

NOISE ASSESSMENT

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

INGREBOURNE VALLEY LTD

APRIL 2019

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Status	Prepared By	Date
1.1	L Jephson BEng (Hons) MIOA	2/4/19

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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 application for a proposed extension to the sand and gravel operations at Elton.

Works have been progressing on the site for a number of years to form a new agricultural reservoir for the estate. It is now proposed to extend the sand and gravel extraction into an extension area to the west of the reservoir site and to restore the land back to agriculture utilising the importation of inert materials. The method of extraction, reclamation and restoration would be equivalent to that currently being undertaken within the reservoir site. It is proposed to process the extracted materials within the existing processing plant area to the east of the reservoir, utilising plant equivalent to that which operated previously during the excavation of the reservoir.

This report presents an assessment of the likely noise levels generated at surrounding noise sensitive receptors during the proposed extraction and processing, reclamation and restoration of the proposed extension. 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.

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

No specific noise limits were attached to the current planning permission for the construction of the agricultural reservoir (NCC Ref. 18/00031/MINVOC).

There was, however a requirement to undertake periodic noise monitoring at Water Mill House to the south west and at Lady Margaret Cottages to the north east to ensure noise levels at these properties attributable to the operation of the site did not exceed a level of 55 dB $L_{Aeq, 1 \text{ hour}}$, measured freefield.

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.

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

The reservoir construction is presently continuing, with the reservoir currently being lined with clay.

The plant presently operating on site would continue to be used during the extraction, reclamation and restoration of the proposed extension area. The plant presently in use comprise an excavator, dozer and two articulated dump trucks (ADT). To facilitate the processing of the excavated material, a processing plant would be brought back onto site, which would be equivalent to that used previously. This plant would require the use of a loading shovel, which would be used to service the plant and to load HGVs.

The works within the extension area would be undertaken over three main phases, as indicated on Figure 2.

The soils would initially be removed from Phase 1, with the overburden dug out and transported to the reservoir 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.

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
HGV Movements	106 dB SWL	12 per hour	-
Dump Truck Movement	111 dB SWL	20 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. This limit is also consistent with that applied previously for the reservoir construction operations.

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 [3]. Where barrier corrections have been calculated, the algorithm used within a Calculation of Road Traffic Noise [4] 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.

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 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, 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 - 49 dB $L_{Aeq, 1 \text{ hour}}$;
- Extraction Phase 3 / Reclamation & Restoration Phase 2 - 48 dB $L_{Aeq, 1 \text{ hour}}$;
- Reclamation & Restoration Phase 3 - 48 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 $L_{Aeq, 1 \text{ hour}}$ and would thus remain at least 6 dB(A) below the normal working limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ at the property.

Noise levels would therefore remain within the noise limits as proposed within the PPG and thus fully accord with the requirements of the NPPF to ensure any adverse noise impacts were minimised.

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 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.

It is recommended that a noise monitoring exercise be carried out at Water Mill House at the commencement of extraction and at a time whilst the processing plant is operational, to demonstrate compliance with the noise limit. Any further requirement for monitoring should be carried out at intervals to be agreed with the minerals planning authority.

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 Limited were appointed by Ingrebourne Valley Limited to undertake a noise assessment to support a planning application for extension at the Elton Reservoir Site, Elton.

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 guidance.

References

1. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. February 2019.
2. Department for Communities and Local Government. Planning Practice Guidance. Assessing Environmental Impacts from Minerals Extraction. 6 March 2014.
3. British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1:Noise. BS 5228-1+A1. 2014.
4. Calculation of Road Traffic Noise (CRTN). Department of Transport. 1988.

Figures

Figure 1:
Site Location / Noise
Monitoring Position

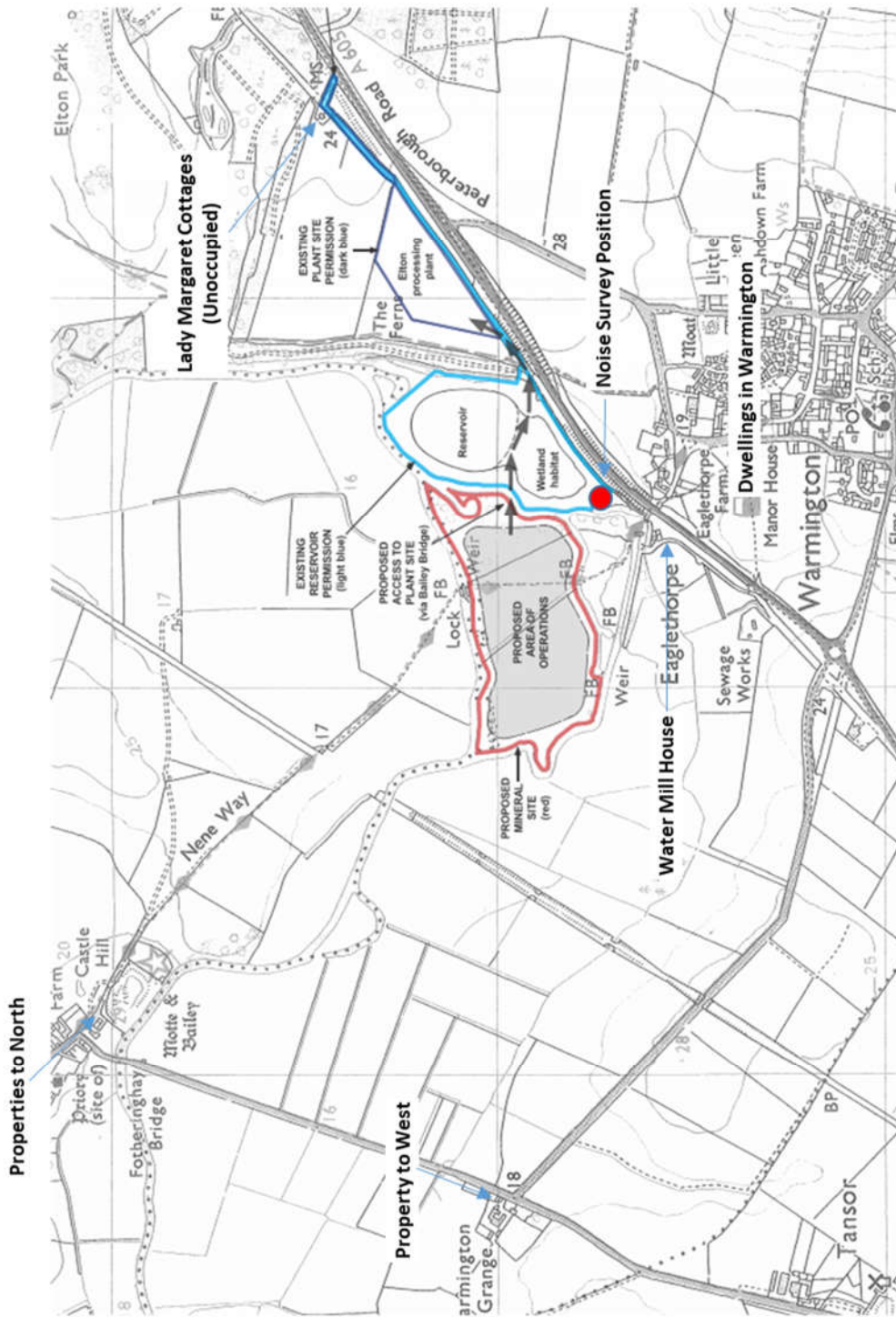
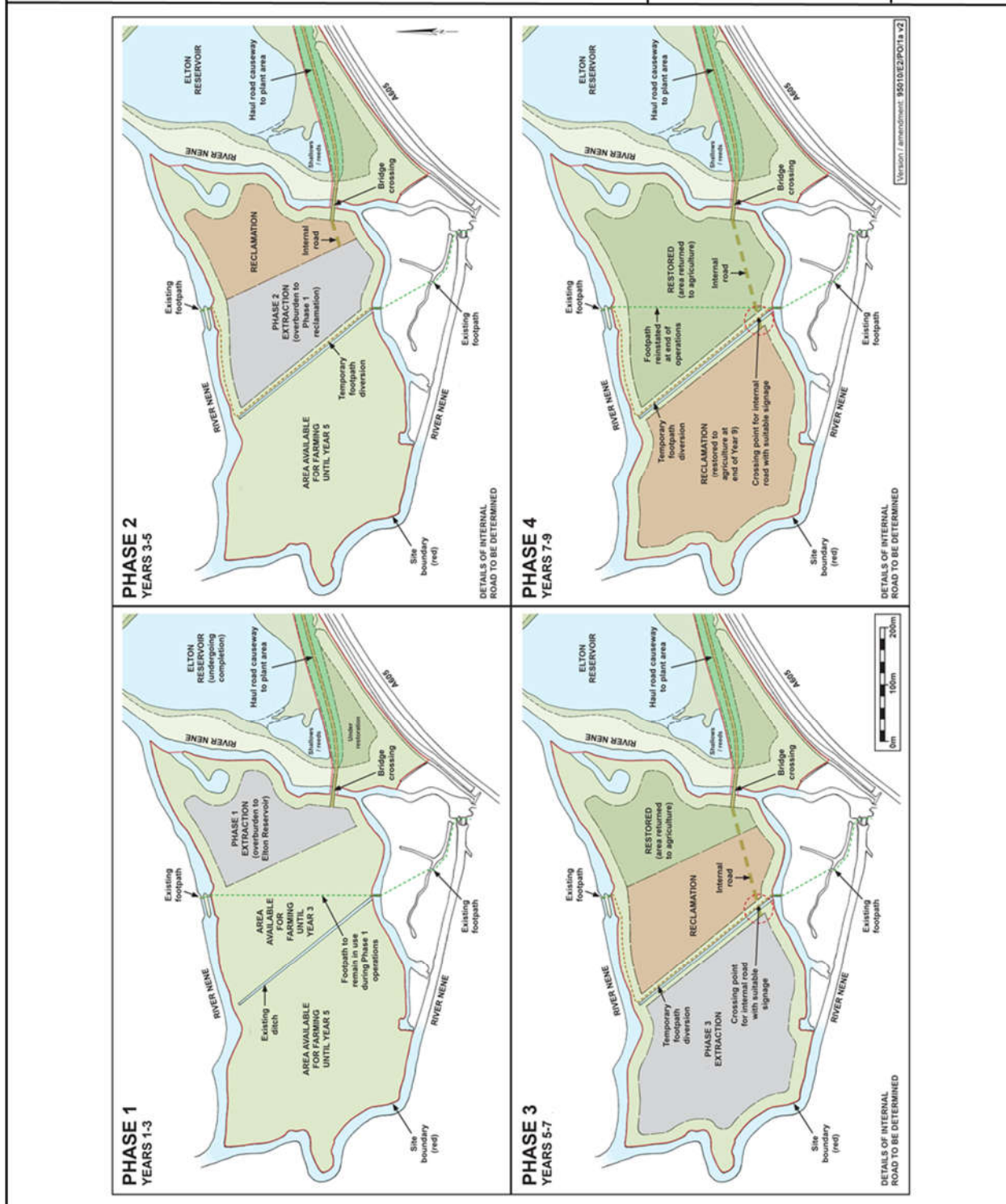


Figure 2:
Proposed Phasing



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**

02-Apr-2019

Receptor: Water Mill House
Height 22 m

Uses BS5228

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Hard Attenuation	Soft Attenuation	Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Total LAeq [dB]	Overall LAeq With Processing [dB]	Noise Limit LAeq [dB]	Within Limit?
Processing Operations																
Processing Plant	80.2 LAeq	1	100	32	550			-34.8	-41.5	0.0	-41.5	38.7				
Loading Shovel	73.6 LAeq	1	100	31	550			-34.8	-41.5	0.0	-41.5	32.1				
HGV Movements	27.7 LAeq	12	-	31	900			-39.1	-46.9	0.0	-46.9	19.9	39.6	-	55	Yes
Initial Soil Strip Phase 1																
Excavator	74.3 LAeq	1	100	20	220			-26.8	-31.6	0.0	-31.6	42.7				
Dozer (Operational)	79.0 LAeq	1	75	20	220			-26.8	-31.6	0.0	-31.6	46.2				
Dozer (Idling)	67.4 LAeq	1	25	20	220			-26.8	-31.6	0.0	-31.6	29.8				
Dump Truck Movements	48.7 LAeq	20	-	20	250			-28.0	-32.9	0.0	-32.9	43.7	49.3	-	55	Yes
Extraction Phase 1																
Excavator	74.3 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	39.4				
Dewatering Pump	66.0 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	31.1				
Dump Truck Movements	48.7 LAeq	20	-	20	300			-29.5	-34.9	0.0	-34.9	43.3	45.0	46.1	55	Yes
Extraction Phase 2 / Reclamation Restoration Phase 1																
Excavator	74.3 LAeq	1	100	20	350			-30.9	-36.6	0.0	-36.6	37.7				
Dewatering Pump	66.0 LAeq	1	100	20	350			-30.9	-36.6	0.0	-36.6	29.4				
Dump Truck Movements	48.1 LAeq	20	-	20	350			-30.9	-36.6	0.0	-36.6	42.4				
Dozer (Operational)	79.0 LAeq	1	75	20	220			-26.8	-31.6	0.0	-31.6	46.2				
Dozer (Idling)	67.4 LAeq	1	25	20	220			-26.8	-31.6	0.0	-31.6	29.8	48.2	48.8	55	Yes

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

02-Apr-2019

Receptor: Water Mill House
Height 22 m

Uses BS5228

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	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							
Extraction Phase 3 / Reclamation Restoration Phase 2																
Excavator	74.3 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	39.4				
Dewatering Pump	66.0 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	31.1				
Dump Truck Movements	50.1 LAeq	20	-	20	350			-30.9	-36.6	0.0	-36.6	44.4				
Dozer (Operational)	79.0 LAeq	1	75	20	350			-30.9	-36.6	0.0	-36.6	41.1				
Dozer (Idling)	67.4 LAeq	1	25	20	350			-30.9	-36.6	0.0	-36.6	24.8	47.0	47.8	55	Yes
Reclamation Restoration Phase 3																
Excavator	74.3 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	39.4				
Dewatering Pump	66.0 LAeq	1	100	20	300			-29.5	-34.9	0.0	-34.9	31.1				
Dump Truck Movements	50.1 LAeq	20	-	20	300			-29.5	-34.9	0.0	-34.9	44.7				
Dozer (Operational)	79.0 LAeq	1	75	20	300			-29.5	-34.9	0.0	-34.9	42.8				
Dozer (Idling)	67.4 LAeq	1	25	20	300			-29.5	-34.9	0.0	-34.9	26.5	47.7	48.3	55	Yes

Assumes processing plant still operational

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
Dump Truck Movements (Phase 1)	111	20	25	300	80	48.7
Dump Truck Movements (Phase 2)	111	20	25	350	80	48.1
Dump Truck Movements (Phase 3)	111	20	25	300	110	50.1
HGV Movements (Access to Processing)	106	12	25	900	10	27.7