

NOISE ASSESSMENT

**PROPOSED SAND AND GRAVEL EXTRACTION AND
RESTORATION ON LAND AT ELTON**

INGREBOURNE VALLEY LTD

NOVEMBER 2021

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Status	Prepared By	Date
2.0	L Jephson BEng (Hons) MIOA	11/11/21
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This report has been prepared using all reasonable skill and care within the resources and brief agreed with the client. LF Acoustics Ltd accept no responsibility for matters outside the terms of the brief or for use of this report, wholly or in part, by third parties.

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1. Introduction

LF Acoustics Limited have been appointed by Ingrebourne Valley Limited (IVL) to undertake a noise assessment to support a planning and EA permit application for a proposed extension to the sand and gravel operations at Elton.

Planning permission for the Proposed Development was approved on 31 March 2021 (Application Ref. 19/00033/MINFUL).

The approved scheme requires a haul road to be constructed between the existing reservoir and proposed extension site located to the west. The approved haul road passes through a wetlands area located to south west of the existing reservoir. To reduce any potential disturbance to the wetland, it is now proposed to reposition the haul road south of the wetlands.

This report presents an assessment of the noise levels based upon the revised proposals to reposition the haul road to the south of the wetlands area to ensure noise levels at the surrounding properties remain within acceptable limits.

Section 2 provides a summary of the applicable standards and guidelines. Section 3 provides information on the surrounding land uses and existing noise environment. Calculations and assessment of the noise generated by the extraction are provided in Sections 4 and 5, with recommendations for additional mitigation control measures provided in Section 6. Finally, Section 7 presents a summary of this report.

This report has been prepared by L Jephson BEng(Hons), MIOA, Director of LF Acoustics Ltd.

2. Applicable Standards and Guidance

A description of the noise units referred to within this report is provided in Appendix A.

2.1. National Planning Policy Framework

The principal planning guidance in the UK is presented within the National Planning Policy Framework [1]. At the heart of the NPPF is a presumption in favour of sustainable development, although environmental criteria should be set out to ensure that the permitted operations do not have unacceptable adverse impacts, with appropriate noise limits adopted to control noise.

The current technical planning practice guidance attached to the NPPF relating to noise was published in March 2014 [2], which covers mineral extraction and related processes, including aggregate recycling and the disposal of construction waste, provides guidance and advises upon acceptable levels of noise from minerals operations. It is considered that this is the most appropriate guidance to consider in relation proposed operations.

For normal daytime works the guidance seeks to ensure that the operations do not result in significant adverse effects and advises for normal daytime operations that the following limits should not exceed:

- 10 dB above the background (L_{A90}) noise level; subject to
- a maximum value of 55 dB $L_{Aeq, 1 \text{ hour}}$ (free field).

Where background noise levels are low, the guidance accepts that it may be very difficult to achieve a limit based upon background + 10 dB(A) without imposing unreasonable burdens on the mineral operator. In such cases, the limit set should be as near that level as practicable during normal working hours and should not exceed 55 dB $L_{Aeq, 1 \text{ hour}}$ (free field).

The guidance suggests that in the evening (19:00 – 22:00) $L_{Aeq, 1 \text{ hour}}$ noise levels should not exceed the background (L_{A90}) noise level by more than 10 dB and during the night-time a limit of 42 dB $L_{Aeq, 1 \text{ hour}}$ should be adopted.

In addition to the general daytime works, the guidance advises that all mineral operations will have some particularly noisy short-term activities that cannot meet the limits set for normal operations. These include soil-stripping, construction or removal of bunding or spoil heaps and construction of new permanent landforms. A level of 70 dB $L_{Aeq, 1 \text{ hour}}$ is suggested as a limit for these activities for periods of up to eight weeks in any one year. Where the duration of temporary works may exceed eight weeks it can be appropriate to apply a lower limit for a longer period. The guidance also recognises that, in wholly exceptional cases, where there is no viable alternative, a limit of more than 70 dB $L_{Aeq, 1 \text{ hour}}$ may be appropriate in order to obtain other environmental benefits.

2.2. Planning Conditions

Planning conditions in relation to noise have been attached to the planning permission for the extension area (NCC Ref. 19/00033/MINFUL).

Conditions 32 and 33 requires noise monitoring to be carried out at Water Mill House to the south west and at Lady Margaret Cottages (if occupied) to the north east to ensure noise levels at these properties attributable to the operation of the site do not exceed a level of 55 dB $L_{Aeq, 1 \text{ hour}}$, measured freefield. Noise monitoring shall be carried out at the commencement of extraction and at a time whilst the processing plant is operational.

2.3. Applicable Guidance for Bird Hide

There are no specific guidelines covering noise within the proposed bird hide. The assessment of noise within this facility could be considered equivalent to that akin to a public footpath.

The present minerals guidance attached to the NPPF indicates that public footpaths are not normally considered to be noise sensitive.

With regards noise sensitive locations, such as dwellings, the guidance recommends an upper limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ for normal operations, based upon consideration of the existing background and ambient noise environments. This criterion is, however, not considered appropriate for the assessment of noise within the proposed bird hide.

The previous MPG 11 guidance, which has been withdrawn, did provide some guidance in this regard. Whilst the guidance did not consider public footpaths or bridleways as noise sensitive, consideration was given to open spaces, which may be considered noise-sensitive in some circumstances. The guidance advised that any limits would not be expected to be as low as for dwellings and a limit of 65 dB $L_{Aeq, 1 \text{ hour}}$ was suggested for normal working hours.

On this basis, it is considered that a limit of 65 dB $L_{Aeq, 1 \text{ hour}}$ would be appropriate within the bird hide during normal working hours.

2.4. British Standard BS 4142

BS 4142 [3] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the future operation of the site. The scope of the standard includes consideration of sound from mobile plant and vehicles within the site that is an intrinsic part of the overall sound emanating from the premises. The standard does not include consideration of sound from the passage of vehicles on public roads.

BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

BS 4142 relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level.

The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15 minute duration.

The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component, or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

During the daytime, the specified noise levels are determined over a reference time interval of 1 hour.

- 2.4.1. If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.
- 2.4.2. Where the initial assessment of impact needs to be modified due to the context, all pertinent factors should be taken into account, including:
- The absolute level of sound; and
 - Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background.

2.5. EA Guidance

- 2.5.1. The EA published guidance in relation to noise from permitted activities in July 2021 [4].
- 2.5.2. The guidance advises that BS 4142 must be used to quantify the level of environmental noise impact from industrial processes, including permitted operations.
- 2.5.3. Whilst the noise levels attributable to site operations are assessed in accordance with the requirements of BS 4142, the Guidance provides alternative descriptions for potential impacts which includes operational requirements, when certain limits are exceeded.
- 2.5.4. The Guidance advises how the level of noise impact relates to BS 4142 descriptors, as follows:

Unacceptable level of audible or detectable noise

This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures).

You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.

The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context).

Audible or detectable noise

This level of noise means that noise pollution is being (or is likely to be) caused at a receptor.

Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.

The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context).

No noise, or barely audible or detectable noise

This level of noise means that no action is needed beyond basic appropriate measures or BAT.

The closest corresponding BS 4142 descriptor is 'low impact or no impact' (following consideration of context).

Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority. Note that BS 4142 is unlikely to be the appropriate methodology on its own to assess low frequency noise.

3. Baseline Assessment

3.1. Identification of Potentially Affected Noise-Sensitive Receptors

There are no properties in close proximity to the proposed area of operations, as indicated on Figure 1.

The closest dwelling is Water Mill House, which is located to the south, approximately 300 metres from the southern boundary of the extraction area and 700 metres from the processing plant area.

The other potentially affected properties would be Lady Margaret Cottages, located adjacent to the site access road, to the north east of the processing plant area. These properties are owned by the Elton Estate and have been unoccupied for a number of years. It is understood that there are presently no plans to renovate the properties, which would remain empty during the proposed operations and have thus not been considered within this assessment.

Other surrounding properties are located beyond 1Km to the north and west of the site, or to the south of the A605 in Warmington. These properties would be unlikely to be adversely impacted by the proposed operations and have thus not been considered within this assessment.

3.2. Baseline Noise Monitoring

A baseline noise monitoring exercise was carried out during the morning of 28th August 2018 to determine typical daytime noise levels at Water Mill House.

Weather conditions for the survey were good, fine, dry and calm.

A Rion NL-52 Class 1 Sound Level Analyser was used for the exercise, which was calibrated before and after the exercise with a Rion NC-74 Class 1 Acoustic Calibrator, with no drift recorded.

Measurements were obtained at a position along the track to the east of the house, considered representative of the dwelling. The position was at an equivalent distance from the A605 to that of the property and located behind the noise barrier which runs alongside the road. The monitoring location is indicated on Figure 1.

Noise levels at the property are principally influenced by traffic travelling along the A605, with traffic relatively constant throughout the day, as the road is a main link between Northampton and Peterborough.

Given that the noise levels are principally influenced by road traffic, it is considered that the noise levels monitored in 2018 remain representative of current noise levels at the property.

The results of the noise monitoring are provided in Table 3.1 below.

Time	Measured Noise Levels [dB]		
	L _{Aeq}	L _{Amax,F}	L _{A90}
10:40	55.2	63.4	50.5
10:55	55.0	66.6	49.5
11:10	55.1	65.6	50.3
11:25	56.0	71.5	50.3
11:40	56.7	69.3	51.1

Table 3.1 Results of Noise Monitoring at Water Mill House

Background (L_{A90}) noise levels were influenced by the road traffic noise, which was consistently audible throughout the monitoring period, with a typical level of 50 dB L_{A90} recorded.

4. Proposed Operations

Plant equivalent to that used during the construction of the existing reservoir would be used during the extraction, reclamation and restoration of the extension site. The plant requirements would comprise an excavator, dozer and two to three articulated dump trucks (ADT). To facilitate the processing of the excavated material, a processing plant will be established on site, which will be a modular plant. This plant would require the use of a loading shovel, which would be used to service the plant and to load HGVs.

A crusher would also operate on the site periodically to process material on a campaign basis (typically for 1 – 2 weeks on each occasion). The plant would be located within the reception area within the processing plant site. To provide a worst case assessment, the operation of the crusher has been included within this assessment.

The works within the extension area would be undertaken over three main phases, as indicated on Figure 2. The haul route is to be relocated to the east of the operations area to avoid an area of shallows. The revised location of the haul route in this area is indicated on Figure 3.

The soils would initially be removed from Phase 1, with the overburden dug out and transported to the plant site. Once completed, extraction in this area would commence. The mineral would be extracted using the excavator, loading dump trucks to transport the material for processing.

As extraction moves into Phase 2, reclamation of Phase 1 would commence. Loads of inert material would be delivered by ADT from the processing plant area and spread periodically using the dozer. This method would continue within Phase 3, when the site would be fully restored back to agricultural use. The reclamation operations will require an EA permit.

The haul road between the extraction area and plant site area was initially proposed to pass across the wetlands area, located to the south of the existing reservoir and east of Water Mill House. To minimise disturbance to the wetlands, it is now proposed to route the access to the south of the wetlands, as indicated on Figure 3. The relocated haul road would not be any closer to Water Mill House than the original route, although it would run adjacent to the location of the proposed bird hide, as indicated on the figure.

5. Calculations and Assessment

5.1. Source Term Information

Source term noise information for plant to be used on the site have been obtained either from measurements made adjacent to similar plant, presently operating within existing sites or from data contained within BS 5228.

The noise source terms which have been assumed for this assessment are provided below.

Source	Noise Level	Number	% On-Time
Excavator	74.3 dB L_{Aeq} @10m	1	100
Dozer (Working)	79.0 dB L_{Aeq} @10m	1	75
Dozer (Idling)	67.4 dB L_{Aeq} @10m	1	25
Loading Shovel	73.6 dB L_{Aeq} @10m	1	100
Processing Plant	80.2 dB L_{Aeq} @10m	1	100
Crusher (Periodic Use)	79.1 dB L_{Aeq} @10m	1	100
HGV Movements	106 dB SWL	12 per hour	-
Dump Truck Movement	111 dB SWL	6 per hour	-

Table 5.1 Source Term Noise Levels

5.2. Criteria to be Adopted for the Assessment

The noise monitoring undertaken adjacent to Water Mill House indicated a typical background noise level of 50 dB L_{A90} . On this basis, a normal working limit of 55 dB $L_{Aeq, 1 \text{ hour}}$, would apply in accordance with the guidance presented within the PPG and as specified in Condition 33. This limit is also consistent with that applied previously for the reservoir construction operations.

This limit would additionally ensure that the operations do not result in unacceptable levels of audible or detectable noise, when assessed against the requirements of the EA guidance.

For any short term operations, such as soil stripping or the creation / removal of bunding, which would be carried out for periods of less than 8 weeks in any one year, a temporary freefield working limit of 70 dB $L_{Aeq, 1 \text{ hour}}$ is proposed in accordance with the planning guidance.

5.3. Calculation Methodology

The calculations of the noise levels from the operation of the site at the closest properties have been made using the methodology contained within BS 5228-1 [5]. Where barrier corrections have been calculated, the algorithm used within a Calculation of Road Traffic Noise [6] has been used.

Distance attenuation attributable to the HGV / dump truck movements has been made upon the basis of a line source attenuation, utilising the methodology within BS 5228, which minimises the distance attenuation correction and provide a worst case assessment.

It has been assumed that the plant would be fully operational and working close to the surface to provide a worst case assessment. Generally, the plant would not operate continuously, with the screening plant only operational periodically and generally breaks likely between loads, during which periods the plant would be powered down to reduce noise levels.

To provide a worst case assessment for the permitted operations, which would principally include the operation of a dozer and vehicle movements, the assessment has taken account of the whole site operation, to include the extraction and processing operations. The dozer and potentially the use of an excavator for the infilling and reclamation operations would utilise plant used for both this purpose and extraction.

The details of the calculations are provided in Appendix B.

5.4. Assessment of Noise Levels at Water Mill House

As indicated previously, Water Mill House is considered to be the only residential property which would be likely to be potentially adversely impacted by noise from the proposed operations.

The results of the calculated noise levels during each main phase, taking account of the processing operations (including crushing carried out on a campaign basis), are summarised below:

- Initial works Phase 1 – 49 dB $L_{Aeq, 1 \text{ hour}}$;
- Extraction Phase 1 – 46 dB $L_{Aeq, 1 \text{ hour}}$;
- Extraction Phase 2 / Reclamation & Restoration Phase 1 - 48 dB $L_{Aeq, 1 \text{ hour}}$;
- Extraction Phase 3 / Reclamation & Restoration Phase 2 - 47 dB $L_{Aeq, 1 \text{ hour}}$;
- Reclamation & Restoration Phase 3 - 47 dB $L_{Aeq, 1 \text{ hour}}$.

The calculations indicate that likely worst case noise levels attributable to the operation of the extension would be 49 dB $L_{Aeq, 1 \text{ hour}}$, thus remaining below the prevailing background noise levels and at least 6 dB(A) below the normal working limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ at the property, defined as the upper limit within the MPPG.

The noise levels associated with the overall site operations, which provides a worst case assessment, have also been assessed against the requirements of the EA guidance.

The EA guidelines require an assessment in accordance with the BS 4142 methodology. The methodology requires corrections, for tonality, impulsivity and other characteristic noise, to be made to the calculated noise levels to determine the noise rating level. Given that similar plant has been operational adjacent to the property for a number of years, whilst the reservoir was constructed and the fact that the noise generated by the site operations at the property would primarily be attributable to engine noise and thus not dissimilar in character to the vehicles travelling along the A605, no corrections are deemed to be required for the BS 4142 assessment.

An assessment in accordance with the requirements of BS 4142 would therefore indicate a potential for a low impact.

However, the EA guidance advises that they would normally seek a 3 dB correction for other characteristic noise to be applied to determine the noise rating level. Whilst not considered applicable in this case, the correction has been applied to provide a worst case assessment.

On this basis, the proposed overall site operations would result in a rating level of 50 dB $L_{Aeq, 1 \text{ hour}}$ or below at the property. The rating level is not anticipated to exceed the prevailing background noise levels at this location and the assessment against the EA guidelines would indicate *No noise, or barely audible or detectable noise*. This level of noise means that no action is needed beyond basic appropriate measures or BAT.

5.5. Assessment of Noise Levels at the Location of the Proposed Bird Hide

The proposed bird hide is to be positioned on an existing bund which runs along the southern site boundary, adjacent to the A605. Noise measurements taken within this area of the site previously indicated noise levels of between 55 – 56 dB $L_{Aeq,T}$ during the daytime period attributable to road traffic, which was noted to be the principal source of noise.

The haul road would be used by articulated dump trucks (ADT), moving material from the extraction area to the processing plant area to the east. It is anticipated that there would be up to 50 ADT movements per day using the haul route, which equates to approximately 1 vehicle every 10 minutes passing the proposed bird hide.

Noise levels associated with site operations at the location of the bird hide would be primarily associated with the vehicles using the haul road and potentially the extraction plant whilst plant was operating within the eastern area of the site.

Calculations of the overall site noise levels at the location of the bird hide have been made, taking account of the proposed vehicle movements for the proposed position of the haul road and plant working within the eastern area of the site. The calculation details are presented in Appendix B.

The calculations indicate noise levels attributable to the site operations of 59 dB $L_{Aeq, 1 \text{ hour}}$, with noise levels principally attributable to the operation of the vehicle movements along the haul route.

Assessing the noise levels against the absolute noise level criteria proposed above would indicate that the noise levels at the location of the bird hide would remain below the proposed limit of 65 dB $L_{Aeq, 1 \text{ hour}}$.

The assessment therefore indicates that the repositioning of the haul road would have no adverse noise impacts on the proposed bird hide, with noise levels remaining acceptable.

6. Noise Monitoring and Control Measures

The assessment within Section 5 indicates that noise levels associated with the working of the site would be acceptable with appropriate working methods adopted.

In addition to the mitigation measures incorporated into the design and working method for the site, appropriate noise control measures would be adopted to ensure noise associated with the operation of the site was minimised in accordance with the requirements of BAT and would include:

- Ensuring all plant is kept well maintained;
- Ensuring silencers on plant are effective;
- Turning off plant when not in use;
- Using alternative non tonal reversing signals on mobile plant; and
- Implementing and enforcing a site speed limit.

The current planning guidance advises that noise monitoring should be carried out periodically to ensure that noise levels associated with site operations remain within acceptable limits.

Condition 32 requires a noise monitoring exercise be carried out at Water Mill House and Lady Margaret Cottages (if occupied) at the commencement of extraction and at a time whilst the processing plant is operational, to demonstrate compliance with the noise limit specified in Condition 33.

For any measurements made, a meter conforming to at least Class 2 standards should be used, which should be calibrated before and after the exercise. The meter should be positioned at a height of 1.2 metres above the ground and at a free-field location (i.e. at least 3.5 metres from a building facade or other reflecting surface other than the ground).

At each location, it is recommended that two 15 minute measurements are made, whilst the site is fully operational, which is normally a sufficient time period to demonstrate compliance with the limits.

The results of the monitoring / calculation exercise should be compared to the proposed operating limits presented in Section 5.2. Should the results indicate that the limits are being exceeded, further mitigation measures should be considered and implemented, as appropriate.

7. Summary

LF Acoustics Ltd were appointed by Ingrebourne Valley Limited (IVL) to undertake a noise assessment to support a non-material planning application to revise the route of the internal access road at Elton Quarry approved under permission 19/00033/MINFUL, granted on 31 March 2021.

A western extension to the sand and gravel operations is proposed, which would be carried out over three phases, utilising plant equivalent which is presently operating or that which has previously operated during the extraction of the mineral associated with the construction of the reservoir.

There is a single property, Water Mill House, which is relatively close to the proposed operations and considered within this assessment.

In order to demonstrate that an acceptable noise environment would be maintained at this property an assessment of the likely noise levels associated with the proposed operations has been undertaken, which demonstrates that, with appropriate control measures implemented, noise levels associated with the working and restoration of the site, would be acceptable and ensure any potential adverse impacts to the occupants of surrounding properties is minimised and thus comply with the requirements of the current NPPF planning and EA guidance.

References

1. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. July 2021.
2. Department for Communities and Local Government. Planning Practice Guidance. Assessing Environmental Impacts from Minerals Extraction. 6 March 2014.
3. British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142:2014 + A1:2019.
4. Environment Agency. Noise and Vibration Management: Environmental Permits. Published 23 July 2021.
5. British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1:Noise. BS 5228-1+A1. 2014.
6. Calculation of Road Traffic Noise (CRTN). Department of Transport. 1988.

Figures

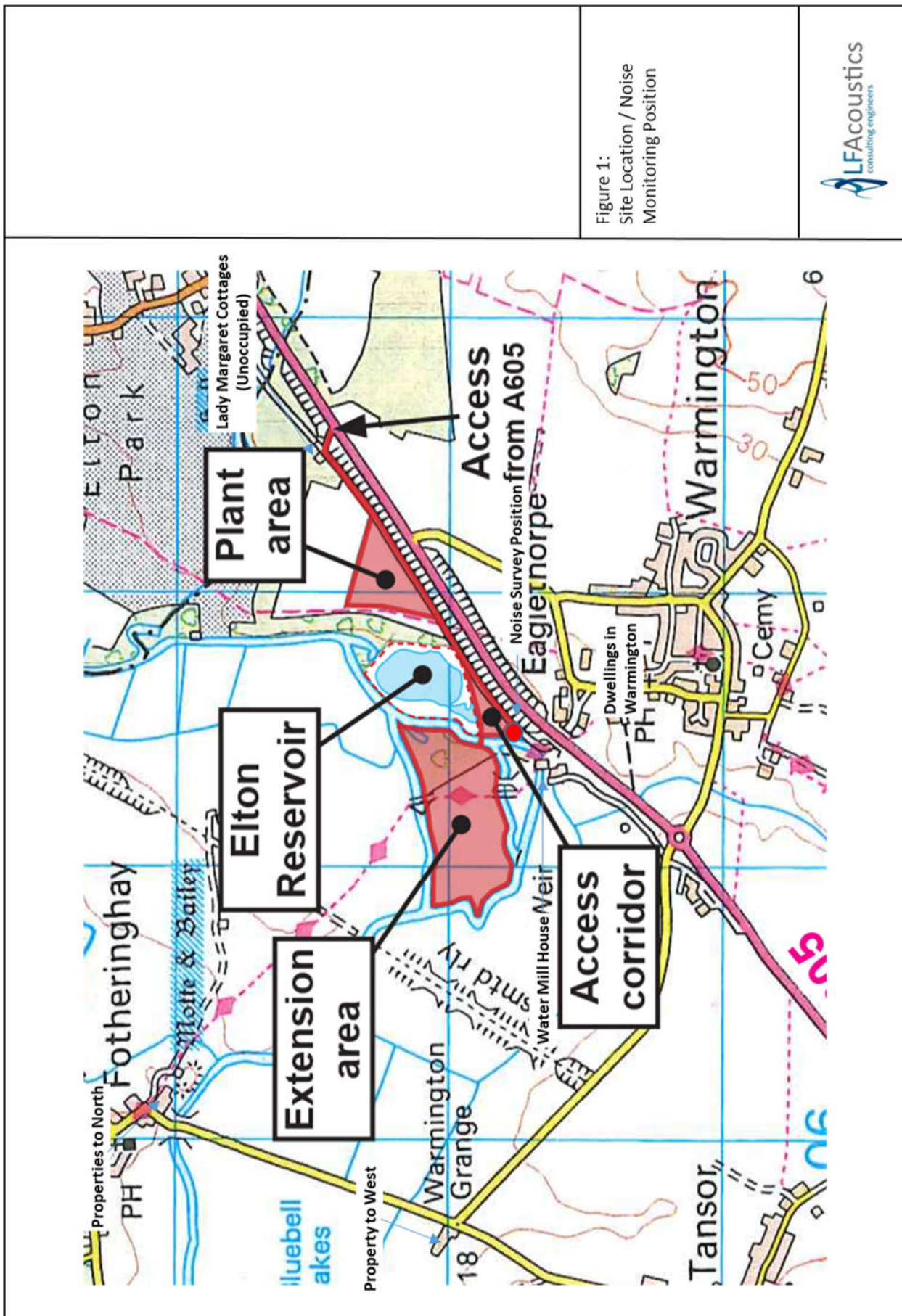
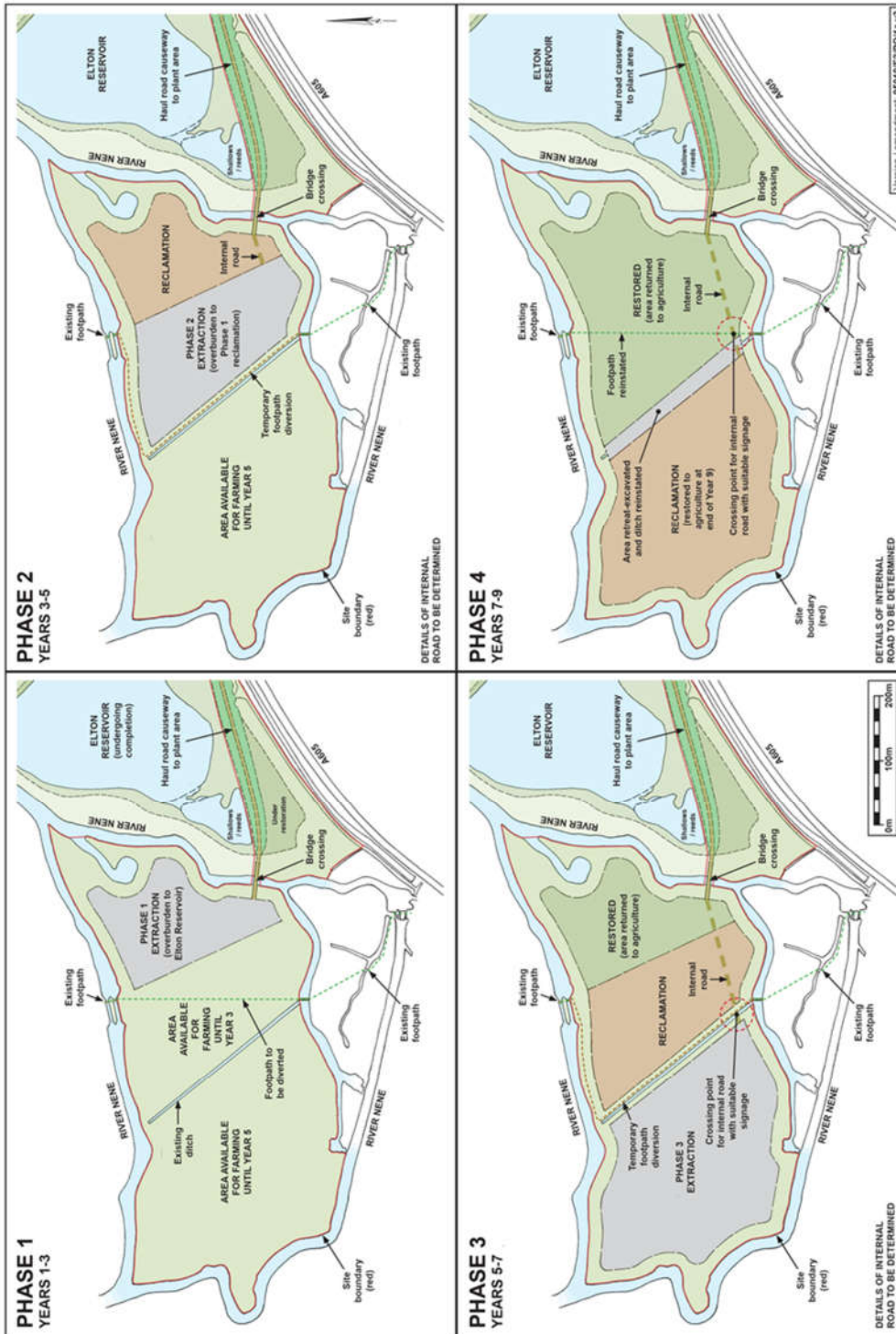
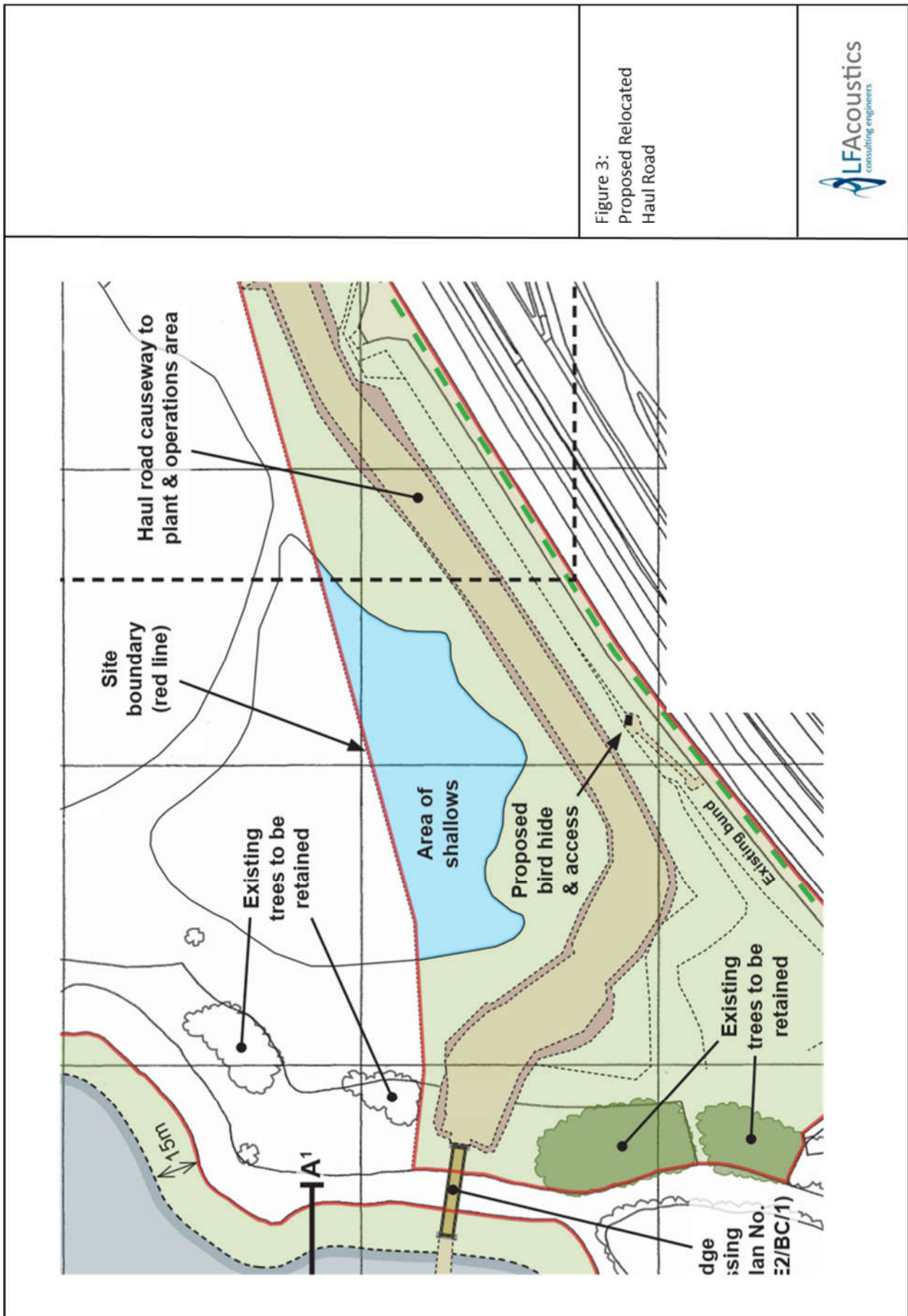


Figure 1:
Site Location / Noise
Monitoring Position

Figure 2:
Proposed Phasing





Appendix A Noise Units

Decibels (dB)

Noise can be considered as 'unwanted sound'. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit that has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq} , L_{Amax} , L_{A10} , and L_{A90})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax S}$, or Slow, is averaged over 1 second. All L_{Amax} values referred to in this report are Fast.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise that is present even during the quieter parts of measurement period.

Appendix B
Calculation Details

Proposed Sand & Gravel Extraction and Processing at Elton
Calculated Noise Levels from Site Operations

11-Nov-2021

Receptor: Water Mill House
 Height 22 m
 Grid Ref: 507413 X 291588 Y

Uses B55228

Predicted Freefield Noise Levels

	Ref Level @10m	No.	%	On Time	Grid Reference	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Total LAeq [dB]	Overall LAeq With Processing [dB]	Noise Limit LAeq [dB]	Within Limit?
										Hard	Soft							
Processing Operations																		
Processing Plant	80.2	1	100		508050	292154	32	850			-38.6	-46.2	0.0	34.0				
Crusher (Periodic Use)	79.1	1	100		508050	292154	32	850			-38.6	-46.2	0.0	32.9				
Loading Shovel	73.6	1	100		508050	292154	31	850			-38.6	-46.2	0.0	27.4				
HGV Movements	27.1	1.2	-		508226	292250	31	1040			-40.3	-48.4	0.0	19.0	37.0	-	55	Yes
Initial Soil Strip Phase 1																		
Excavator	74.3	1	100		507360	291809	20	220			-26.8	-31.6	0.0	42.7				
Dozer (Operational)	79.0	1	75		507360	291809	20	220			-26.8	-31.6	0.0	46.2				
Dozer (Idling)	67.4	1	25		507360	291809	20	220			-26.8	-31.6	0.0	29.8				
Dump Truck Movements	43.5	6	-		507549	291803	20	250			-28.0	-32.9	0.0	38.5	48.4	-	55	Yes
Extraction Phase 1																		
Excavator	74.3	1	100		507360	291809	20	220			-26.8	-31.6	0.0	42.7				
Dump Truck Movements	43.5	6	-		507549	291803	20	300			-29.5	-34.9	0.0	38.1	44.0	44.8	55	Yes
Extraction Phase 2 / Reclamation Restoration Phase 1																		
Excavator	74.3	1	100		507373	291927	20	335			-30.5	-36.1	0.0	38.2				
Dump Truck Movements	42.8	6	-		507549	291803	20	350			-30.9	-36.6	0.0	37.1				
Dozer (Operational)	79.0	1	75		507360	291809	20	220			-26.8	-31.6	0.0	46.2				
Dozer (Idling)	67.4	1	25		507360	291809	20	220			-26.8	-31.6	0.0	29.8	47.3	47.7	55	Yes
Extraction Phase 3 / Reclamation Restoration Phase 2																		
Excavator	74.3	1	100		507206	291807	20	300			-29.5	-34.9	0.0	39.4				
Dump Truck Movements	44.9	6	-		507549	291803	20	350			-30.9	-36.6	0.0	39.2				
Dozer (Operational)	79.0	1	75		507373	291927	20	335			-30.5	-36.1	0.0	41.6				
Dozer (Idling)	67.4	1	25		507373	291927	20	335			-30.5	-36.1	0.0	25.3	45.0	45.7	55	Yes
Reclamation Restoration Phase 3																		
Excavator	74.3	1	100		507206	291807	20	300			-29.5	-34.9	0.0	39.4				
Dump Truck Movements	44.9	6	-		507549	291803	20	300			-29.5	-34.9	0.0	39.5				
Dozer (Operational)	79.0	1	75		507206	291807	20	300			-29.5	-34.9	0.0	42.8				
Dozer (Idling)	67.4	1	25		507206	291807	20	300			-29.5	-34.9	0.0	26.5	45.7	46.3	55	Yes

Moving Point Sources

Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
111	6	25	300	80	43.5
111	6	25	350	80	42.8
111	6	25	300	110	44.9
106	1.2	25	1040	10	27.1

Assumes processing plant still operational

Proposed Sand & Gravel Extraction and Processing at Elton
Calculated Noise Levels from Site Operations

11-Nov-2021

Receptor: Bird Hide
 Height: 24 m
 Grid Ref: X Y

Uses B55228

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference		Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Total LAeq [dB]	Overall LAeq With Processing [dB]	Noise Limit LAeq [dB]	Within Limit?
				X	Y					Hard	Soft							
Processing Operations																		
Processing Plant	80.2 LAeq	1	100	508050	292154	32	550			-34.8	-41.5	0.0	-41.5	38.7				
Crusher (Periodic Use)	79.1 LAeq	1	100	508050	292154	32	550			-34.8	-41.5	0.0	-41.5	37.6				
Loading Shovel	73.6 LAeq	1	100	508050	292154	31	550			-34.8	-41.5	0.0	-41.5	32.1				
HGV Movements	35.0 LAeq	12	-	508226	292250	31	750			-37.5	-44.9	0.0	-44.9	27.6	41.9			
Phase 1 / Phase 2 - Proposed Bird Hide Location - Proposed Haul Route - Closest Operations																		
Excavator	74.3 LAeq	1	100	507425	291848	20	190			-25.6	-30.0	0.0	-30.0	44.3				
Dump Truck Movements	58.6 LAeq	12	-	507605	291826	20	15			-3.8	-3.8	0.0	-3.8	58.6				
Dozer (Operational)	79.0 LAeq	1	75	507425	291848	20	190			-25.6	-30.0	0.0	-30.0	47.8	59.1	59.2	65	Yes
Dozer (Idling)	67.4 LAeq	1	25	507425	291848	20	190			-25.6	-30.0	0.0	-30.0	31.4				

Moving Point Sources

Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
111	6	25	15	130	58.6
106	12	25	750	45	35.0