enzygo
environmental consultants

Noise Assessment

Escrick Brickworks Restoration

The Old Brick & Tile Works, Riccal Road, Escrick, York.

For:

Escrick Environmental Services

SHF.0105.003.NO.R.002

'Experience and expertise working in union'

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Escrick Brickworks Restoration

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For:	Escrick Environmental Services
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1 Introduction

1.1 Introduction

Enzygo Limited (Enzygo) has been commissioned by Escrick Environmental Services (ESS) to undertake a noise assessment for the continued infill and restoration works at Escrick Brickworks, Riccall Road, Escrick, North Yorkshire.

The assessment has been undertaken to assess compliance with the relevant standards at the nearest noise-sensitive receptors during the proposed operational hours of the plant and equipment. The assessment will also provide outline mitigation measures where considered necessary.

Details of the assessment methodology employed, together with the results of the baseline surveys, predictions, assessment and conclusions drawn are presented within this report.

1.2 Site Description

Escrick Brickworks is located to the rear of Escrick Business Park off the A19 between the villages of Escrick and Riccall, North Yorkshire. The site is located at grid reference SE 62124 40390 approximately.

The site is currently being restored to form a mountain bike skills centre in accordance with a planning permission granted in 2007, which was amended in 2013. Hours of operation at the site are Monday to Friday between 07:00 and 17:00 hours, although the planning permission allows for Saturday operations between 07:00 and 13:00 hours also.

1.3 Proposals

The proposal is to import an additional 500,000m^3 of inert and non-hazardous soils to increase approved levels (approximately 900,000 tonnes). The proposal is for the site to be restored over a 10-year period (90,000tpa) although this may reduce to around 5-years if current rates of import are continued. It should be noted that the environmental permit currently allows for 250,000tpa to be disposed of at the site.

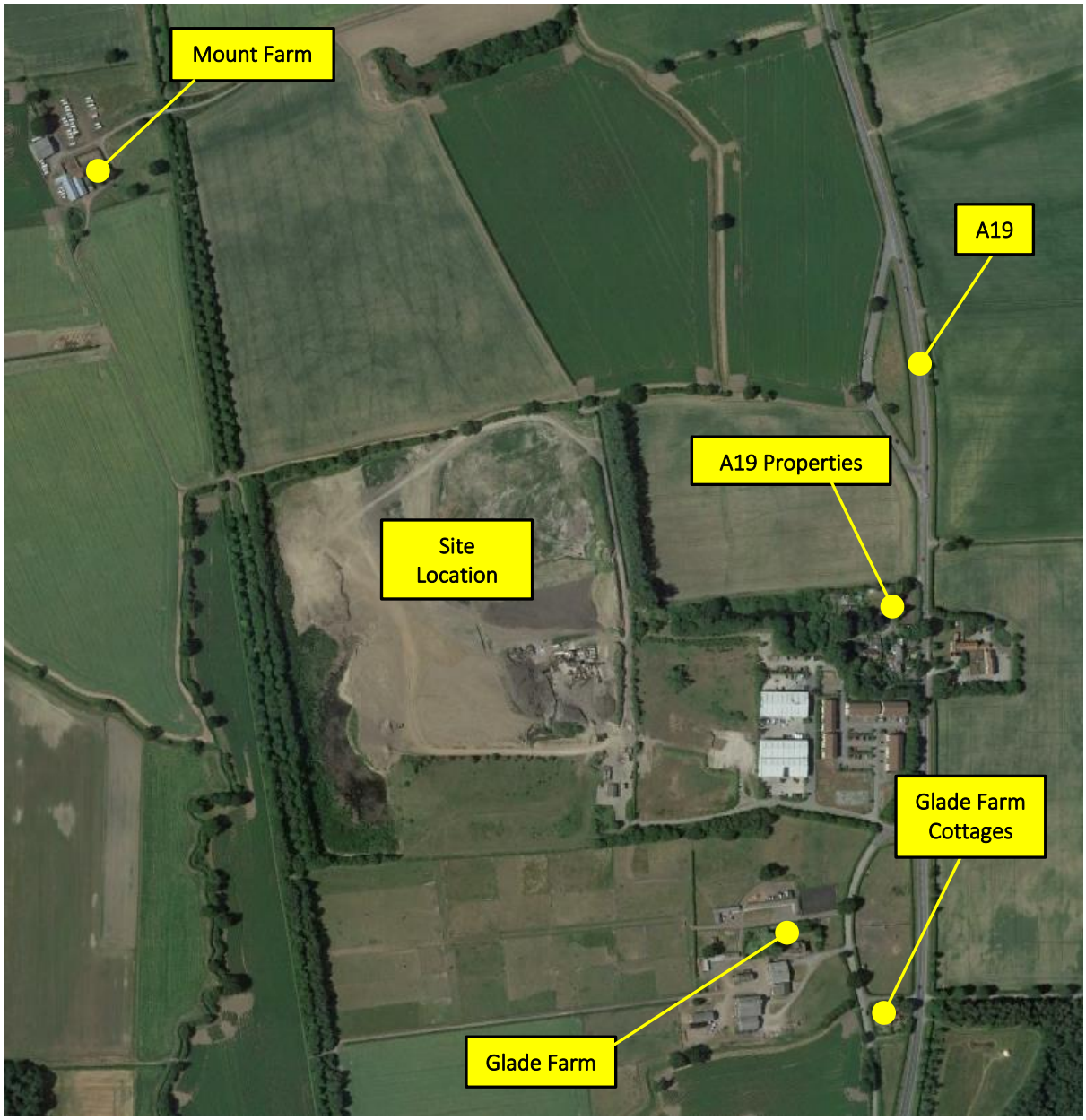
The method and hours of working would remain unchanged.

A review of available aerial imagery and online mapping shows that the nearest noise-sensitive receptors are at the following locations:

- Glade Farm/Glade Farm Cottages, to the southeast of the site;
- Properties on the western side of the A19 to the east of the site; and
- Mount Farm, to the northwest of the site.

The locations are shown on Figure 1-1 overleaf.

Figure 1.1: Site and Sensitive Property Locations



1.4 Noise Assessment Methodology

Noise levels generated by operations within the proposed extension area have been predicted to the nearby sensitive receptors identified using the calculation methodologies outlined in British Standard 5228:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*' (BS5228-1) using the proprietary noise modelling software CadnaA.

The resulting predicted noise levels have been assessed against noise limits derived, based on the measured background noise levels, in accordance with the Planning Practice Guidance for Noise and more specifically with paragraphs 019 to 022 of the Planning Practice Guidance for Minerals (PPGM) outlined on the gov.uk website, and summarised in Section 2 of this report.

Where considered necessary and appropriate, outline mitigation measures have been suggested to ensure that noise levels generated by the proposed development have a minimum impact upon the nearby receptors.

2 Standards and Guidance

2.1 Planning Practice Guidance for Noise

The Planning Practice Guidance for Noise states that the management of noise associated with minerals extraction is considered in the Planning Practice Guidance for Minerals.

2.2 Planning Practice Guidance for Minerals

With respect to noise emissions the Planning Practice Guidance for Minerals (PPGM) states that those making mineral development proposals should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emissions, its characteristics, the proposed operating locations, procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.

The PPGM states in Paragraph 019:

> "*Proposals for the control or mitigation of noise emissions should:*
>
> - *Consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;*
> - *Assess the existing acoustic environment around the site of the proposed operations, including background noise levels at the nearby noise-sensitive properties;*
> - *Estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;*
> - *Identify proposals to minimise, mitigate or remove noise emissions at source;*
> - *Monitor the resulting noise to check compliance with any proposed or imposed conditions.*

The PPGM goes on to state in Paragraph 020 that:

> "*Mineral planning authorities should take account of the prevailing acoustic environment and in doing so considered whether or not noise from the proposed operation would:*
>
> - *Give rise to a significant adverse effect;*
> - *Give rise to an adverse effect; and*
> - *Enable a good standard of amenity to be achieved.*
>
> *In line with the Explanatory Note for the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed effect level and the lowest observed adverse effect level of the given situation.*"

Paragraph 021 of the PPGM relates to the establishment of noise limits states:

> "*Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours. Where it will be difficult not to exceed the background noise level by more than 10dB(A) without imposing unreasonable*

burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impact, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field).

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (eg Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed."

Paragraph 022 of the guidance relates to operations which may give rise to particularly noisy short-term activities and specifies appropriate noise limits for such operations, stating:

"*Activities such as soil-stripping, the construction and removal baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.*

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to 8 weeks in a year at specified noise sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than 8 weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum."

2.3 British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites

BS5228-1:2009+A1:2014 (BS 5228) sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities which are shared with mineral extraction sites. As such, the calculation methodologies it contains can be used to predict noise levels arising from the establishment and operational phases of the proposed development.

BS5228 also contains a number of tables containing typical noise emission levels for general plant and operations which can be found on mineral extraction sites.

Predicted noise levels in this assessment have been determined using the proprietary noise modelling software, CadnaA, and the calulation methologies outlined in the guidance. The sound power levels used as input data for the noise model are those contained within the standard or specified in the plant manufacturer's datasheets.

3 Baseline Noise Monitoring Survey

3.1 Baseline Noise Survey

To inform the noise assessment, baseline background measurements were undertaken at locations representative of the nearest noise-sensitive receptors to the development site. The measurements were made on a normal midweek working days, in this case on Tuesday 17th December 2019 (for road traffic) and Wednesday 8th January 2020 (for prevailing backgrounds).

It is considered that the existing operations at Escrick Brick and Tile Works form part of the prevailing background. However, to verify the background noise levels, an additional survey was undertaken on Wednesday 29th January 2020 over a period when the site was not operational.

The baseline noise survey was carried out in accordance with the requirements of BS7445:1996 '*Description and measurement of environmental noise*', by a suitably qualified and experienced acoustic consultant. The monitoring locations shown in Table 3-1 and Figure 3-1 below are representative of the nearest residential premises to the proposed extension area.

Baseline monitoring was undertaken for at least 2-hours at each location. A sound level meter was left unattended at Glade Farm for the duration of the survey whilst measurements at other locations were made.

Table 3-1: Noise Monitoring Locations

Location Reference	Grid Ref (NGR)
MP1 – Glade Farm	462512, 440014
MP2 – A19 Properties (representative)	462566, 440586
MP3 – Mount Farm	461966, 440966
Road Traffic Measurement	462819, 442533

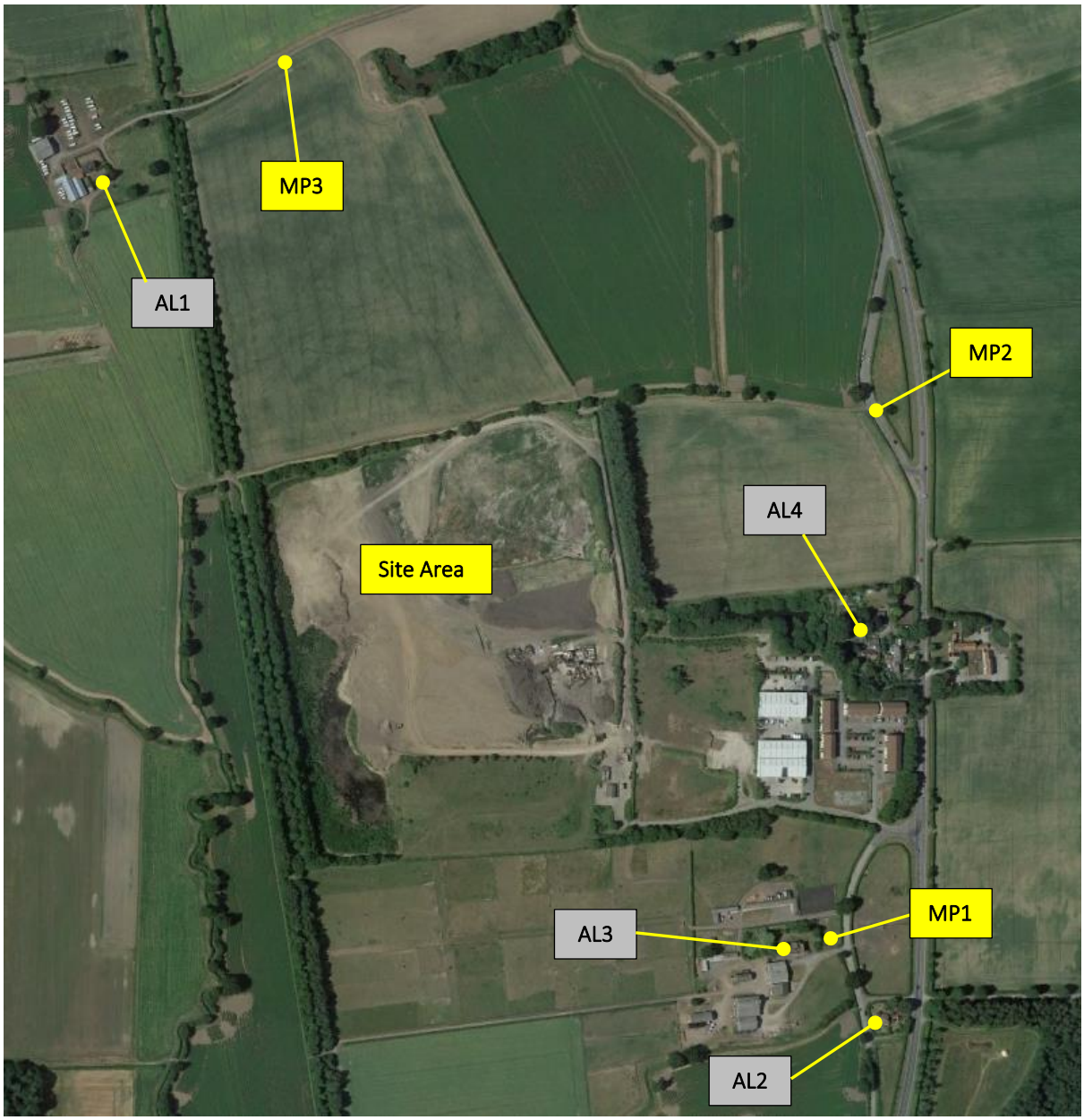
The noise monitoring equipment used during the surveys is shown in Table 3-2 and was set to record the $L_{Aeq,T}$, L_{A90}, L_{A10} and L_{Amax} parameters.

Table 3-2: Noise Monitoring Equipment

Equipment Description	Serial Number	Calibration Date
01dB Solo Class 1 sound level meter	065445	09/03/2018
Cirrus CR:171B Class 1 sound level meter	G301158	28/11/2019
01dB Solo Class 1 sound level meter	065446	09/3/2018
Cirrus CR:171B Class 1 sound level meter	G301158	28/11/2019
Cirrus CR:515 Acoustic calibrator	90331	28/11/2019

The sound level meter was field calibrated, using an electronic calibrator, prior to commencement and upon completion of the overall survey, no drift in calibration was observed. The external calibration documentation for the equipment used is available upon request.

Figure 3-1: Noise Monitoring and Assessment Location Plan



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3.2 Weather

Tuesday 17th December 2019

Weather conditions during the road traffic noise measurement survey were suitable for environmental noise monitoring, being dry with no rain with approximately 50% cloud cover. Wind speeds were below 4.0m/s and temperatures were around 3°C throughout the survey period.

Wednesday 8th January 2020

On Wednesday 8th January it was overcast but dry with no rain and 100% cloud cover. Wind speeds were below 5.0m/s and temperatures were around 8°C throughout the survey period.

Wednesday 29th January 2020

On Wednesday 29th January it was overcast but dry with no rain and 100% cloud cover. Wind speeds were below 5.0m/s and temperatures were around 6°C throughout the survey period.

3.3 Survey Results

The results of the baseline surveys are summarised in Table 3-3 and can be found in full in Appendix A.

Table 3-3: Summary of Baseline Survey Results, dB

Location	$L_{Aeq,T}$	L_{Amax}	L_{A90}	L_{A10}
MP1 Glade Farm	54.3	78.5	49.5	55.3
Non-operational background	57.5	78.4	50.0	56.6
MP2 A19 Properties	59.2	77.1	54.0	60.7
Non-operational background	56.4	86.2	49.6	56.3
MP3 Mount Farm	54.0	82.1	35.3	47.8
Non-operational background	51.9	75.6	38.2	51.0
Traffic Noise Measurements	70.9	96.4	59.4	73.8

Table 3-3 shows that background noise levels were actually higher during the measurement periods when the site was not operational indicating that sources other than the site are the main influencers on noise levels in the area. This is highlighted by the background noise levels increasing as traffic noise (L_{A10}) increases.

3.4 Subjective Field Monitoring Notes

Wednesday 8th January 2020

MP1 – Glade Farm

The noise climate at this location, close to the residential house at Glade Farm, comprised constant and dominant road traffic noise from the A19, farm machinery accessing the farm, occasional noise from farm animals (ducks and goats) and occasional aircraft overhead.

MP2 – A19 Properties – Representative Location

The noise climate at this location, the parking area north of the properties, was dominated by road traffic using the A19, a bird-scarer occasionally sounded and dumpers moving around at the site were audible, including revering alarms. Occasionally vehicles accessing the parking area were audible.

MP3 – Mount Farm

The noise climate at this location, near to Mount Farm, comprised road traffic from the A19, a bird-scarer occasionally sounded, occasional local traffic accessing the farm and occasional aircraft overhead. There were hunters in the nearby fields and occasional gunshots were audible.

Wednesday 29th January 2020

MP1 – Glade Farm

The noise climate at this location, close to the residential house at Glade Farm, comprised constant and dominant road traffic noise from the A19, farm machinery accessing the farm, occasional noise from farm animals (ducks and goats), occasional bangs from a bird scarer, occasional aircraft overhead and some wind noise in nearby trees.

MP2 – A19 Properties – Representative Location

The noise climate at this location, the parking area north of the properties, was dominated by road traffic using the A19, a bird-scarer occasionally sounded.

MP3 – Mount Farm

The noise climate at this location, near to Mount Farm, comprised road traffic from the A19, a bird-scarer occasionally sounded, occasional local traffic accessing the farm and occasional aircraft overhead.

4 Noise Assessment

4.1 Introduction

Noise levels generated by the development proposals have been made using the calculation methodology outlined in BS5228-1:2009+A1:2014 and the assessment of potential noise impacts has been made in accordance with the guidelines contained in the Planning Practice Guidance for Minerals (PPGM).

4.2 Noise Limit Derivation

In order to assess the potential impact of the development proposals on nearby noise-sensitive receptors, noise limits have been derived based on the non-operational measured background noise levels plus 10dB, subject to a maximum of 55dB $L_{Aeq,1hr}$, at the nearby receptors and the guidance contained in the PPGM.

Table 4-1 details the derived noise limits for normal operations at the nearest sensitive receptors, as presented in Figure 3-1. The noise levels have been rounded to the nearest whole number.

Table 4-1: Derived Noise Limits for Normal Operations, free-field

Location	Average Background Noise Level, dB L_{A90}	Derived Noise Limit, dB $L_{Aeq,1hr}$
Glade Farm	50	55
A19 Properties	50	55
Mount Farm	38	48

4.3 Noise Emissions

The client has supplied the following information with repect to operational activities associated with the development.

- In-filling within the north-east corner of the site would be to modified landform on receipt of revised planning permission.
- Further cell formation and progressive restoration would continue in an anti-clockwise direction.
- Infilling with non-hazardous soils and inert materials would be to revised profiles.

The phased method of working is shown on drawing no.s ESS_005 Rev 1 to ESS_009 Rev 1.

The operational plant and equipment detailed in Table 4-2 are those currently in use at the site and will be retained for the continuing operations. The sound power levels derived from either BS5228-1, from manufacturer's datasheets or machine badges.

Table 4-2: Plant & Equipment

Activity	Description	Sound Power Level, dB L_{WA}	Data Source
Acumen Plant	Doonsan DX225LC-5 Excavator	103	Doosan datasheet
	Doosan DA30 Dumper	110	BS5228-1:2009+A1:2014 (Generic)
	Doosan DL250 Loading Shovel	103	Doosan datasheet
	Anaconda TD516 Tracked Trommel	106	Measured data for hybrid plant
	Star Screener & Generator		
ESS Plant	Doosan DX85 Excavator	98	Doosan datasheet
	CAT D6T Dozer	110	Historic CAT data
	Johnston VT651 Road Sweeper	110	Johnston specification Sheet
	Screener	108	BS5228-1:2009+A1:2014 (Generic)
	HGV (per truck)	105	BS5228-1:2009+A1:2014 (Generic)

4.4 Noise Modelling Protocols

The noise model was constructed using the proprietary noise modelling software package, CadnaA, utilising web-based mapping and aerial photography, EA/DEFRA topographical and plant utilisation and operational descriptions supplied by the client. The potential noise impacts at the nearby residential properties have been predicted using the calculation methodology outlined in BS5228-1.

4.5 Modelling Assumptions

The following assumptions have been made during the modelling process:

- All sources have a 80% on-time throughout the 1-hour daytime assessment periods;
- It is assumed that dumpers would have maximum operational speeds of 25km/h;
- Wind and temperature gradient assisted sound propagation at all receptors;
- 100% soft ground between the sources and receptors; and
- Ground floor receiver at 1.5m AOD.

4.6 Potential Impact

All operations would continue in accordance with the permitted hours, i.e. 07:00 to 17:00 hours Mondays to Fridays and 07:00 to 13:00 hours on Saturdays with no working on Sundays or Bank Holidays.

The assessment has been undertaken to determine the expected levels of noise, from infilling and restoration operations within the proposed development area, at the nearby residential receptor locations. Noise predictions have been to the site facing façade of each property assessed to a height of 1.5m above local ground levels.

In order to assess a conservative, worst-case scenario, it has been assumed that all operations are taking place at their closest approaches to the relevant properties.

Table 4-3 shows the predicted worst-case operational noise levels when operations are at their closest approach to the nearest properties. The predicted noise levels have been rounded to the nearest whole number with the highest predicted noise levels at each receptors shown in bold text.

Table 4-3: Predicted Noise Levels per Phase

Location	Worst-case Predicted Noise Level, dB $L_{Aeq,1hr}$			
	Phase 1	Phase 2	Phase 3	Phase 4
AL1 – Mount Farm	41	43	40	**44**
AL2 – Glade Farm Cottages	44	44	44	**46**
AL3 – Glade Farm	48	47	48	**54**
AL4 – A19 Properties	49	**50**	49	48

Table 4-4 details the assessment of the worst-case predicted noise levels from Table 4-3 against the noise limits derived in accordance with the guidance contained in the PPGM.

Table 4-4: Assessment of Worst-case Predicted Noise Levels

Location	Worst-case Predicted Noise Level, dB $L_{Aeq,1hr}$	Derived Noise Limit dB $L_{Aeq,1hr}$	Difference
AL1 – Mount Farm	44	48	-4
AL2 – Glade Farm Cottages	46	55	-9
AL3 – Glade Farm	54	55	-1
AL4 – A19 Properties	50	55	-5

Table 4-4 shows that the worst-case predicted noise levels, at the nearest noise-sensitive receptors identified, would meet the noise limits derived in accordance with the PPGM.

As the development proposals do not exceed the derived noise levels, no specific mitigation measures are considered necessary.

4.7 Potential Changes in Traffic Noise

The potential effects of the increase in traffic noise levels due to the proposed development, and the potential decrease in traffic noise levels following cessation of operations at the existing site, has been assessed against existing traffic noise levels on the A19 at Escrick Village. During the measurement period 7no. trucks per hour left site.

Noise measurements where undertaken over a 1½ hour period on the outskirts of Escrick Village. The average measured noise level over the measurement period was 70.9dB $L_{Aeq,T}$. The full measurement results are shown in Appendix A.

The predictions were made in accordance with the calculation algoritms detailed in the Calculation of Road Traffic Noise using the CadnaA noise modelling software. The model was calibrated using the

actual traffic count data for the average 12-hour daytime period (07:00 to 19:00 hours) divided by 12 to give a 1-hour average. Table 4-5 details the potential changes and details the results of the assessment over a 1-hour period.

Table 4-5: Estimated Changes in Traffic Noise

Description	Vehicles/hr			Predicted Noise Level dB $L_{Aeq,1hr}$	Change
	Total Vehicles	HGVs	%age HGV		
Actual Count	1428	132	9.3	70.9	-
No site trucks	1421	125	8.8	70.8	-0.1
Double site trucks	1435	139	9.7	71.0	+0.1

Table 4-6 shows that noise levels with no site related trucks travelling through Escrick Village would reduce by just 0.1dB. Whilst doubling the number of trucks would not affect of increasing the predicted noise levels by 0.1dB.

As 3dB is generally considered to be the minimum change which is detected by the human ear, the change in noise levels due to no, or twice the number of, site related vehicles passing through Escrick would not be noticeable.

5 Conclusion

5.1 Background

Enzygo Limited has been commissioned by Escrick Environmental Services to undertake a noise assessment for the continued infill and restoration works at Escrick Brickworks, Riccall Road, Escrick, North Yorkshire.

The assessment has been undertaken to assess compliance with the relevant standards at the nearest noise-sensitive receptors during the proposed operational hours of the plant and equipment. The assessment will also provide outline mitigation measures where considered necessary.

A baseline survey has been undertaken to determine the prevailing noise levels at locations representative of the nearest noise-sensitive receptors to the site and to inform the derivation of noise limits in accordance with the Planning Practice Guidance for Minerals. The assessment is based on the results of a series of noise predictions undertaken in accordance with the calculation methodology contained in BS5228-1:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites*'.

5.2 Noise Assessment

The assessment has considered the potential for worst-case operational noise to give rise to impacts at the nearest noise-sensitive receptors to the proposed extension area.

The assessment has shown that the proposed continuation of infill and restoration operations at the site would not exceed noise limits derived in accordance with the guidance contained in the Planning Practice Guidance for Minerals based on background noise levels plus 10dB subject to a maximum limit of 55dB $L_{Aeq,1hr}$ at any receptor assessed.

The assessment of road traffic noise due to either vehicle movements from site ceasing, or vehicle movements from site doubling, shows that the predicted changes would not be noticeable.

Based on the results of the assessment, noise should not be considered a material constraint in granting planning permission for the development proposals.

Glossary of Terminology

Noise is defined as unwanted sound. The range of audible sound is known to be from 0dB (threshold of hearing) to 140dB (threshold of pain). Examples of typical noise levels relating to 'everyday' occurrences are given in Table G-1 below.

Table G-1: Typical Noise Levels

Source	Sound Pressure Level in dB(A)	Subjective Level
Gun shot	160	Perforation of eardrum
Military Jet take-off	140	Threshold of pain
Jet Aircraft at 100m	120	Very Loud
Rock Concert, front seats	110	Threshold of Sensation
Pneumatic Drill at 5m	100	Very Loud
Heavy goods vehicle from pavement	90	
Traffic at kerb edge	70 – 85	Loud
Vacuum Cleaner, Hair Dryer	70	
Normal conversation at 1m	60	Moderate
Typical Office	50 – 60	
Residential area at night	40	Quiet
Rural area at night, still air	30	
Leaves Rustling	20	
Rubbing together of fingertips	10	
	0	Threshold of hearing

The frequency response of the human ear to noise is usually taken to be around 18Hz (number of oscillations per second) to 18,000Hz. However, the human ear does not respond equally to different frequencies at the same level, it is more sensitive in the mid-frequency range than lower and higher frequencies and, because of this, when undertaking the measurement of noise the low and high frequency components of any given sound are reduced in importance by applying a filtering (weighting) circuit to the noise measuring instrument. The weighting which is widely accepted to correlate best with the subjective nature of human response to noise and is most widely used to quantify this is the A-weighted filter set. This is an internationally accepted standard for noise measurement.

For variable noise sources within an area an increase of 3dB(A) would be the minimum perceptible to the human ear under normal conditions. It is generally accepted that an increase/decrease of 10dB(A) corresponds to a doubling or halving in perceived loudness. The 'loudness' of a noise is a purely subjective parameter, dependant not only upon the sound pressure of the event but also on the dynamics of the listener's ear, the time of the day and the general mood of the person.

With regard to environmental noise levels (in the open air), these are rarely steady but rise and fall according to the activities being undertaken within the surrounding area at any given time. In an attempt to produce a figure that relates this variable nature of noise to human subjective response, a number of statistical noise metrics have been developed. These and other useful terminology and descriptors are presented in Table G-2 below.

Table G-2: Terminology

Term	Definition
Sound	Pressure fluctuations in a fluid medium within the audible range of amplitudes and frequencies which stimulate the organs of hearing.
Noise	Unwanted sound emitted from a source and received by the sensitive receptor.
Decibel (dB)	Unit most often used to describe the sound pressure level. A logarithmic number, it correlates closely to the way in which humans perceive sound. Its wide range of values helps quantify sound pressures from a large variety of magnitudes.
A-Weighting (dB(A))	Human perception of sound is frequency dependant. A-weighting applies a range of corrections at each frequency to provide a 'human-averaged'. Can be frequency band or broadband values.
Frequency (Hz)	The number of cycles per second, for sound this is closely related (and often mistaken for) pitch.
Frequency Spectrum	A more detailed analysis of the frequency components that comprise a sound source.
$L_{A10,T}$	The 10th statistical percentile of a measurement period, i.e. the level that is exceeded for 10% of the measurement duration. Closely correlates with traffic sources, A-weighted.
$L_{A90,T}$	The 90th statistical percentile of a measurement period, i.e. the level that is exceeded for 90% of the measurement duration. Used to describe background sound levels, as this value is affected less by short, transient sound sources, A-weighted.
L_{Amax}	The root mean square (RMS) maximum sound pressure level within a measurement period, A-weighted.
Ambient Sound	The total sound climate of all sources incident at one location, both in the near- and far-field (*The ambient sound comprises the residual sound and the specific sound when present)*.
Ambient Sound Level $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Equivalent Continuous A-weighted Sound	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

Term	Definition
Pressure Level $L_{Aeq,T}$	$$L_{Aeq,T} = 10lg_{10}\left\{\left(\frac{1}{T}\right)\int_{t1}^{t2}\left[p_A\frac{(t)^2}{{p_0}^2}\right]dt\right\}$$ Where p_0 is the reference sound pressure (20μPA); and $P_A(t)$ is the instantaneous A-weighted sound pressure level at time t.
Measurement Time Interval T_m	Total time over which measurements are taken (*This may consist of the sum of a number of non-contiguous, short-term measurement time intervals)*
Rating level $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound, over a period of time, T.
Reference Time Interval, T_r	Specified interval over which the specific sound level is determined (This is 1hr during the day from 07:00 to 23:00 hours and a shorter period of 15-min at night from 23:00 to 07:00 hours).
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound in a given situation at the assessment location over a given time interval, T.
Sound Pressure Level	The level of fluctuation in air pressure, caused by airborne sound sources. Measured in Pascals (Pa).
Sound Power Level	The rate at which sound is radiated by a source. This parameter is useful as it describes sound energy before environmental or decay factors. Quantified in dB and notated usually as L_w or SWL.
Specific sound level $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T.
Specific Sound Source	Sound source being assessed.

Statement of Uncertainty

This report is based upon a range of measurements, a system of calculations and noise predictions. As such, this report attempts to quantify fluctuations in air pressure and is subject to the effects of meteorology, physical and perceived anomalies, tolerances within the measuring and monitoring equipment and accuracy margins within the noise modelling software. In the interests of repeatability, this report must be considered as being affected by common factors involved in the measurement and calculation of noise propagation.

All measurement values, outcomes and assumptions are subject to a margin of uncertainty. This has been quantified and assessed as follows:

- Rounding errors – systemic tolerance of ±1dB;
- Type 1 sound level meter – operational tolerance of ±1.1dB;
- Meteorology – allowance of ±1.9dB; and
- CadnaA noise propagation modelling software – operational accuracy of ±2.1dB

The most influential uncertainty factors for the assessment of noise are deemed to be equipment tolerances, meteorology and software accuracy. A root-sum-square statistical average has been used to provide an overall margin of uncertainty of ±3dB.

Table A-1A: Location MP1, Glade Farm – Site Operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
08/01/2020 11:30	56.4	76.7	48.9	55.2
08/01/2020 11:45	52.7	73.3	48.6	53.7
08/01/2020 12:00	52.6	63.4	49.0	54.5
08/01/2020 12:15	52.4	67.1	47.4	54.0
08/01/2020 12:30	52.5	60.1	48.8	54.8
08/01/2020 12:45	52.8	64.1	48.6	54.6
08/01/2020 13:00	52.7	66.7	48.4	54.6
08/01/2020 13:15	53.4	64.3	50.1	55.1
08/01/2020 13:30	52.5	67.0	48.0	54.2
08/01/2020 13:45	55.0	78.5	50.3	54.8
08/01/2020 14:00	53.2	63.9	49.6	54.7
08/01/2020 14:15	52.4	61.1	48.4	54.4
08/01/2020 14:30	54.8	65.4	50.8	56.7
08/01/2020 14:45	57.4	72.7	51.5	58.2
08/01/2020 15:00	55.6	61.5	51.6	57.8
08/01/2020 15:15	56.8	70.8	52.2	58.2
Overall	**54.3**	**78.5**	**49.5**	**55.3**

Table A-1B: Location MP1, Glade Farm – Site Non-operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
29/01/2020 12:00	61.1	78.4	50.9	59.6
29/01/2020 12:15	56.8	75.1	50.4	55.9
29/01/2020 12:30	54.1	71.0	50.3	55.6
29/01/2020 12:45	53.2	60.3	48.4	55.3
Overall	**57.5**	**78.4**	**50.0**	**56.6**

Table A-2A: Location MP2, A19 Properties – Representative Location - Operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
08/01/2020 13:52	56.8	72.5	51.7	57.7
08/01/2020 14:07	56.1	69.2	52.1	58.2
08/01/2020 14:22	59.1	70.7	52.8	61.9
08/01/2020 14:37	57.7	68.4	53.4	59.6
08/01/2020 14:52	59.4	74.7	54.7	61.3
08/01/2020 15:07	59.8	73.2	55.2	61.1
08/01/2020 15:22	60.5	68.0	55.8	62.9
08/01/2020 15:37	61.6	77.1	56.0	62.7
Overall	**59.2**	**77.1**	**54.0**	**60.7**

Table A-2B: Location MP2, A19 Properties – Representative Location – Site Non-operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
29/01/2020 12:00	58.4	79.2	50.5	57.6
29/01/2020 12:15	56.7	86.2	50.2	56.6
29/01/2020 12:30	53.8	77.3	49.6	55.5
29/01/2020 12:45	55.4	84.5	48.1	55.3
Overall	**56.4**	**86.2**	**49.6**	**56.3**

Table A-3A: Location MP3, Mount Farm - Operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
08/01/2020 11:46	48.8	71.4	37.6	47.3
08/01/2020 12:01	60.3	82.1	36.9	62.4
08/01/2020 12:16	40.0	56.7	35.1	41.8
08/01/2020 12:31	43.9	71.7	33.8	39.7
08/01/2020 12:46	56.9	76.6	33.6	57.9
08/01/2020 13:01	49.3	73.1	34.3	45.9
08/01/2020 13:16	49.0	71.3	35.1	44.6
08/01/2020 13:31	51.9	78.1	35.8	42.5
Overall	**54.0**	**82.1**	**35.3**	**47.8**

Table A-3B: Location MP3, Mount Farm – Site Non-operational

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
29/01/2020 12:00	56.9	75.6	39	54.5
29/01/2020 12:15	46.9	58.5	38.2	50.9
29/01/2020 12:30	45.7	61.5	37.7	48.9
29/01/2020 12:45	46.1	59.4	37.7	49.5
Overall	**51.9**	**75.6**	**38.2**	**51.0**

Table A-4: Road Traffic Measurement, Escrick

Periods	15m			
Weighting	A			
Data type	L_{Aeq}			
Unit	dB			
Period start	**L_{Aeq}**	**L_{Amax}**	**L_{A90}**	**L_{A10}**
17/12/2019 11:00	70.2	80.2	59.6	73.7
17/12/2019 11:15	70.4	80.3	59.1	73.7
17/12/2019 11:30	70.3	84.0	56.7	73.6
17/12/2019 11:45	70.8	80.8	59.6	73.9
17/12/2019 12:00	70.9	85.4	60.2	73.9
17/12/2019 12:15	72.4	96.4	61.4	74.2
Overall	**70.9**	**59.4**	**73.8**	**96.4**

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