations: *noise sensitive premises: any area other than highly sensitive area*).

With regards to the noise measurements that were undertaken by LGA, it is not specifically noted how long each item of equipment was measured for, however it suggests that the duration of these was 1.5 minutes each - with reference to capturing

a minimum 10% of the minimum Representative Assessment Period of 15 minutes in order to determine if a tone was present. It is unclear from the report what operations the short measurement periods characterise. For example, it is understood from the description the front-end loader obtains a load of sand from the face, transports it to the waiting truck, empties it and returns – a cycle repeated. If this entire operation occurs within a small area, a single measurement may characterise the L_{A10} noise level of the loader. However, if the distance between the face and the truck is substantial, several measurements may be necessary, and the transporting of the load to the truck may be a significant source of noise because of the increased speed and RPM of the loader and duration of the noise. The LGA report would benefit from a more complete description of the measurement procedures, particularly given no make or model of loader is provided, so sound power levels cannot be verified against manufacturer's data.

It is noted that in Table 3-2 of the LGA report reference is made to *Truck Loading/Unloading x 3* with a sound power level 10 dB lower than that of the *Front-End Wheeled Loader (FEL) x 3*. Section 3.1 speaks of "*haulage trucks were entering the site and being loaded by the 3 loaders at separate locations concurrently*", so it appears the *Truck Loading/Unloading x 3*, may not be related to loading/unloading activities and may simply be the sound power level of a truck at idle. Clarification could be sought from LGA on this point.

Additionally in relation to Table 3-2 of the LGA report there is the following comment "*truck moving sound power is converted from shown sound power in SoundPLAN software based on travelling speed*." It is unclear if the *Haulage Trucks* sound power level in Table 3-2 are based on site measurements or some other source, however site measurement data would be preferable.

It is presumed in Figure 4-3 that the line source relates to haul trucks and the point sources are the front-end loaders and idling trucks. It is noted each of the point sources are situated away from R2, with the operating face of the sand extraction some 70 metres closer to R2 than what the model shows. If the point source was placed closer to R2 (i.e. representing the front-end loader operating at the extraction face), then the reduced distance to R2 may increase the received noise levels but the barrier effect of the pit face and noise bund may improve, especially as the extraction proceeds to greater depths. Modelling should be provided to demonstrate the emissions comply at excavation locations closest to the R2 receiver for all relevant pit depths.

Additionally, Scenario 3 (Figure 4-3) indicates a noise bund in the northwestern corner of the site but a barrier effect is observed in the contours along much of the length of the northern boundary. This warrants further explanation.

The LGA report considers the noise from the machinery to be used to have tonal components. However, a loader moving backwards and forwards between a workface and a truck to be loaded can have modulating noise characteristics as well - which has not been considered in the LGA report. When tonal or modulating noise is received it can be more annoying than noise without those characteristics. When those characteristics are measured in accordance with the Noise Regulations at receiver locations, they attract 5 dB penalty adjustments which can be cumulative.

Consequently, tonal and/or modulating noise may need to be 5 to 10 dB below the assigned levels to comply.

It is noted that one of the recommendations is that a noise bund be constructed; however Figures 4-2 and 4-3 identify that the modelling was undertaken with noise bunds being in place. Therefore, the inclusion of noise bunds cannot be considered a recommendation, but instead an integral part of any potential operations. It is to be noted that despite noise bunds forming part of the operations, compliance with the assigned levels has not been demonstrated. The LGA report additionally identifies that a suite of recommendations are made in order to achieve a reduction in noise levels, however no detail or modelling is provided to determine if their use will in fact result in compliance.

4. Conclusion

The Environmental Protection Authority's *Guideline for the Assessment of Environmental Factors No.3 Separation Between Industrial and Sensitive Land Uses* (Guidance No.3) recommends a generic separation distance of 300-500 metres for sand and limestone extraction, between the operations and sensitive land uses to avoid or minimise the potential for land use conflict. Figure 3-1 of the LGA report indicates the nearest dwelling (R2) is approximately one sixth of the minimum generic separation distance, at approximately 50 metres. Guidance No.3 does not prohibit development within the generic separation distance but suggests "a scientific study based on site- and industry-specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts". In light of:

- application of appropriate adjusted assigned levels for the receivers, particularly in relation to R2;
- non-compliance with the assigned levels by as much as 14 dB based on existing modelling; and
- lack of detail or modelled evidence that any amelioration methods employed will result in compliance,

the acoustic report cannot be said to demonstrate the proposal will not result in unacceptable noise impacts.

5. Limitations

Technical expert advice in any field is subject to various limitations. Important limitations to the advice include:

- No computer modelling was undertaken to verify the modelled noise results.

6. Appendix A

Calculation of the Influencing Factor for R2

Road Type	Location	number	tot. dB
Major road *(>15000 vehicles/day)*	Outer Circle (450m)	0	0 dB
	Inner Circle (100m)		0 dB
Secondary Rd *(6000-15000 vehicles/day)*	Outer Circle	N/A	
	Inner Circle	0	0 dB
	Transport Factor		0 dB

Other Noise	Location	Area (m2)	% area	tot. dB
Commercial	Inner Circle	4866	15.48895906	1
	Outer Circle	35653	5.604297468	
Industrial	Inner Circle	0	0	3
	Outer Circle	160107	25.1672301	

Total Influencing Factor	3.571386 dB

Premise Type	Time of Day	Adjusted Assigned Level (dB)		
		LA10	LA1	LAmax
Noise Sensistive (within 15m of building recieveing noise)	0700 to 1900 Mon - Sat	49	59	69
	0900-1900 Sun & P/Hols	44	54	69
	1900 to 2200 all days	44	54	59
	2200 on any day to 0700 Mon - Sat or 0900 Sun & P/Hols	39	49	59
Noise Sensitive (further than 15m from building receiveing the noise)	All hours	60	75	80
Commercial	All hours	60	75	80
Industrial	All hours	65	80	90

100 m circle


Area: 11,534.44 m²
Perimeter: 450.17 m
Area: 35,653.29 m²
Perimeter: 764.92 m
Area: 14,163.14 m²
Perimeter: 477.83 m
Area: 134,410.74 m²
Perimeter: 1,823.00 m
225.95 m
214.81 m
291.34 m
290.99 m

450 m circle