Great Southern Lime

4 November 2024

Tom Wenbourne
Senior Planning and Development Compliance Officer
City of Albany

By email

tomw@albany.wa.gov.au

Dear Tom,

Supporting information to application to amend condition 4 and to delete condition 17 of P2160670 for extractive industry at Lot 9005 Eden Road Nullaki WA 6330

1. Introduction

On 10 January 2019, in the matter of Robertson and the City of Albany [2019] WASAT 3, the State Administrative Tribunal granted approval for an extractive industry at Lot 9005 Rock Cliffe Circle/Eden Road subject to certain conditions.

These conditions required that processed lime would be stockpiled at the pit and laden vehicles would exit to Lees Road via a steep decline.

The Department of Energy, Mines, Industry Regulation and Safety (**DMIRS**) declared that laden trucks driving down the steep decline was unsafe.

DMIRS, however, approved the following changes:

- instead of trucks being loaded at the pit they would be loaded in a flat area at the foot of the steep decline near the exit to Lee Road;
- the lime would be taken from the pit to the stockpile area in a fit for purpose vehicle;
- trucks would be loaded at the stockpile area and the laden trucks would exit directly to Lee Road.

On 21 December 2023, the City of Albany amended conditions 2, 4 and 17 to permit these changes in operations.

2. Application

This letter provides supporting information for the application made by Great Southern Lime to the City of Albany to make the following amendments to Development Approval P2160670:

(a) Replace condition 4 of the Development Approval with the following:

"4 *Except as otherwise approved by the City of Albany, the hours of operation of the extractive industry shall be restricted to the hours of 7.00am – 5.00pm*

Monday to Friday and 8.00am – 5.00pm Saturday with no operation of the extractive industry permitted on Sundays or Public Holidays."

(b) Delete clause 17.

3. Grounds for the application

Great Southern Lime is operating a legitimate business of selling high quality lime excavated at its pit in Lot 9005.

Lime (known as aglime), supplied by Great Southern Lime, is urgently needed to counteract soil acidity in the Great Southern Region.

Great Southern Lime's business is severely restricted by conditions 4 and 17 of the development approval, in that:

- the business can only deliver a maximum of 50,000 tonnes of lime to its customers for 4 months of each year between 2 January and 30 April;
- laden vehicle movements, delivering lime to its customers, must not exceed 84 vehicles over a 7 day period to a maximum of 20 vehicles on any one day;
- excavation, processing/screening and associated activities at the pit can only be carried out within the period 2 January 31 August (inclusive); and
- transport of lime onsite from the pit to the stockpile area can only be done within the period 2 January to 31 August (inclusive).

Being able to earn income for 4 months of the year from a restricted tonnage is not a sound basis for a successful business.

As permitted by the development approval, Great Southern Lime intends to broaden its offering to include road base.

There is a strong demand for road base as well as aglime.

Already, Great Southern Lime has a request to supply 20,000 tonnes per annum of road base.

Great Southern Lime expects demand for its aglime alone will soon exceed 50,000 tonnes per annum.

The farmers need to spread aglime each year. If their annual requirements cannot be met, they will go elsewhere and once gone it is difficult to get them back.

Therefore, to be a reliable supplier it is critical that Great Southern Lime is capable of a timely response as the demand for lime increases over time.

Any increase in annual production beyond 50,000 tonnes can be done without any changes to the footprint of the pit and the stockpile area.

Indeed, the only constraint on delivery of lime from the site is that daily truck movements is dependent on the loading turnaround times.

Our past experience is that despite their best efforts the City and other regulatory authorities are unable to respond quickly to amendments to development approvals as they must follow time consuming procedures.

The City will be aware that prior to the commencement of haulage of lime from the site, Great Southern Lime was required, at its expense, to make substantial upgrades to the Lower

Denmark Road/Lake Saide intersection, Lake Saide Road, Lake Saide Road/Browns Road intersection, Browns Road, Browns Road / Lee Road intersection, Lee Road, the crossover from Lee Road and to seal the internal roads: see conditions 14 and 15.

Further, the load bearing capacity of the Browns Road's bridge was upgraded to bear the loading of vehicles associated with the extractive industry use: see condition18.

And, Great Southern Lime, is obliged to rectify any damage to the roads as a result of heavy haulage operations from the site: see condition 19.

Accordingly, the public roads and the bridge are fit for use by laden trucks from the site at Lot 9005.

Given that the farmer's preferred delivery times for aglime is between January and April, it is expected that truck movements will be high in those months and lower for the rest of the year.

Great Southern Lime is unaware of any other extractive industries, particularly its competitors, being restricted to delivering their product for 4 months of any yearly period or being legally constrained as to the tonnages of product that can be brought to market.

The Tribunal addressed 7 issues which it decided were necessary for its determination of its review of the issues raised by the City to refuse the initial application to grant the development approval for an industry licence.

For your convenience, a summary of the Tribunal's determination of the seven issues and extracts of its decision which are relevant to this application are set out in the attachment to this letter. In particular, we note the following findings of the Tribunal at paragraph 216

> Finally, Mr. Mack expressed the opinion that it is 'likely that surrounding residents will experience a loss of amenity due to the proposal as a result of the noises emanating from the site and haulage'.[163] We do not accept this evidence. The nearest residence to the proposed limestone pit is 2.3 kilometres away, over double the generic separation distance in the EPA Guidelines. As indicated earlier, noise from vehicles on public roads is not subject to the Noise Regs. Furthermore, the public roads comprising the transport route to and from the site are in rural areas. Noise generated by trucks is neither unexpected nor unreasonable in rural areas.

Further, Great Southern Lime has commissioned Bowman & Partners Environmental, ENVIRONMENTAL SCIENTIST INDEPENDENT VERIFIERS to provide an

> *update on the research which has been conducted regarding the potential impacts of the operations at Nullaki on the Australasian Bittern population within the Eungedup Wetlands, located to the east of these operations, and how the findings relate to the future viability of this population.*

A copy of Mr Bowman's update, dated 21 October 2024, is attached (see **Attachment B**) in which Mr Bowman has addressed all relevant issues and with the following concluding comments:

> *In my opinion, this research shows that Great Southern Lime's Nullaki operations will have no impact on the Australasian Bitten population within the Eungedup population.*

Further, a copy of the report, dated 14 August 2024, made by Aurora environmental, ASSESS ADIVISE APPLY, Re Noise monitoring – Nullaki Lime Pit Haul Road- August 2024, referred to in the

Bowman report, is also attached (see **Attachment C**) in which Aurora Environmental concludes with the following

> *Summary*:
>
> *While tolerance levels to noise for Australasian Bitterns is not known, a review and study of water birds associated with the Beeliar Wetlands and other studies indicate that noise levels over 55 dB may be deleterious.*
>
> *However, the noise levels recorded of the Moxy on the haul road in this assessment were significantly lower than 55 dBA at between 26 – 34 dBA and the noise was barely above background noise levels.*
>
> *These results indicate that the use of Moxy vehicles on the haul road is unlikely to impact on wildlife, including the Australasian Bittern.*

For the reasons set out above, Great Southern Lime submits that the current restrictions in condition 4 and 17 are unreasonable, unnecessary and serve no legitimate purpose.

Accordingly, clause 4 should be amended and condition 17 deleted as set out in the in item 2 of this letter.

Please let me know if you require any further information.

Yours sincerely
Great Southern Lime

Graeme Robertson

Attachment A - extracts from the Tribunal decision

Graeme Robertson sought the review by the Tribunal of the decision of the City of Albany to refuse his application for an extractive industry, in particular, lime extraction on Lot 9005 Eden Road Nullaki WA 6330.

On 10 January 2019, the State Administrative Tribunal delivered its decision and granted development approval subject to certain conditions.

The Tribunal addressed the following seven issues for determination in its review.

1. Whether the proposed development is capable of approval under LPS 1?

   The Tribunal decided the *proposed development is capable of approval under LPS 1*

2. Whether the proposed development is consistent with orderly and proper planning?

   The Tribunal decided that the proposed development was consistent with orderly and proper planning.

3. Whether the proposed development would have an unacceptable impact on the amenity and character of the locality as a Conservation zone?

   The Tribunal decided that proposed development would not have an unacceptable impact on the amenity and character of the locality as a Conservation zone.

4. Whether the proposed development would have an unacceptable impact on the natural environment?

   The Tribunal decided that proposed development would not have an unacceptable impact on the natural environment.

5. Whether the traffic generated by the proposed development would exceed the capacity of the road system in the locality or have adverse effect on traffic flow and safety?

   See comment below.

6. Whether the proposed variation of development standards and requirements applicable under Sch 12 of LPS 1 would have an adverse impact upon the inhabitants of the locality or the likely future development of the locality for the purposes of cl 5.2.3(b) of LPS 1?

   The Tribunal decided the proposed variation of development standards and requirements applicable under Sch 12 of LPS 1 would not have an adverse impact upon the inhabitants of the locality or the likely future development of the locality for the purposes of cl 5.2.3(b) of LPS 1.

7. Whether the Bushfire Management Plan submitted by the applicant adequately addresses bushfire risk.

   See comment below.

The Tribunal noted that issue 5 (traffic impact) and issue 7 (bushfire risk) had been satisfactorily addressed by expert evidence and the draft conditions of approval proposed by the City on a 'without prejudice' basis and agreed to by the applicant.

In relation to the suitability of limestone and benefits of a local supply the Tribunal found:

181 It is common ground between the parties that the limestone which is proposed to be extracted from the site is 'suitable as lime for agriculture and neutralization of acidity',[118] in addition to use for road base. As Mr. Bowman said in evidence, which was not questioned or contradicted, and which we accept:[119]

> *Soils in Western Australia are notoriously poor and low in nitrogen. As nitrogenous fertilisers are added, soil acidity increases, and that causes problems for plant growth, and acidified water run-off into local estuaries and streams. One solution is to add lime to the soil.*

182 Similarly, the State Planning Strategy 2050 states as follows at page 53 in relation to 'agriculture and food':[120]

> *To counteract soil acidity, which poses a major risk for sustained agricultural production, there is a need for strategic planning to secure basic raw materials, particularly lime and gypsum resources.*

183 Specifically in relation to the Lower Great Southern Region of the State, the Lower Great Southern Strategy, which was published by the Commission in May 2016, states as follows at page 57:121

> *Limestone access is particularly important since agricultural limestone and lime sand are required to neutralise environmental impacts by minimising farm soil acidity*.

184 However, on the evidence before the Tribunal, there is only limited locally produced agricultural limestone available in the Lower Great Southern Region. According to unchallenged evidence of Mr. Williams, local production is limited to a relatively small limestone pit operated by the Shire of Denmark, which is in a Class 'A' Reserve and subject to community opposition, and a limestone pit in Bornholm, which is within the City's district and 'is very close to reaching the end of its lifespan'.[122] As Mr. Williams also said:[123]

> *… a lot of limestone in the Great Southern actually comes from Redgate, which is near Margaret River.*

185 In a letter to the City in relation to the proposed development dated 15 July 2016, the Manager, Land Use Planning and Policy at the Department of Agriculture and Food, WA (DAFWA) states as follows:124

> *Soil acidity is a major degradation problem across Western Australian [sic], especially in the South Coast Region with the dominance of light textured and highly leached sand plain soils. Soil acidity is estimated to cost broadacre agriculture approximately $498 million per year in WA. It is one of the few soil constraints that can be treated with appropriate management. Bulk lime, in the form of limesand, crushed limestone or dolomite is currently the cheapest way to ameliorate acid soils.*

186 The letter refers to statistics indicating that the amount of lime used to treat acidifying soils in Western Australia increased by 600% between 2004 and 2016. The letter also indicates that the increase in use of lime to treat land degradation is likely to continue, including in the South Coast Region:[125]

> *A report prepared for South Coast Natural Resource Management Inc. – "Lime Situation Report 2015 South Coast NRM Region" (Fry,*

2015) estimated the agricultural lime required in the South Coast Region over the next 10 years to be approximately 8 million tonnes. If most soils(sic)are remediated in the next 5 years, this will require close to a million tonnes per year. To maintain South Coast soils at target pH would require approximately 20 million tonnes over the next 30 years and 30 million tonnes of the next 50 years.

187 The letter from DAFWA then states as follows:[126]

Current lime supply on the South Coast from existing extraction sites is limited and often the quality from many of the regional sources is low (in the form of carbonate available within the liming agent and the particle size of the product). If used at a rate required to ameliorate South Coast soils, based on recent investigation and analysis of demand, current pits may only have enough lime resources to last a few more years.

188 The letter also states that the quality of the lime available from the proposed limestone pit on the site is 'high' and is 'in the better or higher quality range for the region'.[127]

189 As indicated earlier, in addition to the limited local supply, limestone used by farmers in the Great Southern Region comes from the Margaret River area. This requires trucks to travel from that area to the Great Southern and then return, with consequent carbon emissions. In contrast, as Mr. Bowman said in his evidence, 'the reduced transport requirements from the proposed site would have positive greenhouse benefits' in terms of reduced carbon emissions.[128]

190 In our view, the proposed development is consistent with the objective of the PD Act to 'promote the sustainable use and development of land in the State' and the aim of the Scheme to '[p]romote the sustainable management of all natural resources … to prevent land degradation …'. This is because the proposed development would reduce carbon emissions by reduced travel distances to supply lime to farmers in the Great Southern Region and would mitigate the significant environmental problem of land degradation through soil acidification by the supply of lime. The proposed development is therefore consistent with the sustainable development principles of sustainable use and effective integration of economic, social and environmental considerations in the decision-making process. Furthermore, the proposed development is also consistent with the sustainable development principle that conservation of biological diversity and ecological integrity should be a fundamental consideration, because, for reasons discussed in relation to issue 4 below, the development would have an acceptable impact on the natural environment.

In relation to the impact on surrounding residents, the Tribunal found

216 Finally, Mr. Mack expressed the opinion that it is 'likely that surrounding residents will experience a loss of amenity due to the proposal as a result of the noises emanating from the site and haulage'.[163] We do not accept this evidence. The nearest residence to the proposed limestone pit is 2.3 kilometres away, over double the generic separation distance in the EPA Guidelines. As indicated earlier, noise from vehicles on public roads is not subject to the Noise Regs. Furthermore, the public roads comprising the transport route to and from the site are in rural areas. Noise generated by trucks is neither unexpected nor unreasonable in rural areas.

217 Furthermore, as indicated earlier, the proposed development would have a significant positive impact on the amenity of the locality comprising the Conservation zone, because it would provide a secondary emergency accessway for residents in the 51 wilderness retreat lots comprising the remainder of the CZ1 zone by linking Rock Cliff Circle with Lee Road and because it would effectively remove the visual 'scar' on the landscape formed by the firebreak (particularly if the development were conditioned to require the haul road to be constructed with gravel shoulders and topsoil to be spread on or spray sealing applied to the shoulders to encourage growth of vegetation).

218 We are satisfied that the proposed development would have an acceptable impact on the amenity and character of the locality as a Conservation zone and generally.

In relation to the impact the development would have on the natural environment, the Tribunal found:

219 The City submits that the proposed development would have an unacceptable impact on the natural environment, in particular on the conservation values of the Nullaki Peninsula, because of the clearing of eight hectares of native vegetation for the quarry and up to a further one hectare of native vegetation to facilitate construction of the haul road, …, because 'there is going to be some permanent change to the environment as a result of the [proposed] development in that you are going to be removing or changing the topography and the landscape, removing peaks' and 'you would never get a total rehabilitation' of the native vegetation.[164]

220 We do not accept Mr Mack's opinion, and the City's submission, that the proposed development would have an unacceptable impact on the natural environment. As Ms Price said in her evidence, the removal of vegetation in the extraction area will be 'transient'[165] and 'temporary'.[166] The vegetation in the area of the proposed limestone pit is, as Ms Price said, 'fairly typical vegetation for that coastal area', although it has been 'possibly impacted by previous fire history at the site, which meant that it wasn't quite as thick and dense as in some other parts of the coast that I've surveyed'.[167] No more than three hectares in the pit area will be open for extraction at any one time and the cleared area will be progressively rehabilitated with native vegetation using retained topsoil on the site. Furthermore, as Mr Bowman said in evidence, the vegetation on site comprises a 'very, very robust community, consisting of plants that are able to withstand what is a very harsh environment'.[168] Moreover, as Ms Price said, 'the species that are common there at the moment are generally very successfully rehabilitated and they're readily available in terms of either collecting seed from the site or planting seedlings'.[169] Indeed, as indicated earlier, there is evidence on site of successful rehabilitation of the area quarried in the period from 2002 to 2006.

221 It is also significant, in our view, that, as Mr Price observed, the footprint of the proposed limestone pit and hence vegetation to be removed is relatively 'small in the context of the vegetation on the whole of the Nullaki Peninsula'[170] and, indeed, is relatively small even in the context of the site itself, which comprises about 437 hectares of similar vegetation. As Ms Price said in unchallenged evidence, the vegetation in the area proposed to be quarried is 'quite similar'[171] to the vegetation on the Nullaki Peninsula generally. The area proposed to be quarried is only about 2.1% of the area

of the site and is a little more than 0.01% of the area of the Nullaki Peninsula. On the evidence of Ms Price and Mr Bowman, which was not questioned or contradicted, and we accept, the proposed extraction area contains vegetation of the same general nature and quality as the remaining about 97.9% of the site and the remaining about 99.99% of the Nullaki Peninsula.

222 In relation to potential impact on fauna, as Ms Price said, based on her fauna survey of the proposed limestone pit and accessway in August 2018, 'there doesn't appear to be any conservation significant fauna that would be detrimentally impacted by the proposed development'[172] and 'the value in terms of flora and fauna diversity and its values to fauna habitat wouldn't be diminished after it has been rehabilitated'.[173]

Attachment B – update dated 21 October 2024 prepared by Bowman & Partners Environmental, ENVIRONMENTAL SCIENTIST INDEPENDENT VERIFIERS

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Your Ref: DA P2160670
Our Ref: GSL/005/2024

21st October 2024

Mr Graeme Robertson
Great Southern Lime

By email to: gjrgroup@wn.com.au <gjrgroup@wn.com.au>

Dear Graeme,

Application by Great Southern Lime to Amend DA P2160670

I refer to your request for an update on the research I have conducted regarding the potential impacts of Great Southern Lime's (GSL) operations at Nullaki, on the Australasian Bittern population within the Eungedup Wetlands, located to the east of these operations, and how the findings relate to the future viability of this population.

Within this letter I can provide you with further technical information in the form of a noise monitoring survey conducted by Aurora Environmental consultants.

I have also provided further findings from research of the published literature we have conducted concerning this species, its history, present status, and recognized threats to its future survival.

The context of this correspondence is a recent application by GSL for an amendment to the approved operational periods for the Nullaki operations, such that effectively year-round operation can be allowed.

In recent email correspondence to you, Mr Tom Welbourne from the City invited submission of any further research as to the potential risks to the Australian Bittern population, which advice published by the Denmark Bird Group suggests consists of 3 to 4 breeding pairs over the last few years.

I present this advice here.

1.0 Findings of Aurora Environmental Noise Survey

One element for assessment of the acceptability of the Nullaki operations, is the potential for noise from machinery operations to impact local sensitive receptors including the Bibbulman Hut, and the Eungedup wetlands. There is concern that machinery noise could impact the landscape/environmental amenity at the Hut, and could be detrimental to the population of

Australasian Bitterns which have established in recent years in the wetlands.

There is particular concern that machinery noise could interfere with the noise environment during breeding season (September to December) when male birds issue a "booming" call to communicate with females, generally at dawn and dusk.

This survey conducted in August 2024, measured sound levels in two locations to the east of the Nullaki Pit operations, simultaneous to a Moxy (articulated haulage truck) being driven between the pit and the new stockpile area. This machinery activity generated engine and machine noise equivalent to that which could be expected during limestone product transfer, between the pit and the stockpile area.

The objective of the survey was to determine the effect of day-to-day product transfer operations on sound levels at these locations.

The two monitoring locations selected were at the Bibbulman Hut (410m away from the stockpile site), and on the road between Lake Saide, and the north eastern end of the Eungedup wetlands (1.7 km away).

Figure 1 below, extracted from the attached Aurora report, shows these locations.

FIGURE 1. NOISE MEASUREMENT LOCATIONS

The measurements showed that regulatory noise level criteria at the Bibbulman Hut would not be exceeded by noise transmission from the Moxy as it descends and ascends the pit haul road.

Analysis of the noise measurements found that the Moxy was audible within each location at a level (LAF 90) which could be approximated as "rustling leaves" (see Figure 5 of the Aurora Report).

In regard to ongoing concerns to the future viability of the Australasian Bittern population within the Eungedup Wetlands, the measurements also allow prediction of noise level changes within the wetlands due to machinery noise and an evaluation of potential impacts.

It has been proposed that machinery noise could impact upon this species during its mating season (September to December), when birds communicate, typically at dawn and dusk, using a "booming" noise which the male bird emits to identify its presence to a female bird.

With the background that the (limited) research on noise effects on birds suggests that effects could potentially be experienced when sound levels exceed 55 dB, the findings in Table 2: Results, within the Aurora Report, can be reasonably expressed as follows;

- The ambient noise level during monitoring for more than 90% of the time (LAF 90), at the western end of the Eungdeup wetland would be lower than 23.71 – 24.9 dB, which is equivalent to "rustling leaves" or a "whisper", recorded at the Bibbulman Hut, as this location is closer to the Moxy operation,
- The operating Moxy was recorded at 30 dB – equivalent to a "whisper",
- The peak noise, whilst recorded at 74.83 dB was from 2-way radio communications between the Moxy and the noise monitoring operator: this can be set aside from these considerations, with the observation that 2- way radios are noisy when operating at close range,
- At the eastern end of the wetlands the ambient noise level for more than 90% of the time, would be less than 21.09 to 21.89 dB – equivalent to "rustling leaves"
- At the eastern end of the wetlands, the loudest noises recorded were a gunshot at 57.89 dB (faint to moderate to quiet), and an overflying aircraft at 40 dB (faint), with the Moxy audible at 26 dB to 34 dB – ie a sound equivalent in loudness to between a "whisper" and a "refrigerator".

I believe it is reasonable to conclude from these measurements that within the Eungedup wetland area, the Moxy operation will be effectively inaudible except as part of background noise of the type and loudness which is typical for this rural setting.

Logically, if additional noise from the Nullaki operation is audible only as background within the Eungedup wetlands, then there is no basis to conclude there is any risk of noise impacts to the Australasian Bittern Population which breeds within the wetland.

It is relevant to note that the Australasian Bittern population has re-established over recent years, since potato farming ceased, and this re-establishment has occurred within the noise environment typical for this location. This historical noise environment will not be significantly altered by the GSL Nullaki operations.

2.0 Discussion of the Australasian Bittern and its population status and conservation biology

The assumption upon which assessment of noise transmission from Nullaki to the Eungedup wetlands derives from, is that the Australasian Bittern is sensitive to noise, in its breeding season or at other times.

This assumption is susceptible to further assessment using the findings of historical research and observations of the status of the species determined by research, and observations of its behavior in response to impacts.

I have previously provided you with research findings about the ecological history of this bird species gathered from the technical literature, and importantly from the conservation advice published under the EPBC Act.

The Conservation Advice published by the Threatened Species Scientific Committee is considered to be the authoritative summary of the state of knowledge for a species which is considered to have special conservation significance.

This advice is instructive as to the biology and behavior of this species, and can form a baseline of an understanding of the causes of its population decline, the ongoing risks to the species, and its biological response to impacts to its natural habitats including loss of habitat.

It is therefore worthwhile to consider the key summary facts that emerge from the advice in this document.

1. Loss of habitat has been overwhelming causal factor in the decline of the Australian Bittern population drainage and clearing of wetlands as part of the land use and development patterns and processes since European settlement.

   (Please note well that the Eungedup wetland context is in direct contrast to this history: whereas the land was historically used for potato farming with drainage systems controlling water levels such that it was not viable habitat for Australasian Bitterns (and other wetland species), this land use has now ceased and natural wetland values (principally a return from seasonal drainage to more natural hydrology) are returning: that is to say this area is newly recovered habitat and the existence of the Australasian Bittern population and its future viability is a direct consequence of this).

2. The second major risk to the species (in its national conservation context) is the conversion of rice fields in south-eastern Australia to alternative dryland agriculture, and or reduced water provisions to irrigated agriculture. The technical literature advises that the irrigated rice fields in the Riverina area of south-eastern Australia are the national stronghold habitat for this species in Australia.

3. This is instructive in understanding the status of this species in terms of its current and future conservation. It means that the species is sufficiently adaptable to use irrigated rice fields as living and breeding habitat. A rice field, as an ecological setting, with the attendant activity of maintenance and harvesting machinery and operational staff

visitations, is a highly altered environment, which the species can clearly nevertheless successfully utilize. This history of survival attests to the adaptability of the species in terms of its ability to utilize artificially created habitats for its survival.

At this point it is necessary to emphasis the conclusion that the Australasian Bittern's population decline and threatened status is a result of significant habitat loss.

Their present status is that remnant populations survive in reserves but have also adapted to survival in alternative manmade habitats, in the form of irrigated rice fields.

At this point it is further necessary to point out that it is not technically legitimate to translate the fact that habitat loss has reduced populations, to the assumption that the species is particularly sensitive to noise, and the other environmental perturbations which permeate the rural and agricultural settings in which it has contracted to.

In fact, the evidence is that the species has a level of robustness which has assisted its survival in rural and irrigated agriculture settings.

In regard to the Eungedup wetlands, as noted above, this a recovered habitat in which an Australasian Bittern population has established, presumably only after potato farming ceased, and the wetland area was again allowed to flood.

I presume that there was no Australasian Bittern population present whilst potato farming was active, as the area was kept dry and there was no suitable habitat.

Therefore, the new population, whilst establishing as surface water returned, did so under the noise environment which is currently the normal ambient condition, and which noise measurements confirm will not change as a result of GSL's operations.

Combined with the findings that there will be no significant noise transmission from the operations into the wetlands, it can be reasonably concluded that there is no implied threat to the future viability of the Australian Bittern Population.

3.0 Supporting advice from relevant documents and assessments

3.1 Report of the Appeals Convenor to the Minister for Environment (July 2024)

I believe it will assist you to know that the conclusions I have reached in preceding sections are validated by other assessments and by advice published in the technical literature.

In the report Appeals Committee Report to the Minister for Environment: Appeals objecting to L9381/2023/1 and CPS 10188/1, Nullaki Limestone Quarry, City of Albany (July 2024) the committee found as follows:

"In considering the potential impacts of the operation on the Australasian Bitterns, the Appeals Committee accepts DWER's position that the sanctuary mentioned by the appellant does not appear in any relevant database, and that due to its purported distance from the facility, its inclusion would not have altered the outcomes of the risk assessment in any case. The Appeals

Committee noted that the City of Albany also considered impacts on the bittern in its assessment of revisions to the DA, and it is for this reason that the DA prohibits operations between September and December each year, coinciding with the bitterns mating season.

The Appeals committee concludes that Appeal 039/23 should be dismissed."

I note that the information I have presented earlier, confirms that the prohibiting of operations between September to December will not have the effect of further protecting Australasian Bitterns during breeding season.

3.2 Threatened species scientific committee

The published conservation advice for the Australasian Bittern advises that the threats to the species may be described as set out below.

Table 1 - Summary of threats

Threat factor	Threat type and status	Evidence base
Habitat loss		
Habitat loss through water reductions	Known Current	The major factor in the decline of the Australasian Bittern population in Australia is the reduction in extent of available habitat due to the long-term diversion of water away from wetlands and floodplains to support irrigated agriculture and urban water supplies; and the permanent loss of wetlands through conversion to other purposes, such as agricultural and urban development (Marchant & Higgins 1990; Kingsford & Thomas 1995; Garnett et al. 2011; Kingsford 2000).
Transition from ponded rice to other farming systems	Known Current	Australasian Bitterns are known to nest in ponded rice crops, with estimates of 500-1000 birds breeding in the New Souths Wales Riverina each year (Bitterns in Rice Project 2018). Rice farmers are increasingly transitioning to crops with delayed permanent water and shorter season varieties in order to reduce the amount of water used per crop. This is emerging as a new threat as the contraction of the ponding period is reducing opportunities for successful Bittern breeding before harvest. There is also a trend among irrigators in the Riverina to transition from rice to cotton, as evidenced by the 2017-18 season being the first in southern New South Wales where more cotton was grown than rice. As cotton is only flooded with brief pulses of water, no aquatic ecosystem can develop and Bitterns cannot breed (M Herring 2018. pers. comm).
Habitat degradation		
Increased salinity, siltation and pollution	Known Current	Reduced water quality due to increased salinity, siltation and pollution is having an ongoing impact on wetland quality throughout Australia (Nielsen et al. 2003; Halse et al. 2004). Elevated salinity levels and a general decline in water quality may directly impact on Australasian Bittern

		survival and breeding success, and also affect food sources such as invertebrates, algae and macrophytes (Marchant & Higgins 1990; Halse et al. 2003).
Grazing by livestock and feral animals	Known Current	Grazing of wetlands by livestock (e.g., cattle and sheep) and feral animals (e.g., pigs, deer) has a range of environmental impacts, including water contamination, physical damage to soil and vegetation, and facilitating the spread of weeds (Jansen & Healey 2003).
Changes in abundance of plant species, (including native species and introduced weeds)	Suspected Current	Changes in abundance of certain plant species has the potential to reduce wetland productivity. For example, Phragmites is becoming more common across wetlands in South Australia (J. van Weenen 2018. pers comm), which may impact on the quality of foraging habitat and hence occupancy and breeding success of the Australasian Bittern at these sites.
Inappropriate fire regimes	Possible Current	Frequent or intense burning of wetland areas may reduce the dense vegetation that forms the core habitat of the Australasian Bittern, potentially resulting in reduced nesting success.
Urban wetland management	Possible Current	Urban wetlands can provide critical habitat during droughts. However, many of these wetlands are also used as a source of irrigation water. The uncharacteristic rapid fall in water levels due to extraction has the potential to impact on birds utilising such sites.

Climate change

Changes in water availability	Suspected Current	There is strong evidence that rising temperatures caused by increased greenhouse gases is leading to reduced rainfall across southeast and southwest Australia, and to increased evaporation, leading to large declines in surface water runoff (CSIRO 2010). This will impact on Australasian Bittern habitat.

Changes in fire regimes	Suspected Current	A drying climate in southeast and southwest Australia will likely lead to more frequent and intense wildfires (Hughes & Steffen 2013). Fires within the key wetlands will likely reduce habitat quality for the Australasian Bittern.
Salinisation of coastal wetlands	Suspected Current	Coastal freshwater wetlands are under increasing threat from rising sea levels, particularly as they are unable to retreat in many regions due to urban infrastructure (e.g., roads, housing etc); and because infrastructure can act as a barrier which limits salt water flushing after a coastal wetland has been inundated by saltwater through a combination of high tides and storm action (White and Kaplan 2017).

Infrastructure

Inappropriate placement of infrastructure	Possible Current	The inappropriate placement of infrastructure (i.e. fence lines; powerlines) in or adjacent to suitable wetlands increases the likelihood of possible collision incidents with birds hitting wires or getting snagged on barbed wire.

Urban development	Known Current	Urban development along the margins of wetlands can impact on water quality and increase levels of disturbance, particularly from domestic pets.

Introduced animals

Predation by introduced species	Possible Current	Foxes and cats are known to prey upon wetland birds (O'Donnell et al. 2014). However, the extent to which these species impact on the Australasian Bittern is unknown at this stage.

This in instructive as to confirming that none of the proposed activities at Nullaki can be assigned to any of these threats, and also that there is no mention or other indication that the species is particularly sensitive to noise.

3.3 National Recovery Plan for the Australasian Bittern, 2022

This document presents the following advice on threatening processes, which consistent with other advice, does not mention that the species is especially sensitive to noise, or that it is an otherwise especially sensitive to the environmental characteristics of rural land. The document advises as follows:

"Threatening processes:

The main threatening processes operating on the Australasian bittern in Western Australia are:

- *altered hydrology due to land use changes;*
- *climate change;*
- *bushfire and inappropriate fire regimes;*
- *habitat damage; and*
- *predation."*

It remains that none of these processes can be ascribed having any association with the proposed activities at Nullaki.

3.4 Australasian Bittern (Botaurus poiciloptilus) Western Australian Recovery Plan Wildlife Management Program No. 64 Western Australia Department of Biodiversity, Conservation and Attractions, August 2018.

This document presents consistent advice to the National Plan, as follows:

"The main identified threats to the Australasian Bittern are the reduction in extent and quality of habitat due to the diversion of water away from wetlands (primarily for irrigation as well as groundwater extraction), the drainage of swamps, climate variability and change, the loss or alteration of wetland habitats due to urban and agricultural development, peat mining, predation by introduced animals such as foxes (Vulpes vulpes) and cats (Felis catus), reduced water quality as a result of increasing salinity, siltation and pollution, and overgrazing by livestock and detrimental fire regimes (Jaensch and Vervest 1988; Marchant and Higgins 1990; Kingsford and Thomas 1995; Garnett and Crowley 20".

4.0 Concluding Comments

In my opinion, this research shows that Great Southern Lime's Nullaki operations will have no impact on the Australasian Bittern population within the Eungedup wetlands.

I invite you to raise any questions you may have in regard to this matter with me, as you may require.

Yours sincerely,

MARTIN BOWMAN

Director

Attachment C - report, dated 14 August 2024, made by Aurora environmental, ASSESS ADIVISE APPLY, Re Noise monitoring – Nullaki Lime Pit Haul Road- August 2024.

Albany
Suite 7. 57-59 Lockyer Avenue
Albany WA 6330
T 0447 446 343

14 August 2024

Great Southern Lime Partnership
PO Box 114
DENMARK WA 6333

Dear Graeme

RE: Noise Monitoring – Nullaki Lime Pit Haul Road - August 2024

1. Introduction

Aurora Environmental (Aurora) is pleased to provide this report which documents the findings of noise monitoring of an articulated haul truck (Moxy) along an internal haul road between the Extractive Industry Lime Pit to a laydown/stockpile area at Lot 9005 on Deposited Plan P052008 within the City of Albany Western Australia (WA) (the Site). The location of the Site is illustrated in Figure 1.

The City of Albany has requested that noise monitoring be undertaken to determine if movement of vehicles on the haul road is likely to disturb wildlife at nearby Lake Saide and Eugedup wetlands, particularly the Australasian Bittern.

Moxys will be used to transport screened lime sand from the pit to a stockpile area. Lime sand from the pit will be tipped from the Moxy, stockpiled using a front-end loader and then loaded onto trucks and road trains for transportation from the site.

Transport from the site will be along Lees Road to Browns Road, onto Lake Saide Road to Lower Denmark Road. Lee Road has been upgraded to accommodate the movement of the lime sand material from the Site. The road upgrade requirements are based on an average of 14 road train movements per day between January and April.

Reserve 17464 is located to the east of the lime pit, haul road and stock pile area and is managed by the City of Albany. The reserve contains Lake Saide, the Bibbulmun Track and comprises native vegetation. There is also an area which is being rehabilitated and is known as Eugedup wetland. This area was previously used for growing potatoes.

2. Objectives

The objective of the noise monitoring assessment was to determine the level of noise generated by a Moxy on the haul road, in relation to nearby areas, including the Bibbulmun Track hut, Lake Saide and the Eugedup Wetlands (Figure 1).

3. Scope of Work

The scope of work comprised:

- A brief literature review on impacts of noise on wildlife;
- Sound level recordings using a handheld sound level meter and mobile phone from two locations;
- Assessment of analytical data against established assessment criteria to evaluate potential risks to human health and wildlife.

4. Landform

Ground level rises steeply from 10 mAHD at the Lee Road entrance to the haul road and stockpile laydown area up to 170 mAHD at the entry of the haul road to the pit. A newly constructed bitumen road provides access from the pit to the stockpile area (). The Bibbulmun Track hut is at approximately 30 mAHD, with Lake Saide and the Eugedup Wetlands at approximately 10 mAHD.

5. Wetlands

Lake Saide is listed as a Conservation Category Wetland (CCW, Landgate, 2024[1]) and is 2.3 km east of the extractive industries pit and 1.6 km from the laydown area. Eungedup Wetland is 815 m to the east of the haul road.

6. Australian Bittern

The Australasian Bittern (*Botaurus poiciloptilus)* is listed as 'Endangered' in the *Environment Protection and Biodiversity Conservation Act 1999* and under the Western Australian *Biodiversity Conservation Act 2016* (BC Act).

In Western Australia, the Australasian Bittern was formerly widespread in the south-west, ranging north to Moora, east to near Cape Arid, and inland possibly as far as the Toolibin Lake area (Jaensch et al. 1988). However, following extensive loss of habitat throughout the 1900s (e.g. due to drainage, salinisation and ongoing urban development) the species is rarely recorded on the Swan coastal plain between Lancelin and Busselton. The species is recorded more regularly in the southern coastal region from Augusta to the east of Albany and inland to some wetlands in the Jarrah forest belt (Lake Muir district), with small, isolated populations in swamps near Esperance eastwards to near Cape Arid (; DBCA, 2018[2]). Sighting information can be sourced at the Birdlife Birdata website[3] which indicates there have been 31 sightings in the vicinity of Lake Saide.

The Australasian Bittern lives in freshwater wetlands in dense beds of reeds and rushes. Australasian Bitterns forage, mainly at night on a wide range of small animals, including birds, mammals, fish, frogs, yabbies, snails, insects and spiders (Birdlife Australia, 2024).

The Australasian Bittern has a regular breeding season (October to February) but will also breed during inland flooding (Birdlife Australia, 2024).

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[1] Landgate (2024) Locate V (DBCA-018). https://maps.slip.wa.gov.au/landgate/locate/

[2] **Department of Biodiversity, Conservation and Attractions, DBCA (2018)** Australasian Bittern (*Botaurus poiciloptilus)* Western Australian Recovery Plan. Wildlife Management Program No. 64.

[3] **Birdlife (2024)** https://birdata.birdlife.org.au/explore#map=-33.8867249_122.2406451_11&species_id=197

FIGURE 1: LOCATION OF LIME PIT, HAUL ROAD AND LAY DOWN AREA

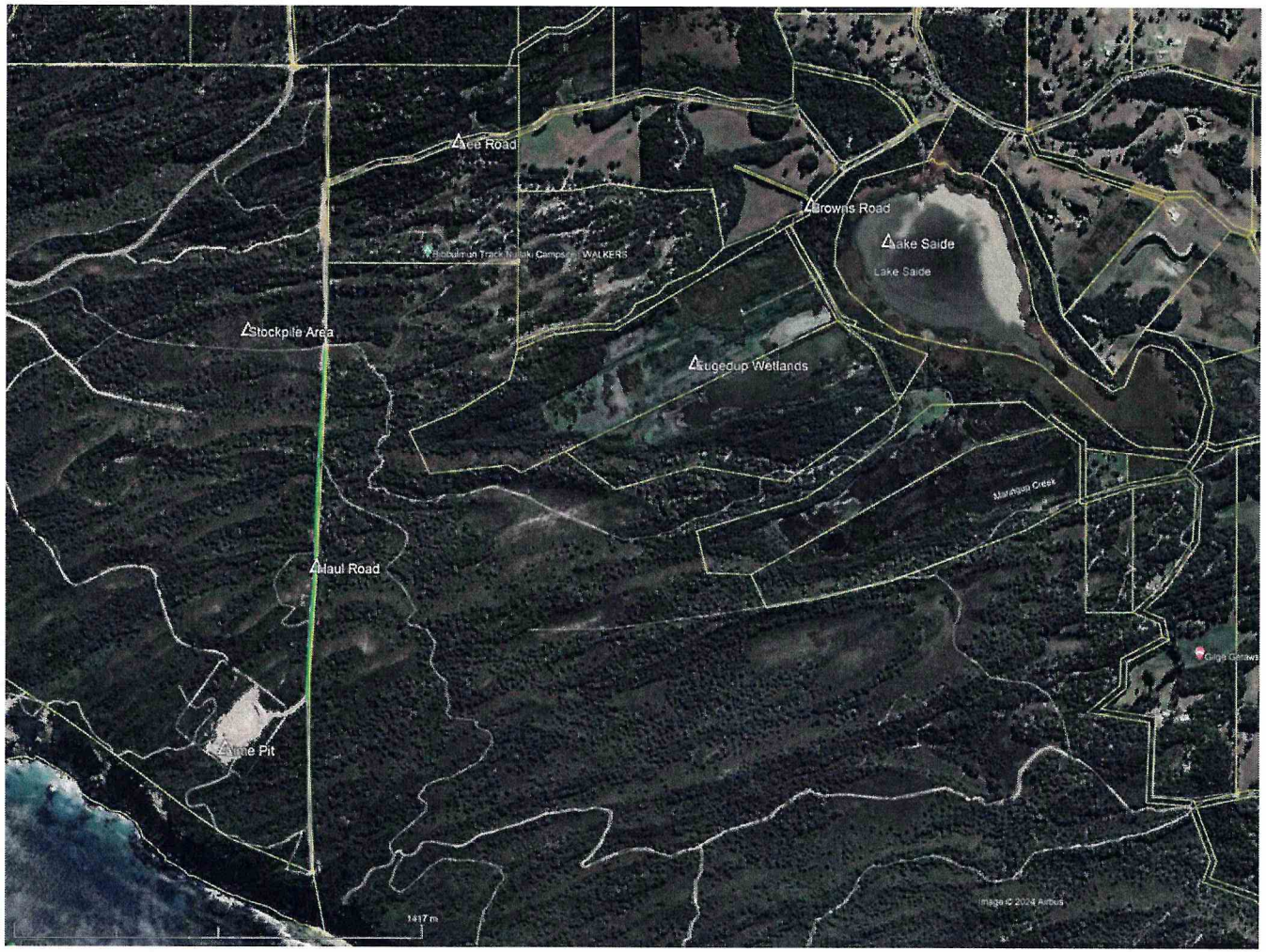
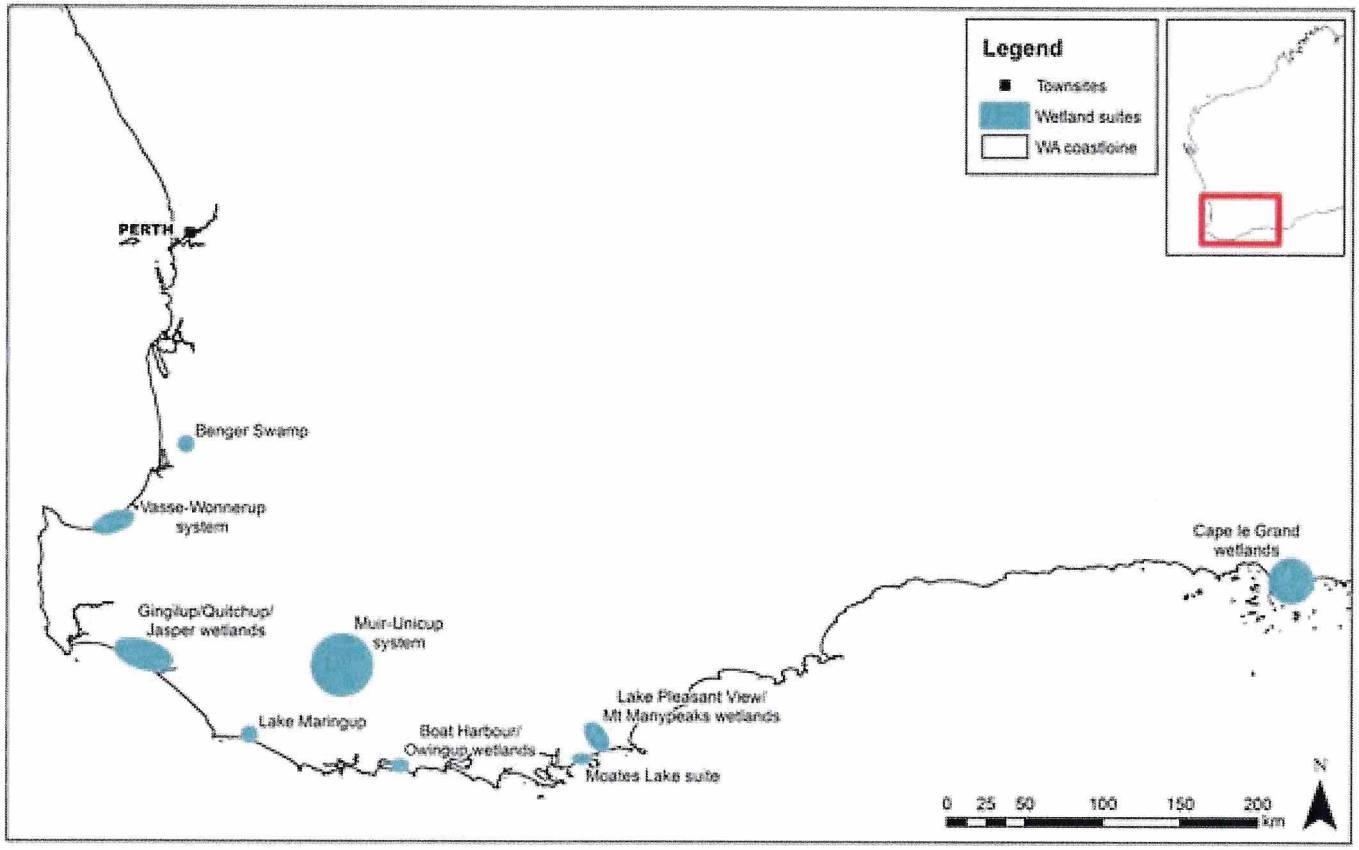


FIGURE 2: TOPOGRAPHY

FIGURE 3: SIGNIFICANT WETLANDS FOR BITTERNS IN WESTERN AUSTRALIA



Source: DBCA, 2018

7. Noise impacts on Wildlife

A search was undertaken for studies of impacts of noise on wildlife, particularly birds. The following was found:

- Light pollution negatively affected insectivorous and omnivorous bird species while not affecting granivorous species. Noise pollution, in contrast, was not significantly associated with changes in species assemblages[4].
- Although some studies state that there is negative impact as a consequence of anthropogenic noise, there is positive effect contributed by the noise of which are also recorded in other studies. The impacts of other variables such as vegetation density that cause major changes to the bird population as compared to noise have also been highlighted. This indicates that several influencing factors are important in measuring impact that may lead to changes which occur within a bird population. Thus, in depth studies on the impacts of anthropogenic noise needs to take into account other contributing variables[5].
- A literature review indicated that the effect of traffic noise on birds becomes apparent above noise levels of 55 dB(A). The noise measurements collected in the study (Beeliar wetlands, Perth Western Australia) did not demonstrate any evidence of a relationship between road traffic noise and wetland birds. This may be due to the low noise levels recorded at most of the sampled wetlands. Due to the number of limitations applying to this study no strong conclusions can be made regarding the relationship between road traffic noise and wetland birds within the study area.[6]
- Bird abundance, occurrence and species richness may be reduced near roads in response to noise. The largest reductions occur where traffic levels are high. Similar effects are also evident near airports. A small percentage of species with sufficiently plastic behaviour to escape noise can thrive near airports. Even so, this diminishes the bird community and consequently the ecosystem may be affected. Diversity of bird communities may be reduced by noise, especially in secondary lowland forest sites. However, sometimes noise exerts a beneficial effect on smaller birds if it cannot be tolerated by egg-eating predators. Noise indirectly increases pollination by hummingbirds[7].
- A literature review of papers published between 1990 to 2013 on the effects of anthropogenic noise on wildlife, including both terrestrial and aquatic studies. Research was concentrated predominantly on European and North American species that rely on vocal communication, with approximately two-thirds of the data set focussing on songbirds and marine mammals.

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[4] Morelli, F., Tryjanowski, P., Ibáñez-Álamo, J.D. *et al.* Effects of light and noise pollution on avian communities of European cities are correlated with the species' diet. *Sci Rep* 13, 4361 (2023). https://doi.org/10.1038/s41598-023-31337-w

[5] Gilbert, Emily & Sompud, Jephte & Sompud, Cynthia. (2017). A Review On The Impact Of Anthropogenic Noise On Birds. Borneo Science. 38. 28-35. 10.51200/bsj.v38i1.4408.

[6] Phoenix Environmental Sciences, March 2011. Assessment of the Effect of Traffic Noise on Wetland Birds: Background Study for the Roe Highway Extension Project. Unpublished report prepared in association with AECOM for South Metro Connect, Perth, WA.

[7] Dutta, H. Insights into the impacts of four current environmental problems on flying birds. *Energ. Ecol. Environ.* 2, 329–349 (2017). https://doi.org/10.1007/s40974-017-0075-6

The majority of studies documented effects from noise, including altered vocal behaviour to mitigate masking, reduced abundance in noisy habitats, changes in vigilance and foraging behaviour, and impacts on individual fitness and the structure of ecological communities. The review indicated that terrestrial wildlife responses begin at noise levels of approximately 40 dBA, and 20% of papers documented impacts below 50 dBA[8].

8. Methodology

Noise levels were recorded on 3 August 2024 at two noise monitoring locations which were selected based on proximity to Lake Saide, Eugenup Wetlands and the Bibbulmun Track hut (Figure 4). Browns Road is the only access way that could be used to access the Lake Saide and Eugenup wetland area.

Noise levels/ volume (dB(A)) were recorded for three runs at Browns Road and for two runs at the Bibblman Track hut. Each run was recorded for a minimum of 15 minutes.

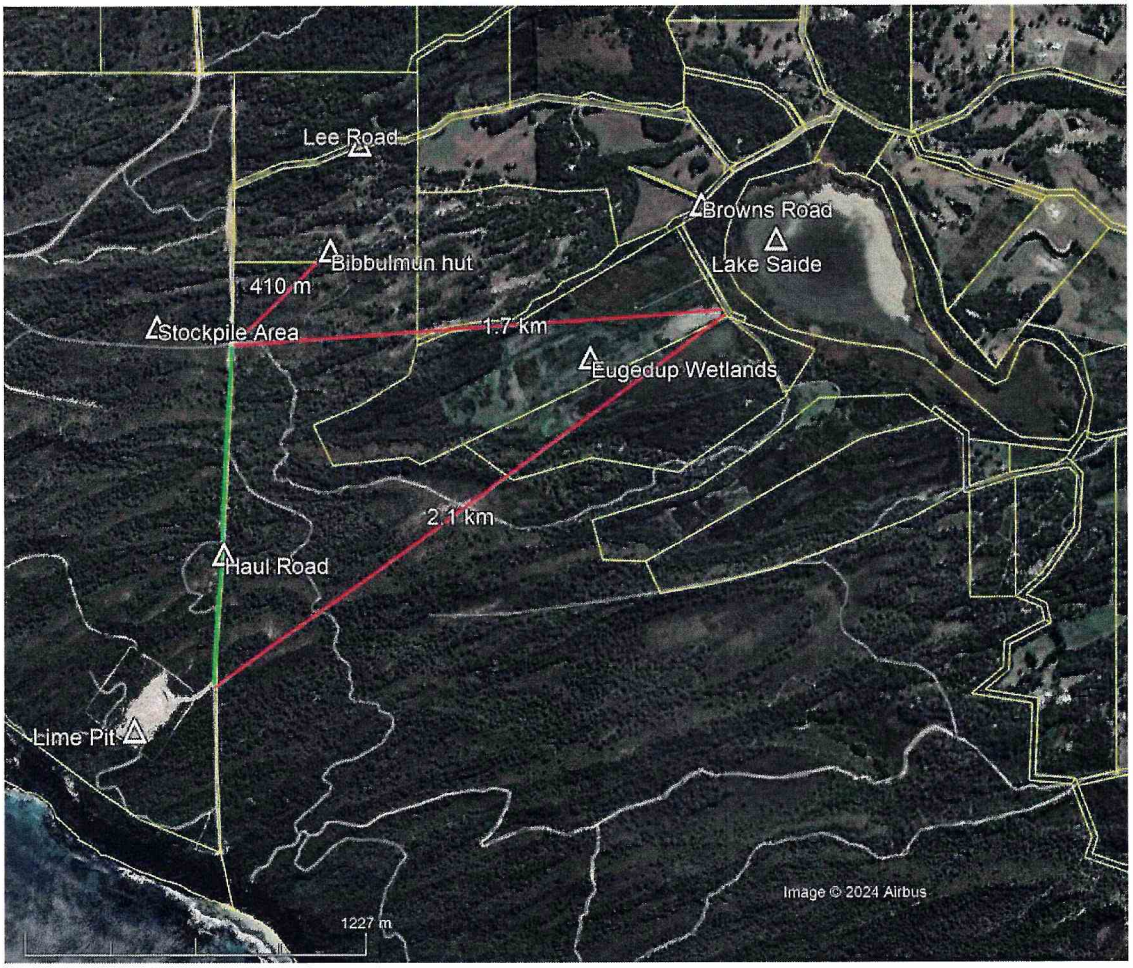
Monitoring was undertaken with a Bruel and Kjaer 2250 Light Handheld Analyser. The instrument complies with the instrumentation requirements of *Australian Standard 2702-1984 Acoustics – methods for the Measurement of Road Traffic Noise*. The calibration certificate is included in Appendix A.

Recording was undertaken with just ambient conditions (no vehicle movement) and then with a Moxy driving down the haul road from the lime pit to the stockpile area and back again. Background noise types and levels were noted during monitoring.

The timing for noise monitoring was chosen based on a weather forecast for calm conditions. This was to ensure that wind noise was not likely to drown out vehicle noise.

[8] Graeme Shannon, Megan F. McKenna, Lisa M. Angeloni, Kevin R. Crooks, Kurt M. Fristrup, Emma Brown, Katy A. Warner, Misty D. Nelson, Cecilia White, Jessica Briggs, Scott McFarland, George Wittemyer (2016) A synthesis of two decades of research documenting the effects of noise on wildlife. Biological Reviews. Cambridge Philosophical Society. Volume 91, Issue 4.
https://onlinelibrary.wiley.com/doi/full/10.1111/brv.12207

FIGURE 4: NOISE MEASUREMENT LOCATIONS



9. RESULTS

Weather conditions on the morning of 3 August 2024 were mild and calm (Table 1). The temperature ranged from 6°C to 17.3 °C during the day. There was a trace of rainfall (0.1 mm). These conditions are conducive to recording sound levels as there was no wind to drown out traffic noise or to impact on noise directionality.

The recorded noise levels are presented in Table 2 with descriptions of vehicle noise and other noise sources at each location.

At the Browns Road monitoring location, between Lake Saide and Eungedup wetland, LA_{eq} noise levels ranged from 36.44 dB(A) to 45.1 dB(A). The noise from the Moxy was barely perceptible to the recording personnel at this location. The highest noise level recorded at this location was 74.83 dB(A) and was caused by two way radio communications between the Moxy operator and recording scientist. Other sources of noise recorded at this location included a gunshot and bird calls (overhead flying ducks). However, the dBA levels for these were not captured.

TABLE 1: WEATHER CONDITIONS

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)	9am Temperature (°C)	9am relative humidity (%)	9am cloud amount (oktas)	9am wind direction	9am wind speed (km/h)	9am MSL pressure (hPa)	3pm MSL pressure (hPa)
1/08/2024	8	12.5	20.5	8.9	81	6	NW	26	1015.2	1018.1
2/08/2024	6	16	6	9	79	3	NNW	7	1024.8	1023.7
3/08/2024	6	17.3	0.1	9.7	84	2		Calm	1027.2	1024.5
4/08/2024	6.1	19.2	0	8	86	0	WSW	6	1024.9	1021
5/08/2024	8	19	0	13.6	72	7	N	7	1018	1016.3
Note: There were no wind records for afternoons										

Source: Bureau of Meteorology (2024) http://www.bom.gov.au/climate/dwo/IDCJDW6001.latest.shtml

TABLE 2: NOISE MONITORING RESULTS

Wetland	Start time	Duration	LAFmin	LAFmax	LAeq	LAF10	LAF90	Comment
Run 1	3/08/2024 10:08	19:30	20.73	74.83	45.1	38.78	23.71	Two radio communications at monitoring location and high volume Dominant noise for short period whist sampling: 74.83 dBA. Bird calls (ducks) flying overhead: Noise level not captured Moxy visible at times going up hill: 28 – 30 dBA More audible at top of ridge: 30 dBA
Run 2	23/08/2024 10:35:50 AM	15:05	21.67	57.88	37.21	39.25	22.72	Moxy visible at times going up/down hill, when visible audible: 30 dBA More audible at top of ridge SL ranging from 28-34 dBA. Beepers tested: 28-30dbA
Run 3	3/08/2024 10:51:07 AM	15:03	21.77	64.64	36.44	37.38	24.9	Radio communications: 64.64 dBA Moxy visible at times going up/down hill, when visible audible: 28 – 30 dB

Nullaki Hut	Start time	Duration	LAFmin	LAFmax	LAeq	LAF10	LAF90	Comment
Run 1	3/08/2024 11:25:11 AM	15:40	19.31	57.6	34.37	36.34	21.80	Hut below ridgeline, laydown area. Access road not visible. Beepers audible at commencement of run: 28 – 30 dBA
Run 2	3/08/2024 11:41:05 AM	15:29	18.86	57.89	43.72	39.4	21.09	Aircraft noise for two minutes of sampling period, dominant noise for that period: Gunshot: 57.89 dBA Moxy audible 26-34 dBA. Beeper: 28-30dbA Aircraft noise: 40 dB

Note: Units are dB(A) Decibels 'A' weighted. This is the most commonly used standard frequency weighting designed to reflect the response of a human ear to noise.

TABLE 3: NOISE LEVEL PARAMETERS

LAFMin	The minimum Sound Level measured with 'A' frequency weighting and Fast Time weighting during the measurement period.
LAFMax	The maximum Sound Level with 'A' Frequency weighting and Fast Time weighting during the measurement period.
LAeq	Equivalent Continuous Sound Level. Represents the average noise energy during a measurement period. An Leq is the level that would produce the same sound energy over a stated period of time when using a 3 dB exchange rate. It is defined as the sound pressure level of a noise fluctuating over a period of time T, expressed as the amount of average energy.
Peak	This function is often confused with the maximum Sound Level. Whereas the maximum is the highest sound level, the Peak level is the actual peak level of the pressure wave.
LAF10	The noise level exceeded for 10% of the measurement period with 'A' frequency weighting calculated by statistical analysis from samples of the Fast time weighted sound level.
LAF90	The noise level exceeded for 90% of the measurement period with 'A' frequency weighting calculated by statistical analysis from samples of the Fast time weighted sound level.

Source: Cirrus Research: https://www.cirrusresearch.co.uk/library/documents/ebooks/noise-measurement-terminology-guide.pdf

At the Nullaki Hut monitoring location, LA_{eq} ranged from 34.37 – 43.72 dB(A). The highest noise levels were between 57.6 and 57.89 dB(A) and were due to radio communications. During the second sampling period at this location an aircraft passed overhead (40 dB). A gunshot was heard but the dBA was not captured.

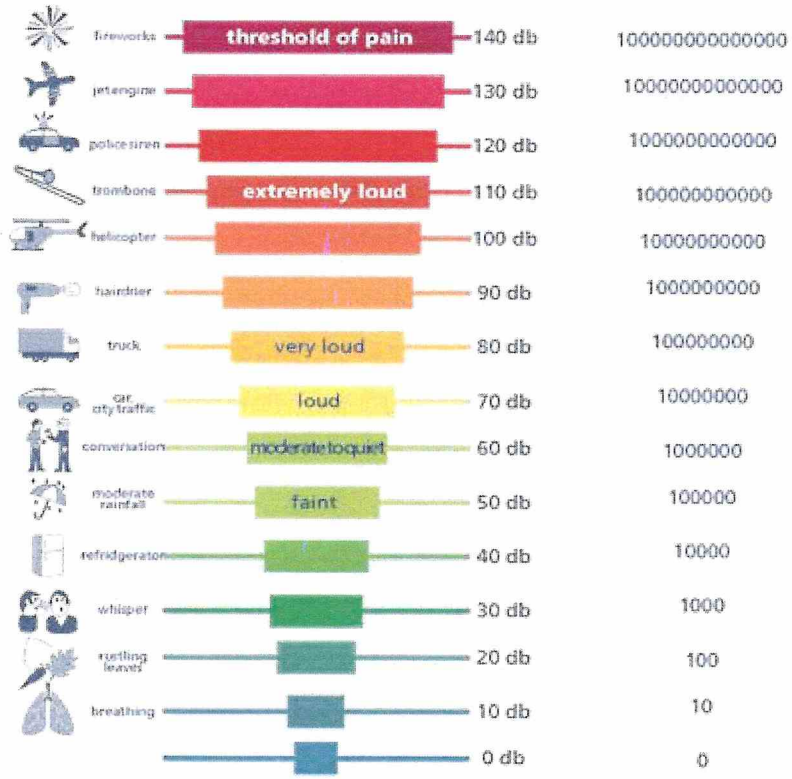
Parameters are described in TABLE 3.

10. DISCUSSION

Noise recorded during this assessment, at locations between 410 m and 2.3 km from the Moxy on the haul road ranged from 26 - 34 dBA which equates to 'rustling leaves' to less than 'a refrigerator' (Figure 5). These recordings indicate that noise from the Moxy on the haul road is attenuated relatively rapidly over even modest distances (410 m). Other noises recorded, such as aeroplane noise and radio communications were between 40 dBA and 74 dBA and within the range of 'faint – refrigerator' and 'loud'.

The limited information regarding noise impacts on birds suggests that the noise from the Moxy is unlikely to impact on wildlife with research indicating that impacts are likely above 55 dB. However, the tolerance of the Australasian Bittern is unknown. Other rural activities involving machinery are likely to occur in the area which supports rural industries such as horticulture and use of rural equipment.

FIGURE 5: COMPARISONS OF NOISE LEVELS



Note: Noise levels are on a logarithmic scale.

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels at any noise sensitive premises from other premises. The allowable noise level is determined by the calculation of an influencing factor, which is added to the baseline criteria set out in Table 1 of the Regulations. The baseline assigned noise levels are listed in Table 4.

Limits of noise generated and received at offsite locations is governed by the *Environmental Protection (Noise) Regulations 1997.* The regulations require that sensitive premises including dwellings in non industrial and rural areas are not subjected to general noise levels that exceed 45 dBA. Allowable noise to 55 dBA is permitted for up to 10% of the time and to 65 dBA for 1% of the time. Noise levels are not to exceed 65 dBA during normal working hours.

At the Browns Road monitoring location, between Lake Saide and Eungedup wetland, LA_{eq} noise levels ranged from 36.44 dB(A) to 45.1 dB(A) which is acceptable.

TABLE 4: ALLOWABLE NOISE LEVELS

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise Sensitive Premises	0700 - 1900 hours Monday to Saturday	45	55	65
	0900 - 1900 hours Sunday and Public Holidays	40	50	65
	1900 - 2200 hours all days	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35	45	55

Note: The LA10 noise level is the noise that is exceeded for 10% of the time. The LA1 noise level is the noise that is exceeded for 1% of the time. The LAmax noise level is the maximum noise level recorded.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

"impulsiveness" (e.g. banging, thumping) means a variation in the emission of a noise where the difference between LApeak and LAmax Slow is more than 15 dB when determined for a single representative event;

"modulation" (e.g. whining, droning) means a variation in the emission of noise that –

(a) is more than 3 dB LA Fast or is more than 3 dB LA Fast in anyone-third octave band;

(b) is present for more at least 10% of the representative assessment period; and

(c) is regular, cyclic and audible

"tonality" (e.g. like a siren) means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any-one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands, is greater than 3 dB when the sound pressure levels are determined as LAeq,T levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as LA Slow levels.

The noise from the Moxy was not impulsive, whining, droning or like a siren. The vehicles will run between the hours of 7.00 to 17.00 Monday to Friday and 8.00 to 17.00 on Saturdays, for 8 months per year.

11. SUMMARY

While tolerance levels to noise for Australasian Bitterns is not known, a review and study of water birds associated with the Beeliar Wetlands and other studies indicate that noise levels over 55 dB may be deleterious.

However, the noise levels recorded of the Moxy on the haul road in this assessment were significantly lower than 55 dBA at between 26 – 34 dBA and the noise was barely above background noise levels.

These results indicate that the use of Moxy vehicles on the haul road is unlikely to impact on wildlife, including the Australasian Bittern.

For and on behalf of Aurora Environmental,

Paul Clifton
Senior Environmental Scientist

Melanie Price
Principal Environmental Scientist

DISCLAIMER

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