APPENDIX ES J

NOISE IMPACT ASSESSMENT

LOXWOOD CLAY EXTRACTION AND CMRF

PROTREAT LIMITED

JUNE 2021

NOISE IMPACT ASSESSMENT
LOXWOOD CLAY EXTRACTION AND CMRF

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REVISION HISTORY

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1 INTRODUCTION

Anderson Acoustics Ltd has been commissioned by Protreat Limited to undertake a noise assessment for the proposed development of Loxwood Clay Pits, Loxwood Rd, Billingshurst, West Sussex RH14 0RW (approximate postcode), within the authority of West Sussex County Council (WSCC) and under consultation with Chichester District Council (CDC).

The site, currently scrub and woodland, is proposed to provide mineral (mostly clay) over a period of 30 years. The first 10-year phase comprises mineral extraction from the eastern third of the site, with material handling and a construction material recycling facility (CMRF) to the north west, with much of the recycling activities within a proposed processing building. The proposed hours of operation are 08:00 to 18:00 hours Mondays to Fridays, though Saturday operations may also be considered if demand dictates. The area surrounding the site is primarily forest/agriculture, with isolated residential properties the nearest sensitive receptors. Consideration of potential noise effects are also given to the nearby Rikkyo school and public rights of way (PROW).

Details of local noise policy and pertinent guidance are presented in Section 2 of this report, followed by a brief description of the site and proposed development is given in Section 3.

The methodology and results of the baseline noise survey undertaken at the site are presented in Section 4, and Section 5 provides an assessment of the proposed operational noise from the proposed works including predicted noise levels at nearby sensitive receptors.

Advice regarding mitigation options to ameliorate noise impacts at nearby sensitive receptors is given in Section 6, followed by a summary of this report in Section 7.

This report is necessarily technical in nature, therefore, a summary of sound units and acoustic terminology relevant to this assessment is provided in Appendix A, for reference. National planning policy and legislation is provided in Appendix B.

2 PLANNING POLICY AND GUIDANCE

This section provides a summary of local planning policy relating specifically to noise and of the guidance which is deemed pertinent to an assessment of mineral extraction and construction material recycling noise effects at noise sensitive receptors in proximity to proposed works. Details of national planning policy and legislation are provided in Appendix B, for reference.

2.1 Local Planning Policy

2.1.1 West Sussex County Council

The West Sussex Waste Local Plan, April 2014 [1], provides the basis for making consistent land-use planning decisions about planning applications for minerals and waste management facilities.

The document includes *Strategic Objective 13: To protect and, where possible, enhance the health and amenity of residents, businesses, and visitors*, which states the following, in relation to noise under paragraph 5.3.14:

"Throughout the plan period, new facilities will be located so as to minimise any potential impacts on communities and the potential negative impacts of any new waste development on the health and amenity of residents, businesses and visitors to West Sussex will be minimised, mitigated and, where possible, avoided. In addition and where relevant, opportunities will be taken to maximise benefits for communities, and the environment."

The section on health and amenity states, in relation to noise under paragraph 8.10.4:

"Specific works can be undertaken to mitigate potential disturbance. Measures can include landscaping, sound attenuation, careful design of light sources (including avoidance of light pollution of the night sky) and restriction on working hours. The appropriate measures will depend on the characteristics of the proposal, the site, and the surrounding area."

The West Sussex High Quality Waste Facilities Supplementary Planning Document [2] includes guidance or the design of waste facilities, including to manage and minimise adverse noise effects.

The West Sussex Joint Minerals Local Plan [3] was adopted in July 2018. The plan contains Policy M18: Public Health and Amenity:

"*Proposals for mineral development will be permitted provided that:*
(a) lighting, noise, dust, odours, vibration and other emissions, including those arising from traffic, are controlled to the extent that there will not be an unacceptable impact on public health and amenity…."

2.1.2 Chichester District Council

Planning Noise Advice Document: Sussex, 2015

The Planning Noise Advice Document for Sussex [4], which has been adopted by WSCC and CDC, contains the following paragraph in relation to commercial/industrial developments.

"The starting point for designing any industrial/ commercial development should be to minimise noise "as far as reasonably practicable". The rating level of the plant/process, when measured in accordance with BS4142:2014, should, where practicable, be no greater than the existing background levels when measured in accordance with BS4142:2014. There may be instances, for specific sites, where a rating level below background is deemed appropriate. This can be determined through prior discussion with the Local Planning Authority or Local Environmental Health Department. For example, a rating level of 10 dBA below background may be required in certain instances if there are specific concerns such as the potential for noise creep. It is considered that meeting these criteria would avoid adverse noise impacts, in the interests of ensuring a good standard of amenity and protecting human health. Where these criteria are not

attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the LPA that the development is acceptable."

2.2 Relevant Guidance

2.2.1 Planning Practice Guidance – Minerals (PPG-M)

The Government has published 'planning practice guidance' (PPG) on a range of subjects including Minerals [5] (PPG-M) [https://www.gov.uk/guidance/minerals].

This forms technical guidance to the National Planning Policy Framework [6] (NPPF) and provides advice on how to deliver its policies. The PPG-M provides specific guidance on noise emissions from mineral extraction sites stating:

"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 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 guidance notes that restoration falls within its minerals guidance, even where the site has been used for landfill:

"*Some former mineral sites may also be restored as a landfill facility using suitable imported waste materials as an intermediate stage in restoration prior to an appropriate after use.*" [Paragraph: 045 Reference ID: 27-045-20140306 Revision date: 06 03 2014]

The guidance directs that:

"*Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations 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 of 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 adverse effect level and the lowest observed adverse effect level for the given situation."

The PPG-M suggests the following basis for noise limits from surface mineral working activities:

"*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 10 dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10 dB(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 the operations should not exceed 55 dB(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 10 dB(A) and should not exceed 55 dB(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 impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42 dB(A) LAeq,1h (free field) at a noise sensitive property.*

Furthermore, Paragraph: 022 Reference ID: 27-022-20140306 of the PPG-M advises that for activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms:

"*Increased temporary daytime noise limits of up to 70 dB(A) LAeq 1h (free field) for periods of up to eight 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 eight 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."

Although not explicit in the guidance, it is considered that exceedance of the noise level and temporal criteria above would be an indication of exceedance of the Significant Observed Adverse Effect Level (SOAEL), subject to the context of the exceedance, as discussed in the National Planning Practice Guidance for Noise [7] PPG-N. This is discussed further in Appendix B.

2.2.2 British Standard 4142

Guidance on the rating of noise from fixed installations and sources of an industrial/commercial nature is provided in BS 4142:2014+A1:2019 [8]. This Standard provides a procedure for the measurement and rating of noise levels outside dwellings. A methodology for predicting the likelihood of adverse impact is also provided in this document. The assessment of nuisance explicitly falls outside the scope of this British Standard, and which is down to the Local Authority to determine where the need arises.

The rating level ($L_{Ar,Tr}$) as defined in BS 4142 is used to rate the industrial source (known as the specific sound source) outside residential dwellings. This level is obtained by adding a correction to the specific sound level ($L_{Aeq,Tr}$) of between 0 and 6 dB for tonal noises and between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of noise source.

Reference time intervals, T_r, of 1 hour and 15 minutes are specified for the determination of rating levels during day and night respectively.

The method for determining the potential for adverse impact is based initially on the differences between the rating level and the background ($L_{A90,T}$) sound level. In addition to which, context needs to be taken into account. The Standard states that:

"a) Typically, the greater this difference, the greater the magnitude of impact.

b) A difference of around +10 dB or more is likely to be an indication of significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact depending on the context."

2.2.3 BS 5228-1:2009+A1:2014

BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* [9] (BS 5228-1) sets out techniques to predict the likely noise effects from open

sites, based on detailed information on the type and number of plant being used, their location and the length of time they are in operation.

The noise prediction methods can be used to establish likely noise levels in terms of the $L_{Aeq,T}$ over the core working hours. This Standard also documents a database of information, including previously measured sound pressure level data for a variety of different construction plant undertaking various common activities.

Section E.3 of Annex E in BS 5228-1 advises that for projects that involve large-scale and long-term earth moving activities, akin to mineral extraction (i.e. over 6 months in duration), the guidance contained with the "*Technical Guidance to the National Planning Policy Framework*" should be taken into account when setting the assessment criteria (i.e. the PPG-M detailed above).

2.2.4 BS 8233:2014

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* [10] provides guideline values for internal ambient noise levels in spaces when they are unoccupied. A summary of the levels recommended in paragraph 7.7.1 of subclause 7.7 and Table 4 of BS 8233:2014 for rooms used for resting, dining and sleeping is provided in Table 2.1 below. The guideline values in Table 2.1 are annual average values and do not have to be achieved in all circumstances.

Table 2.1: BS 8233:2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	Daytime 07:00 to 23:00 hours	Night-time 23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.2.5 Building Bulletin 93

The Department of Education and Skills has produced Building Bulletin 93 *Acoustic Design of Schools: A Design Guide* (BB93) [11]. BB93 provides guidance on the acoustic design for schools and is supported by the Building Regulations. Whilst it relates to the design of new school buildings, the objectives of "*providing suitable internal ambient noise levels for clear communication between students and teachers, between students themselves and for quiet study*" also apply to situations where a new noise is introduced to an existing school.
BB93 states that all spaces within a school building should meet the performance standards defined within the document for ambient noise, reverberation time and airborne sound insulation for each of the areas defined. Table 1.1 of the document contains recommended performance standards for indoor rooms, measured as the maximum internal ambient noise level, $L_{Aeq,30mins}$. For general classrooms an upper limit for the indoor ambient noise level of 35 – 40 dB $L_{Aeq,30min}$ is prescribed. Supporting guidance also provides limits for outdoor teaching space noise levels: "*Playgrounds, outdoor recreation areas and playing fields are generally considered to be of relatively low sensitivity to noise. Indeed, playing fields may be used as buffer zones to separate school buildings from busy roads where necessary. However, where used for teaching, for example sports lessons, outdoor ambient noise levels have a significant impact on communication in an environment which is already acoustically less favourable than most classrooms. […] Noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$. If this is not possible due to a lack of suitably quiet sites, acoustic screening should be used to reduce noise levels in these areas as much as practicable, and an assessment of predicted noise levels and of options for reducing these should be carried out.*"

In general, where the prevailing external level of a school achieves the 50 dB L_{Aeq} criteria or below, the internal noise criteria will also be readily achieved without specific mitigation measures.

2.3 Consultation

Consultation has been undertaken with both WSCC and CDC, through the scoping process and subsequent email and telephonic correspondence.

WSCC confirmed that the guidance in PPG-M would be appropriate for assessment of the site's mineral operations, with the CMRF component being subject to a BS 4142 type assessment rating level minimising site noise as far as is reasonably practicable to a level not exceeding the representative background sound level and not exceeding 5 dB above the representative background sound level.

WSCC also instructed that "*The noise and disturbance caused by the increase in HGVs travelling on the local roads linking to the local lorry route should also be quantified*" and that "*Consideration should be given, in detail, of the potential scheme impacts upon the setting of the Grade II Listed Pephurst Farmhouse (noise impacts, from the site and use of the access).*"

Discussions with CDC centred around the survey locations, agreeing the approximately location of the two baseline noise survey locations.

2.4 Determination of Noise Limits

Based on consultation with WSCC and the guidance presented in PPG-M, this assessment of noise impacts from the proposed works will be subject to the following noise limits.

For clay extraction works alone the criteria based on PPG-M applies:

Table 2.2 – Proposed noise limit for on-site Mineral Extraction works

Period	Noise limit, dB ($L_{Aeq,\ 1hr}$)
Daytime (07:00 – 19:00) (works likely to take longer than eight weeks)	Minimised as far as is reasonably practicable to a level 10 dB above the representative background sound level $L_{A90,1hr}$; and No more than 55 dB $L_{Aeq,1hr}$ free-field at residential properties
Daytime (07:00 – 19:00) (up to eight weeks duration)	No more than 70 dB $L_{Aeq,1hr}$ free-field at residential properties

For other works of an industrial/commercial nature, i.e. the CMRF operations, the criteria based on BS 4142 applies:

Table 2.3 – Proposed noise limit for CMRF

Period	Noise limit, dB ($L_{Aeq,\ 1hr}$)
Daytime (07:00 – 19:00)	Minimised site noise as far as is reasonably practicable and having a noise rating level not exceeding the representative background sound level ($L_{A90,1hr}$)

For the total noise emission of the site, i.e. combined clay extraction works and CMRF, the criteria based on BS 8233 and BB93 apply:

Table 2.4 – Proposed noise limit for Cumulative works

Period	Noise limit, dB ($L_{Aeq,\ 16hr/30min}$)
Daytime (07:00 – 23:00)	No more than 55 dB $L_{Aeq,16hr}$ free-field at residential properties
Daytime (09:00 – 17:00)	No more than 50 dB $L_{Aeq,30min}$ in areas used as outdoor teaching spaces

The corresponding site sound levels are determined as free-field levels, at 1.5 m above local ground level, either immediately outside the property or within any external amenity areas (e.g. rear gardens), where present.

3 SITE DESCRIPTION AND DEVELOPMENT PROPOSALS

3.1 Existing Site and Local Noise Sensitive Receptors

The proposed development site is located in a largely wooded area, with an existing access road established from Loxwood Road. The site is relatively separated from noise sensitive receptors, with isolated properties in all directions, and the village of Loxwood to the southwest, and hamlets of Alford to the northwest and Tisman's Common and Bucks Green to the east.

The sensitive receptors noted as being closest to the site are shown in Figure C1 in Appendix C. The closest, Keepers Cottage, lies approximately 300 m northwest of the site. Pephurst Farm, a Grade II listed building, is situated approximately 900 m to the south of the site and set back 25 m from the carriageway of Loxwood Road. Other listed buildings in the area include Barnsfold (one of the Barnsfold Cottages); Tisman House, Greenhurst Cottage; and Males Farm House.

To the north, at a distance of approximately 1.2 km, is the Rikkyo School, a Japanese curriculum boarding primary and secondary school. The Sussex Border Footpath passes within 200 m of the northwest corner of the site, with a public footpath running along the northeast edge of the site. In all directions immediately adjacent to the site lies wooded or open land.

3.2 Proposed Clay Extraction Works and CMRF Building

The site is zoned for mineral extraction, mostly clay. Works will begin in the southeast corner and work north-eastwards along the boundary for the first 10 years. It is likely that the works will then go anti-clockwise around the site, finishing after 30 years in the southwest corner.

Operational hours are planned to be 08:00 to 18:00 hours Mondays to Fridays, though Saturday operations may also be considered if demand dictates.

A building (circa 40m x 35m, 8 m height) will be constructed primarily as a construction material recycling facility (CMRF), but will also be used to house any noisy stationary plant associated with the clay extraction, such as the stone / brick crusher and trommel.

It is anticipated to excavate 12500 tonnes per year, approximately 50 tonnes per day max. This can likely be achieved with a single excavator.

The dig will be a 'deep' excavation of between 8-12 m below ground level. Consequently, the excavator will be below ground level for a significant proportion of the works.

As the volume of material moved on each day is quite low, one dump truck and one backhoe (JCB or similar) moving materials around the site are anticipated. A conveyor may also be used to reduce the on-site material handling.

The CMRF will provide local construction material recycling facilities with the use of some of the recycled materials for the restoration of the clay pit.

A wheel-wash will operate at the entrance to the site to remove mud and debris from movements on site and use of the haul road.

Given the nature of the works and the limited material movements, it is expected that daily site activities will be reasonably consistent throughout the duration of works.

3.2.1 Programme

It is understood that works are intended to run for approximately 30 years with an estimated 42 heavy duty vehicle (HDV) movements (21 in, 21 out) per day. The site will operate between 08:00 hrs and 18:00 hrs, Monday to Friday, with occasional Saturday activity.

3.2.2 Plant Schedule

Tables 3.1 to 3.3 presents the plant to be used on site for the mineral extraction, and CMRF activities, which has been provided by Protreat. The schedules includes the sound level (sound pressure level at 10 m distance) for each item of plant, which has been obtained from BS 5228, the manufacturer or Anderson Acoustics' measurement database. The anticipated on-time is given as a percentage of one hour of works, in line with the assessment reference period. Further detail including the source spectra is provided in Appendix D.

Table 3.1 – Plant schedule – Clay Extraction

Plant Item	Description	Location	Sound level, dB(A) at 10 m	No. of plant	On-time, %
Excavator	Face shovel loading dump trucks. Tracked hydraulic excavator. 45 t	Extraction zone	78	1	100
Dump truck	Dump trucks on haul roads, Articulated dump truck, 23 t	Extraction zone, stockpile/mounds	78	1	50
JCB (backhoe)	Clearing site. Wheeled backhoe loader. 8 t	Whole site	68	1	100
Crusher	Crushing concrete/rubble. Tracked crusher. 47 t	Inside CMRF	82	1	100
Fan	Korfman 1m vent fan exhaust - 500RPM (LOW)	East side of CMRF building	74	1	100
Compressor	General site works. Atlas Copco GA90	East side of CMRF building	56	1	100
Generator	Site diesel generator	East side of CMRF building	56	1	100
Conveyor motor	Field conveyor system. Conveyor drive unit. 37 kW	Extraction zone to stockpiles	76	1	100
Conveyor belt	Field conveyor system. Field conveyor (rollers)	Extraction zone to stockpiles	53	1	100
Wheel washer	Cleaning vehicles. Wheel wash	Access point	74	1	20
HDV	Waste delivery vehicles. Tipper lorry	Access route to CMRF building	79	6 one-way HDV movements per busiest hour	100

Table 3.2 – Plant schedule – CMRF operations

Plant Item	Description	Location	Sound level, dB(A) at 10 m	No. of plant	On-time, %
Trommel	Trommel (Kiverco KL830)	Inside CMRF	72	1	100
JCB grab/front-loader	Clearing site. Wheeled backhoe loader. 8 t	Inside CMRF	68	1	100
Conveyor motor	Field conveyor system. Conveyor drive unit. 37 kW	Inside CMRF	76	1	100
Conveyor belt	Field conveyor system. Field conveyor (rollers)	Inside CMRF	53	1	100
Fan	Korfman 1 m vent fan exhaust - 500RPM (LOW)	East side of CMRF building	74	1	100
Compressor	General site works. Atlas Copco GA90	East side of CMRF building	56	1	100
Generator	Site diesel generator	East side of CMRF building	56	1	100
Wheel washer	Cleaning vehicles. Wheel wash	Access point	74	1	20
HDV	Waste delivery vehicles. Tipper lorry	Access route to CMRF building	79	6 one-way HDV movements per busiest hour	100
Waste tipping	HV tipping waste	Inside CMRF	85	3 x 20 seconds per hour	1.25

Table 3.3 – Scheme plant schedule – Combined Extraction and CMRF (Cumulative) operations

Plant Item	Description	Location	Sound level, dB(A) at 10m	No. of plant	On-time, %
Excavator	Face shovel loading dump trucks. Tracked hydraulic excavator. 45 t	Extraction zone	78	1	100
Dump truck	Dump trucks on haul roads, Articulated dump truck, 23 t	Extraction zone, stockpile/mounds	78	1	50
JCB (backhoe)	Clearing site. Wheeled backhoe loader. 8 t	Whole site	68	1	100
Crusher	Crushing concrete/rubble. Tracked crusher. 47 t	Inside CMRF	81	1	100
Fan	Korfman 1 m vent fan exhaust - 500RPM (LOW)	East side of CMRF building	74	1	100
Compressor	General site works. Atlas Copco GA90	East side of CMRF building	56	1	100
Generator	Site diesel generator	East side of CMRF building	56	1	100
Conveyor motor	Field conveyor system. Conveyor drive unit. 37 kW	Extraction zone to stockpiles	76	1	100
Conveyor belt	Field conveyor system. Field conveyor (rollers)	Extraction zone to stockpiles	53	1	100
Wheel washer	Cleaning vehicles. Wheel wash	Access point	74	1	20
HDV	Waste delivery vehicles. Tipper lorry	Access route to CMRF building	79	42 one-way HDV movements per day	100
Waste tipping	HV tipping waste	Inside CMRF	85	3 x 20 seconds per hour	1.25
Trommel	Trommel (Kiverco KL830)	Inside CMRF	72	1	100
JCB grab/front-loader	Clearing site. Wheeled backhoe loader. 8 t	Inside CMRF	68	1	100
Conveyor motor	Field conveyor system. Conveyor drive unit. 37 kW	Inside CMRF	76	1	100
Conveyor belt	Field conveyor system. Field conveyor (rollers)	Inside CMRF	53	1	100

Plant have been assumed to be operating at or above ground height. As the mineral extraction progresses, the excavator and some backhoe/dump-truck activity will occur up to 8 – 12 m below site level. In practice, this will provide approximately 5 – 10 dB of attenuation to those activities for much of the duration of the extraction works; although, this attenuation is not considered within the model, as a worst-case assessment.

Operational on-times are based on reasonable worst case one hour of operations.

The combined effects of CMRF and clay extraction activities are also modelled over a 10-hour working day, with calculation of the $L_{Aeq,16hr}$ daytime metric, assuming no significant site noise

generated over the daytime hours the site is not in operation. This equates to the assessment criteria derived from BS 8233 based on the daytime period 07:00 to 23:00 hours.

4 BASELINE SOUND LEVEL SURVEY

An baseline sound level survey, comprising unattended measurements at two locations, and short attended measurements at three further locations, was undertaken to establish the existing sound environment in proximity to the nearby noise sensitive receptors. Details of the measurement locations are provided below, and presented graphically in Appendix D, with a summary table of the survey equipment.

Observation made during site attendance confirmed the soundscape across and around the site was comprised of sound from local road traffic and country side sounds such as birdsong .

4.1 Unattended Measurement Locations and Equipment

4.1.1 Measurement Locations

Continuous unattended sound level measurements were obtained between approximately 15:00 hrs on Friday 31st July and 12:30 on Thursday 13th August 2020. A summary of the two measurement locations is provided, below.

Measurement Position 1 (MP1)

Measurements were undertaken near the exit of the access road onto the public highway, near the dwelling Ivyhurst . The microphone was at a height of approximately 1.5 m above local ground level and in free-field conditions, approximately 20 m horizontal distance from the Loxwood Road.

Measurement Position 2 (MP2)

Measurements were undertaken at the boundary of Old Songhurst Cottage, at a height of approximately 1.5 m above local ground level and in free-field conditions.

Short attended measurements were undertaken at three further locations. These were of approximately 30 minutes duration at 1.5 m height and in free-field conditions.

Position A1 was on the access road near where it enters the proposed site;

Position A2 was near Males Farm house, to the north of the site; and

Position A3 was near Barnsfold Cottages, to the east.

4.1.2 Equipment Summary

Sound levels were measured using Rion NL-52 precision integrating sound level meters. The microphones were fitted with an environmental measurement windshield. The sound level meters were powered by dry cell batteries and stored inside a weatherproof security box.

The equipment was calibrated before the survey, and the level checked after the survey, using a Rion NC-74 sound calibrator to generate a calibration level of 94.0 dB at 1 kHz. No significant calibration drifts were observed.

The meters were configured to log consecutive A-weighted (dBA) sound pressure levels every 100 ms. Results were post-processed to provide whole-period noise metrics for the unattended surveys and 30-minute period for the attended measurements. The Fast time-weighting was applied to the maximum (L_{Amax}) and percentile ($L_{A10,T}$ and $L_{A90,T}$) levels.

4.2 Weather Conditions

Weather conditions can affect sound levels through several mechanisms. Higher wind speeds can generate increased sound levels from movement of vegetation such as leaves rustling or branches moving and from effects of wind noise on the windshield. The direction of wind can affect the propagation of noise from more distant sources. Rain can generate noise directly, and traffic on wet road surfaces can result in higher and/or different character of sound.

Weather conditions during the survey period have been obtained from internet sources https://www.wunderground.com/ (weather station at Gatwick Airport), which indicates no rain over the survey period, whilst at the time of set-up and collection of the noise monitor the weather

conditions were dry with negligible wind. Accordingly, the conditions were neutral and with the resultant data likely to represent typical conditions, if slightly "quietest" case conditions, which is favourable to a robust/worst case assessment.

In terms of Gatwick Airport, with operation depending on wind direction, and also currently affected by Covid-19 conditions, this is considered sufficient remote from the area of interest to not significantly influence the baseline L_{Aeq} and $L_{A90,T}$.

4.3 Baseline Survey Results

A summary of the daytime hourly ambient $L_{Aeq,1hr}$ and background $L_{A90,1hr}$ sound levels at both unattended measurement locations is presented below. These values are presented as the arithmetic average of daily daytime metrics for each day of the survey period. The night-time levels are presented for interest only. Likewise, the L_{Amax} and L_{A10} levels, which are common metrics, but not used in this instance. The full results of the continuous monitoring survey are presented in graphical form in Appendix F.

4.3.1 MP1 - Ivyhurst

Table 4.1 – Unattended baseline sound level measurements at Measurement Position 1, Ivyhurst

Period	Start Time	End Time	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A10,T}$	$L_{A90,T}$
Daytime	07:00	23:00	45	64	47	31
Night-time	23:00	07:00	36	49	32	21
Working hours	08:00	18:00	46	61	48	33
Working, Sat	08:00	18:00	46	62	48	32

4.3.2 MP2 - Old Songhurst Cottage

Table 4.2 – Unattended baseline sound level measurements at Measurement Position 2, Old Songhurst Cottage

Period	Start Time	End Time	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A10,T}$	$L_{A90,T}$
Daytime	07:00	23:00	45	62	45	32
Night-time	23:00	07:00	38	45	32	22
Working hours	08:00	18:00	45	61	46	34
Working, Sat	08:00	18:00	49	61	49	34

4.3.3 Attended Measurement Results

Table 4.3 – Attended baseline sound level measurements

Period	Start Time	End Time	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A10,T}$
A1: near site	15:40	16:10	41	69	32
A:2 Males Farm	10:00	10:30	44	63	36
A3: Barnsfold Cottages	11:30	12:00	47	68	35

Sound levels across the five survey locations vary but are broadly similar across the L_{Aeq} and L_{A90} noise metrics. In order to determine the representative hourly ambient sound level at both measurement locations, the time periods during the survey period which are deemed to be most representative of site working hours have been established.

4.3.4 Representative Baseline Levels

Representative baseline sound levels for the noise sensitive receptors around the site have been considered as 45 dB $L_{Aeq,1h}$ and 33 dB $L_{A90,1h}$ during the operational hours of the site. Given the assessment criteria, the lower the representative sound levels, the more stringent the assessment. These are considered representative of the typical free-field sound levels at the nearest receptors assessed, during site working hours.

4.3.5 Summary of Proposed Assessment Criteria

The proposed criteria presented in Table 2.4 are set based on these representative external free-field sound levels.

For works associated with clay extraction, the guidance in Section 2 states that noise from works should be minimised as far as practical and to not exceed the background sound level by more than 10 dB(A) and the limit set should be as near that level as practicable to 43 dB $L_{Aeq,1hr}$, subject to a maximum of 55 dB $L_{Aeq,1hr}$ (free-field) at the nearest noise sensitive receptors, without imposing unreasonable burdens on the mineral operator. Assuming a representative background sound level of 33 dB $L_{A90,1hr}$ at the nearest noise sensitive receptor, a value of 10 dB(A) above this level is 43 dB(A). Where noise arising from clay extraction works falls between 43 dB(A) and 55 dB(A), it should be minimised as far as is reasonably practicable. For workings of short duration, less than 8 weeks, a level of 70 dB(A) should not be exceeded.

For works associated with the CMRF, the requirements of BS 4142:2014+A1:2019 apply. The rating level of noise from these activities aim to be below the representative background sound level of 33 dB $L_{A90,1hr}$ at the nearest noise sensitive residential receptors, allowing a penalty for notable acoustic characteristic(s), where applicable. Consideration of the context of the sound and environment is also appropriate in determining compliance, following the procedure of BS 4142 and the Sussex Authorities Planning Noise Advice Document. It is noted that in BS4142 that a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. If the 33 dB $L_{AR,1hr}$ rating level target cannot be reached and best practicable means are deployed a rating level limit of 38 dB $L_{AR,1hr}$ is proposed.

For cumulative works, i.e. both the clay extraction and CMRF works combined, the contribution of the site and haul road noise at residential receptors should not result in level exceeding 55 dB $L_{Aeq,16hr}$. For the school, the contribution of the site at residential receptors should not result in level exceeding 50 dB $L_{Aeq,30min}$.

5 NOISE ASSESSMENT

This section presents an assessment of the predicted noise levels from operation of the site, at noise sensitive receptors.

A detailed acoustic model of the site and surrounding area has been created to calculate the level of noise at the receptors. The model has been generated using CadnaA® noise mapping software and the modelled site layout is based upon the drawings provided by Protreat, which are presented in Appendix C.

The topography across the site and the surrounding area has been based on 25 m Digital Terrain Model (DTM) data across the site and environs. Mapping from Google imagery and OS OpenData is also used.

5.1 Assessment Assumptions

Due to the mixed nature of the site proposal, different assessment criteria apply to different aspects of the site's operation. Each of these assessments is considered within its own scenario. These are:

- Clay extraction;
- CMRF (with and without inclusion of the access road); and
- Combined operation.

The assumed plant type, noise emission, quantity, and percentage operation have been provided in Tables 3.1 to 3.3 above.

In order to predict the typical sound levels anticipated to arise from the proposed site works, a number of assumptions must be adopted within the model, which described below.

Each of these scenarios include a component of noise emission from plant identified as being within the proposed building. A calculation of overall noise emission from the proposed building has been undertaken based on the plant identified as operating within the building, assuming standard construction of a single steel shell (a steel sheet with trapezoidal corrugations 45 mm, providing circa 25 dB R_W sound insulation). This calculation is provided in Appendix G, and when containing the plant for the combined operation of clay extraction and CMRF works indicates an overall sound power emission level (SWL) of the building of 108 dB(A) with the door closed, and 111 dB(A) with the door open.

Overall 42 HDV per day are expected for the combined operation (21 arrivals and 21 departures). As a worst case, six vehicle movements in a single peak hour are assumed, for both the clay extraction and CMRF scenarios.

The predictive model assumes all works take place during daytime hours. The clay extraction and CMRF operations are considered separately over a 1-hour assessment period. Their combined effects are calculated over a 10-hour working day and considered against a 16-hour daytime assessment period.

Common to the three scenarios are: a fan, compressor and generator situated immediately to the east of the building; and a wheel wash near the western boundary of the site. An access road leaves the site from the western boundary, running approximately 1.5 km though a forested area, joining the Loxwood Road near the Ivyhurst residential property.

5.1.1 Clay Extraction works:

The modelled scenario is based upon the excavator loading either a dump truck or conveyor to move the material from the extraction point to a stockpile area where the backhoe operates. With the efficient use of the conveyor system, the dumper is assumed to operate at 50%. The hourly percentage on-times of the excavator and the backhoe is 100%. A crusher is situated within the proposed building. HDVs access the site along the access road, with the wheel wash in use 20% of the time to clean the wheels at the end of the access road.

5.1.2 CMRF operations:

Again, HDVs access the site along the access road, with the wheel wash in use 20% of the time. Within the CMRF, a trommel, JCB grab or front-loader, and conveyor system operate, with delivery HDVs tipping waste prior to processing. In order to inform the detailed assessment of the CMRF, the model has been run both with and without the effects of HDVs on the access road.

For the combined operation, both the clay extraction works and CMRF operate in parallel, with shared wheel-wash, fan, compressor and generator, but the cumulative effects of other plant.

Calculations are based upon the current site levels, with plant operating at ground height. The noise sources associated with external plant is modelled at 1.0 m to 1.5 m height, as considered appropriate. The topography of the surrounding area is also included within the model. The ground cover across the site and between the site and the receptors is noted as being green space, therefore, the calculations assume 100% soft ground. The forest areas of significant foliage have been identified within the noise model and provide slight attenuation to noise emissions in some directions under the calculation methodology of BS 9613 [12].

5.2 Predicted Levels at Noise Sensitive Receptors

Table 5.1 presents the predicted noise levels at all receptors for all scenarios, arising as a result of the proposed site works. The predicted levels are based upon the construction information provided by Protreat and the assumptions outlined above. Noise contours are provided in Appendix H for each scenario. The contours also identify the receptors assessed and associated sound levels.

It should be noted that the predicted levels reflect the periods of time when workings are at ground level, and that for much of the proposed extraction works, some plant will below ground level and subject to further screening.

Table 5.1 - Predicted noise levels from works for all scenarios

Ref	Receptor	Clay Extraction	CMRF	CMRF exc. access road	All Operation	
		$L_{Aeq,1hr}$	$L_{Aeq,1hr}$	$L_{Aeq,1hr}$	$L_{Aeq,10hr}$	$L_{Aeq,16hr}$
1	Keepers Cottage	32	28	28	33	31
2	Old Songhurst Cottage	36	28	26	36	34
3	Longhurst	35	31	30	37	34
4	House on Merryhills Ln	35	29	28	36	34
5	Farmhouse on Merryhills Ln	35	29	28	36	34
6	Bardfold Farm, Loxwood Rd	33	29	28	34	32
7	House on Spy Lane, Loxwood	29	24	23	30	28
8	Pephurst Farm, Loxwood Rd	37	37	31	37	35
9	Ivyhurst, Loxwood Rd	44	44	37	43	41
10	Lower Barnsfold	34	29	29	35	33
11	Barnsfold Cottages	31	26	26	32	30
12	Tisman House	31	26	26	32	30
13	Rikkyo School, Horsham Rd	31	26	26	32	30
14	Lower Hill House, Horsham Rd	27	23	23	29	27
15	Hornshill, Horsham Rd	26	21	21	27	25
16	Wanbrook Barn	30	25	25	31	29
17	Males Farm House	27	22	22	28	26
18	Pallinghurst Farm	27	22	21	28	26
19	Houses in Alfold	26	21	21	27	25
20	Sussex Border Path	34	30	30	36	34

	(non-residential)					
21	Greenhurst Cottage	30	25	25	31	29

5.2.1 Clay Extraction

As discussed in section 4.3.5, the mineral works associated with clay extraction are assessed against a criterion of 55 dB $L_{Aeq,1hr}$, with levels above 43 dB $L_{Aeq,1hr}$ being required to be minimised as far as is reasonably practicable. From the table above it can be seen that, of the residential receptors identified, the levels are below both criteria for all, with Ivyhurst the highest level, where 44 dB $L_{Aeq,1hr}$ is predicted. This is equal to the lower limit, and not, therefore, considered to be significant. Notwithstanding this, the site will seek to minimise noise emissions across all its activities as far as is reasonably practicable, in line with best practice.

For the properties with the highest predicted levels, Ivyhurst (43 dB $L_{Aeq,1hr}$) and Pephurst Farm (37 dB $L_{Aeq,1hr}$), the primary noise source is HDVs on the access route to the site. To ensure potential disturbance is minimised, the access road should be inspected at regular intervals (at least once every week) to check that the surface remains in good condition. Where defects are identified, these should be rectified within a reasonable time frame.

Furthermore, in terms of Ivyhurst, which is adjacent to the start of the access road, HDVs should only use the western branch of the triangle to enter and leave the access route, i.e. avoiding passing directly in front of Ivyhurst; and should not wait or park up on the road triangle, for example if the site is not yet open. These measures should be controlled by the site's operating procedures.

These and general noise mitigation measures are provided in Appendix I.

5.2.2 CMRF operations

For works associated with the CMRF, criteria based on the requirements of BS 4142 apply. As discussed in section 2.4 above, noise from these activities should aim to fall below the representative background sound level (following the Sussex Authorities Planning Noise Advice Document)of 33 dB $L_{A90,1hr}$ at the nearest noise sensitive receptors, allowing a penalty for notable characteristic, where applicable. BS 4142:2014+A1:2019

The rating level limit for CMRF only operations is proposed as 38 dB $L_{Ar,1h}$, in line with the BS 4142 indication of adverse effects (but not significant adverse) at around 5 dB above the background sound level.

For static and mobile plant operating within the worksite, a maximum specific sound level of 31 dB $L_{Aeq,1hr}$ is predicted at Longhurst, to the west. It is noted that due to the topography and foliage effects, levels at Longhurst are marginally higher than at the closer property, Keepers Cottage.

Noise from the CMRF operations comes primarily from within the CMRF building, with external plant contributing only a small proportion. A +3 dB acoustic correction feature is proposed for intermittency.

Therefore, the rating level is the same as the predicted level of 34 dB, which just exceeds the representative background noise level, but is below the BS 4142 indication of an adverse effect at 5 dB above the background sound level 38 dB.

Notwithstanding this, best practice measures should be adopted to control noise arising from within the building as far as is reasonably practicable. As a minimum, therefore, the door to the CMRF building should be closed as much as feasible; although, the overall benefit acoustically is limited.

5.2.3 Combined operations

The combined operations of the clay extraction, CMRF and the 42 daily HDV movements (21 each way) are considered against the criterion of 55 dB $L_{Aeq,16hr}$.

From Table 5.2, the maximum level of 40 dB $L_{Aeq,16hr}$ (at Ivyhurst) is below this threshold, such that this criterion is achieved by a significant margin.

The peak noise levels during a typical 20-second waste tipping operation within the CMRF building (of which 21 events per day are assumed) are estimated at 45 dB $L_{Aeq,20seconds}$ at the most affected property, Longhurst. At this level, tipping events might be audible but would be significantly below any threshold at which disturbance would reasonably occur.

Consideration is given to external levels at Rikkyo School. The maximum predicted level of 35 dB $L_{Aeq,10hr}$ is 15 dB below the target of 50 dB $L_{Aeq,30min}$. From the method of calculation, a 30-minute assessment period could be no greater than 3 dB above that for the 10-hour period. This would also be at a level significantly below any equivalent internal noise criteria. It is considered, therefore, that the operation of the site would have no significant effect on the teaching amenity of Rikkyo School, nor require them to modify their ventilation strategy, for example. The residential component of the school is assessed with the other residential properties above and is also demonstrated to comply with the assessment criteria.

Noise levels at the nearest section of the Sussex Border footpath have been calculated for information. It is considered that the predicted level of 39 dB $L_{Aeq,10hr}$ would have no adverse effect on the recreational amenity of passing walkers. Noise levels along the public right of way that borders the site will be highly dependent on where works on site are taking place. As an absolute worst case, with the excavator operating within 10 m of the footpath, a maximum noise level of 83 dB(A) for the short period (less than 30 seconds) taken for walkers to pass the plant might result. For a short duration, this noise level would not generally be unacceptable, with alternate public footpath routes being available for any short duration that this might apply.

5.2.4 Offsite HDV movements

HVs approaching and departing the site will make use of Loxwood Road. Within the noise model, an assumed existing road traffic flow of 20 vehicles per hour, 10% HGV and 30 mph gives a level of 45 dB $L_{Aeq,16hr}$ at Ivyhurst, matching the measured sound level. At Pephurst Farm, this flow also gives an estimated existing level of 45 dB $L_{Aeq,16hr}$. On adding the site's 42 HV movements per day, in both directions along Loxwood Road, as a worst-case scenario, the predicted level at these two properties increases by 2 dB. This would be the noise increase expected at any property on Loxwood Road for which the road was their primary noise source, should all 42 movements make use of that road section.

Such a change would result in no more than a minor impact in the short term, and negligible over the long-term operational life of the site, with sound levels remaining very low.

6 MITIGATION

General control measures, and recommendations for a noise monitoring procedure in the event of complaint or similar, are provided in the noise management plan in Appendix I.

To ensure potential disturbance from the use of the access road is minimised, this should be inspected at regular intervals (at least once every week) to ensure that the surface remains in good condition. Where defects are identified, these should be rectified within a reasonable time frame.

Furthermore, HDVs should only use the western branch of the triangle to enter and leave the access route, thus avoiding passing directly in front of Ivyhurst, and should not park up on the road triangle, for example if waiting for the site to open. These measures should be controlled by the site's operating procedures.

7 CONCLUSIONS

A noise assessment has been undertaken to assess the impact of noise arising from the proposed clay extraction and a CMRF on noise sensitive receptors.

Sound levels measurements have been undertaken at locations representative of the surrounding residential properties to determine the baseline conditions for the area. From the measurements, the representative baseline ambient and background sound levels, for the site's daytime operational hours, have been taken to be 45 dB $L_{Aeq,1h}$ and 33 dB $L_{A90,1h}$, respectively.

Assessment of the maximum predicted sound levels from both the clay extraction and CMRF process to each receptor has been undertaken against the guidance from West Sussex Council's Waste Local Plan, the Sussex Authorities Planning Noise Advice Document, BS4142:2014+A1:2019, consultation with Chichester District Council, the Government's Planning Practice Guidance for Minerals (PPG-M) and the criteria for schools given in BB 93.

Based on assumptions outlined in this assessment, which have been informed by details provided by Protreat and err on the side of worst case, the predicted levels at the noise sensitive receptors are equal to or below the lowest applicable criteria.

For the CMRF operation the predicted noise rating levels at the sensitive receptors are equal to or below the lowest applicable criteria at all but one property. At Longhurst, the predicted rating level exceeds the target criteria by 1 dB but is still below the limit at which any significant impact might occur.

Accordingly, the noise emissions from the operation of the site are considered to be national and local policy compliant.

Notwithstanding this, the site will seek to minimise noise emissions across all its activities as far as is reasonably practicable, in line with best practice. Accordingly, noise control and monitoring procedures are presented in Appendix I of this report. Specifically, to ensure potential disturbance is minimised, the access road should be inspected at regular intervals to check that the surface remains in good condition, with any defects identified being rectified within a reasonable time frame. Furthermore, vehicles should only use the western branch of the triangle to enter and leave the access route, avoiding passing directly in front of Ivyhurst, whilst the need to wait for access should be avoided.

8 REFERENCES

1 West Sussex County Council. West Sussex Waste Local Plan. April 2014.

2 West Sussex County Council. West Sussex High Quality Waste Facilities Supplementary Planning Document. 2006

3 West Sussex County Council. West Sussex Joint Minerals Local Plan. July 2018.

4 West Sussex County Council, Chichester District Council et al. Planning Noise Advice Document: Sussex. July 2015.

5 Department for Communities & Local Government. Planning Practice Guidance: Minerals. HMSO. 2014. https://www.gov.uk/guidance/minerals

6 Department for Communities and Local Government. National Planning Policy Framework: HMSO. 2019.

7 Department for Communities and Local Government. National Planning Practice Guidance. 2019.

8 British Standards Institution. BS 5228-1:2009+A1:2014 - *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. 2014.

9 British Standards Institution. British Standard 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites - Part 1: Noise. 2014.

10 British Standards Institution. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings. 2014.

11 Department for Education and Skills. Building Bulletin 93. Acoustic Design of Schools: A Design Guide. The Stationery Office. 2015.

12 International Organization for Standardization. ISO 9613-2:1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation. 1996.

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APPENDIX A

NOISE UNITS AND TERMINOLOGY

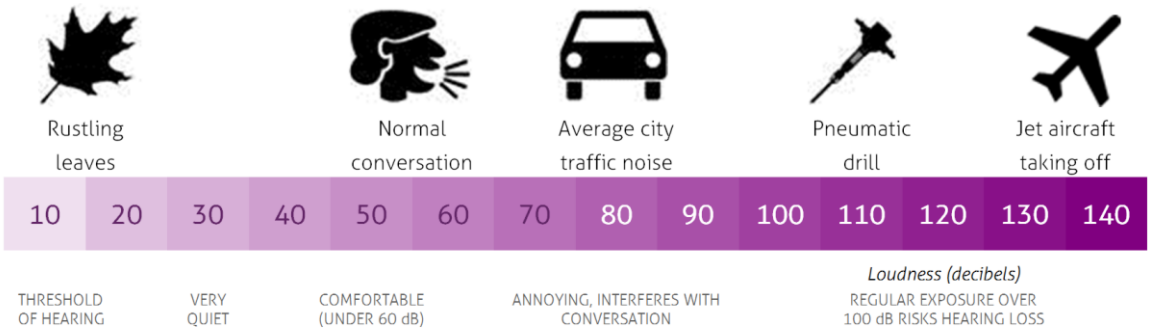
Noise units

Noise is measured using a logarithmic scale, called the decibel (dB). Noise is defined as unwanted sound and the range of audible sound varies from around 0 dB to 140 dB.

The human ear is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz, however its response varies depending on the frequency and is most sensitive to sounds in the mid frequency range of 1 kHz to 5 kHz. Instrumentation used to measure noise is therefore weighted across the frequency bands to represent the sensitivity of the ear. This is called 'A weighting' and is represented as dB(A).

It is generally accepted that under normal conditions humans are capable of detecting changes in steady noise levels of 3 dB, whilst a change of 10 dB is perceived as a doubling or halving of the noise level. An indication of the range of noise levels commonly found in the environment is given below.

Figure A-1 - Typical noise levels



Acoustic terminology

A number of different indices are used to describe the fluctuations in noise level over certain time periods. The main indices include:

- $L_{A90,T}$ This is the noise level exceeded for 90% of the measurement period and provides a measurement of the quieter 'lull' periods in between noise events. It is often referred to as the background noise level.
- $L_{Aeq,T}$ This is the "equivalent continuous A weighted sound pressure level" and is the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.
- $L_{Amax,F}$ This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.

Reference is often made to acoustic measurements being undertaken in 'free-field' or 'façade' locations. Free-field measurements represent a location away from vertical reflecting surfaces, normally by at least 3.5 metres. A façade measurement is undertaken, or calculated to a position 1 metre from an external façade and a correction of up to 3 dB can be applied to account for the sound reflected from the façade. This latter position is often used when assessing the impact of external noise affecting residents inside properties.

APPENDIX B

NATIONAL PLANNING POLICY AND LEGISLATION

National Planning Policy

National Planning Policy Framework

First published in 2012 and most recently updated in February 2019, the *National Planning Policy Framework* (NPPF)[1] sets out the Government's planning policies for England and how these are expected to be applied. Guidance to the NPPF is given through the published planning practice guidance (PPG) webpages on a range of subjects including minerals, summarised in section 2.2.1.

The NPPF replaced Planning Policy Guidance Note (PPG) 24: Planning and Noise amongst other PPG's and Planning Policy Statements (PPS's). The sections of the NPPF relevant to mineral extraction and recycling facility noise are as follows:

"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:…[a number of points including]…

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;"

"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (60);

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;…".

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Reference number 60 of the above quotation points to the Explanatory Note to the *Noise Policy Statement for England*.

"*204. Planning policies should:*

…. g) when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction

"205. When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy. In considering proposals for mineral extraction, minerals planning authorities should:

…c) ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties…"

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE)[2] was published on 15 March 2010. It sets out the long-term vision of the Government's noise policy, which is to promote good health and a good quality of life through the management of noise within the context of sustainable development.

The NPSE sets out the following aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."
- The NPSE describes a number of effect levels that may be used to define effects in the context of noise policy, as follows:

- **NOEL – No Observed Effect Level -** This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- **LOAEL – Lowest Observed Adverse Effect Level -** This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level -** This is the level above which significant adverse effects on health and quality of life

Further guidance on interpreting the effect levels was published on the Government's Planning Practice Guidance first published in March 2014 and updated in October 2019. This includes a table that summarises noise exposure hierarchy, noting this is based on the likely average response of a population. This table is reproduced, below:

Table B-1 - Noise exposure hierarchy and effect levels

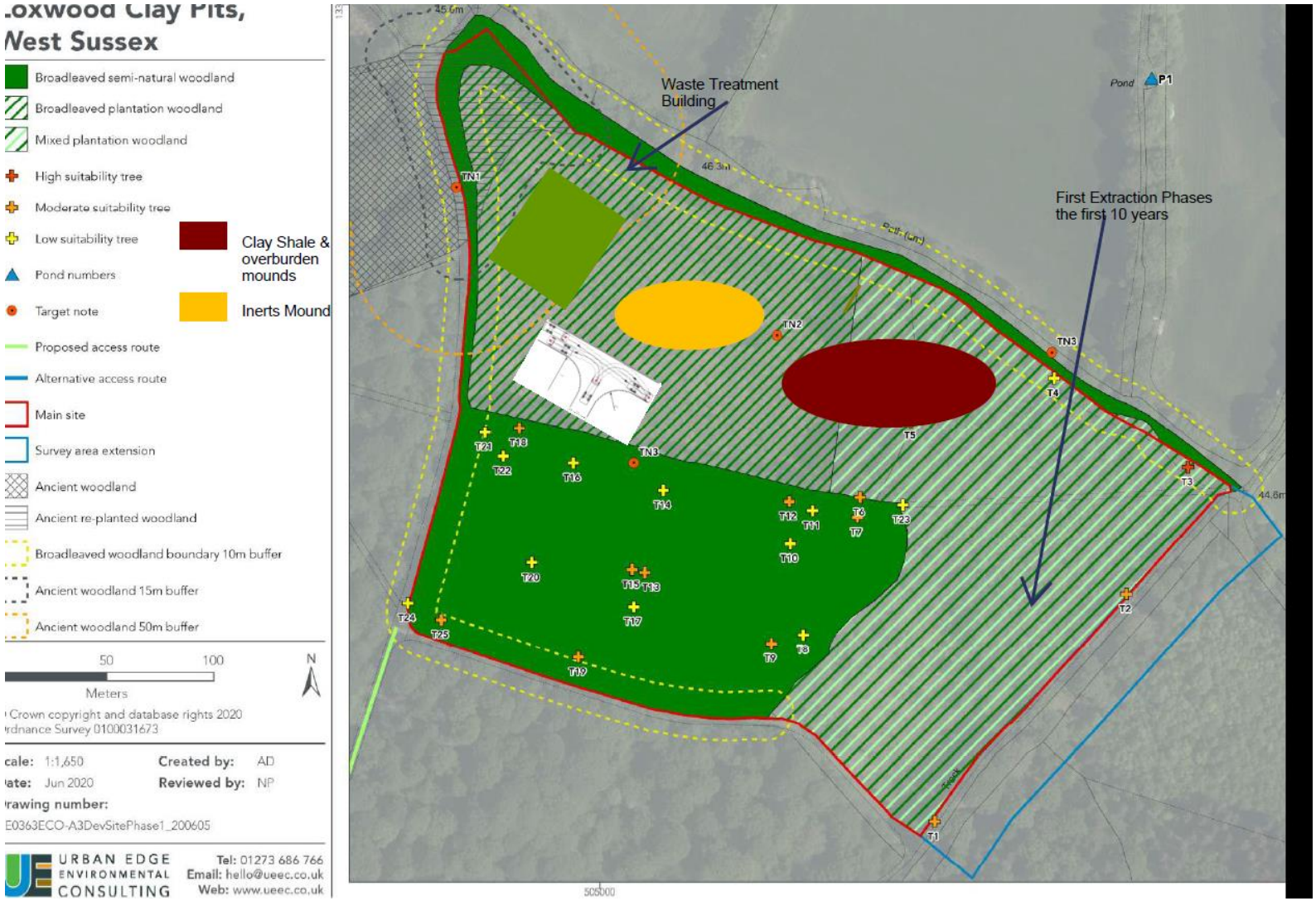
Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour , attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

APPENDIX C

FIGURES SHOWING THE LOCAL AREA & RECPTORS AND PROPOSED SITE LAYOUT

Figure C-1 – Existing Area and Receptor Locations

Figure C-2 – Proposed site Layout



APPENDIX D

PLANT SCHEDULE

APPENDIX E

MEASUREMENT LOCATIONS AND EQUIPMENT DETAILS

Figure E-1 - Site Location and Measurement Locations

Measurement Position	Item	Make and Model	Serial Number	Calibration	
				Certificate number	Expiry Date
1. Ivyhurst	Sound Level Meter	Rion NL-52 AA RCDS-12	01213691	UCRT19/2018	12/09/2021
	Preamplifier	NH-25 AA RCDS-12	36322		
	Microphone	UC-59 AA RCDS-12	318707		
	Calibrator	Rion NC-74 AA-CAL-02	35173438	UCRT20/1328	24/03/2021

Measurement Position	Item	Make and Model	Serial Number	Calibration	
				Certificate number	Expiry Date
2. Old Songhurst	Sound Level Meter	Rion NL-52 AA-SLM-14	00686993	UCRT20/1704	28/07/2022
	Preamplifier	NH-25 AA-SLM-14	87148		
	Microphone	UC-59 AA-SLM-14	13515		
	Calibrator	Rion NC-74 AA-CAL-02	35173438	UCRT20/1328	24/03/2021

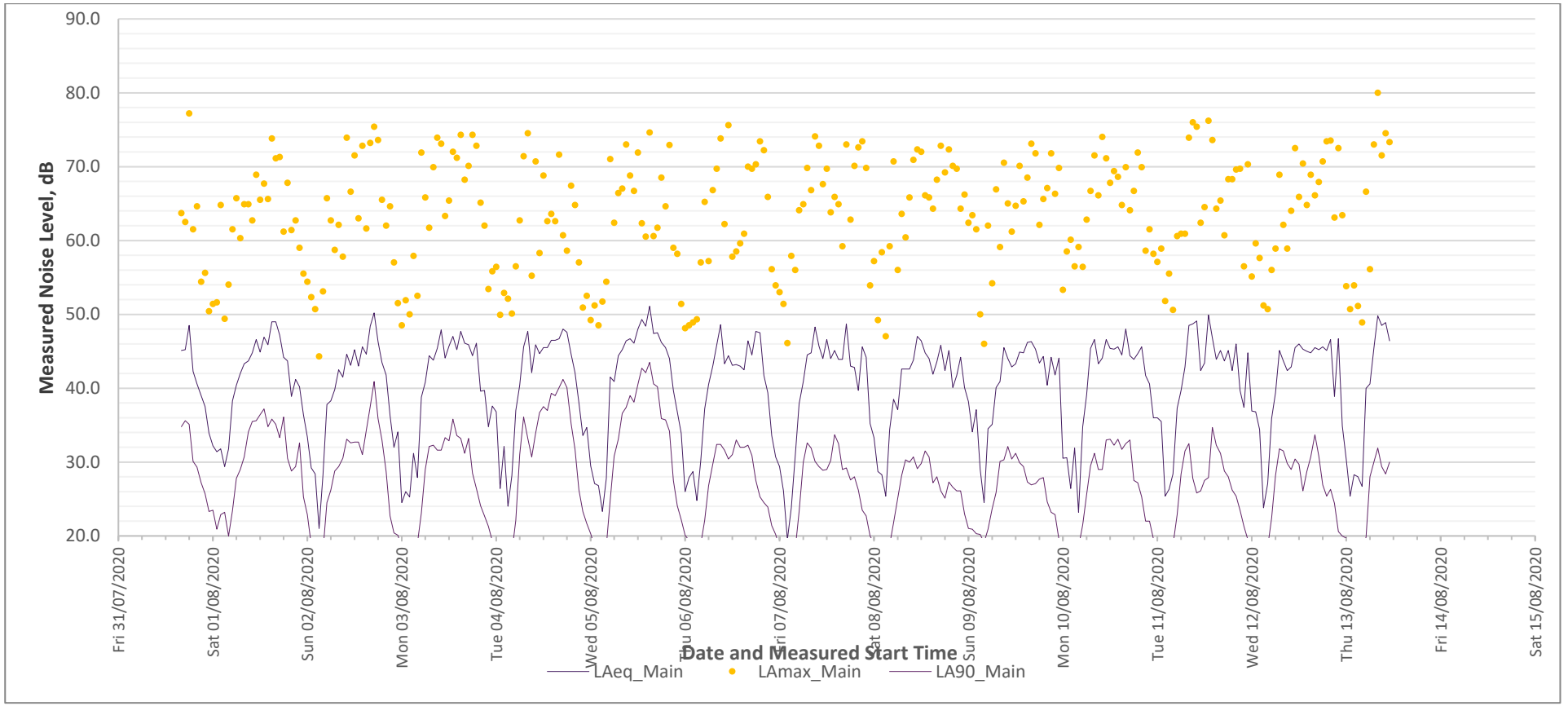
Measurement Position	Item	Make and Model	Serial Number	Calibration	
				Certificate number	Expiry Date
Attended, Near site	Sound Level Meter	Rion NL-52 AA-SLM-10	00620960	UCRT19/1868	05/08/2021
	Preamplifier	NH-25	21001		
	Microphone	UC-59	03878		
	Calibrator	Rion NC-74 AA-CAL-02	35173438	UCRT20/1328	24/03/2021

Measurement Position	Item	Make and Model	Serial Number	Calibration	
				Certificate number	Expiry Date
Attended Males Farm, Barnsfold Cottages	Sound Level Meter	Rion NL-52 AA-SLM-14	00686993	UCRT20/1704	28/07/2022
	Preamplifier	NH-25	87148		
	Microphone	UC-59	13515		
	Calibrator	Rion NC-74 AA-CAL-02	35173438	UCRT20/1328	24/03/2021

APPENDIX F

Measurement Results

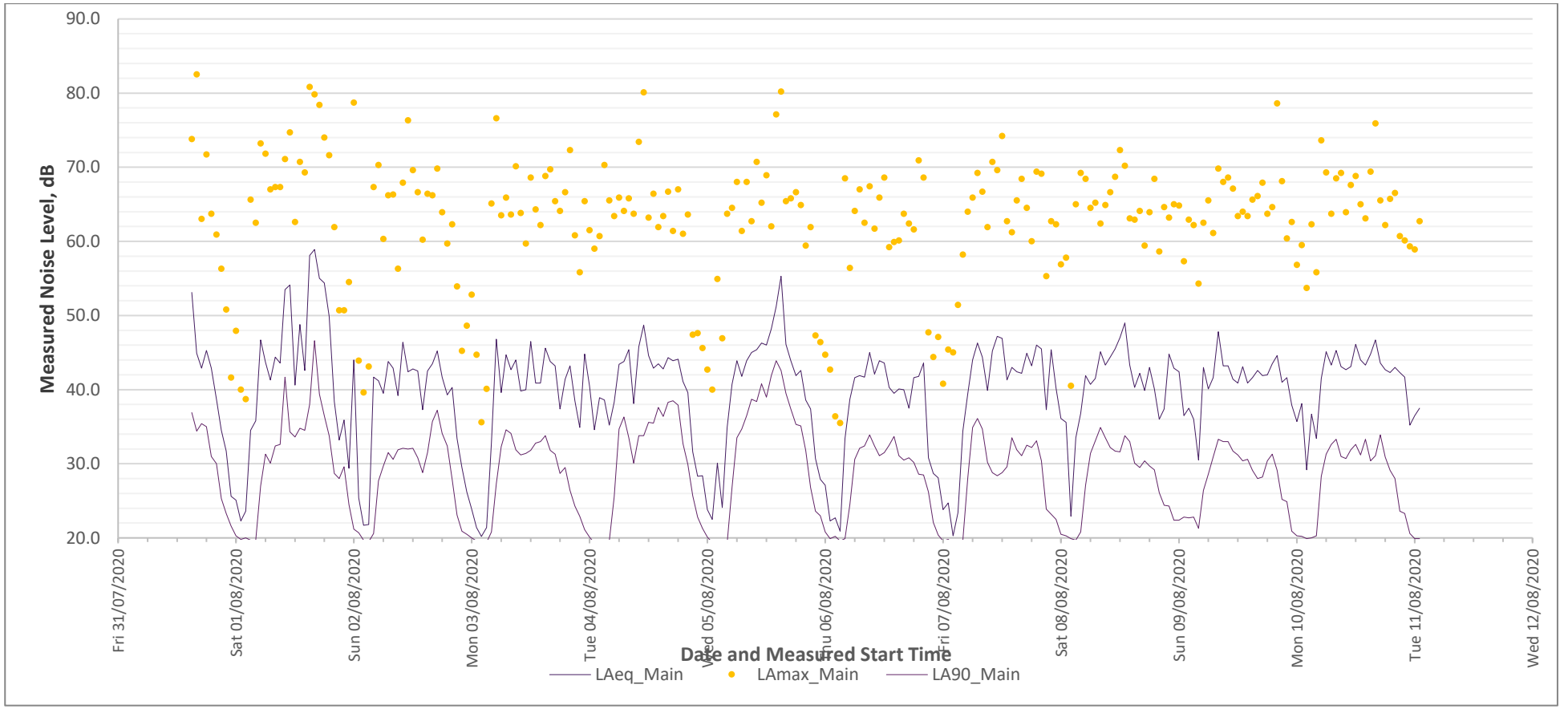
Figure F-1 - Unattended Measurement Position 1; Ivyhurst



Start Time	2020/07/31 15:00:00	Friday
Stop Time	2020/08/13 12:40:53	Thursday

Period	Start Time	End Time	LAeq	LAmax	LA10	LA90
Daytime	07:00	23:00	45	64	47	31
Night-time	23:00	07:00	36	49	32	21
Working hours	08:00	18:00	46	61	48	33
Working sat	08:00	18:00	46	62	48	32

Figure F-2 - Unattended Measurement Position 2 results; Old Songhurst Cottage



Start Time	2020/07/31 14:00:00	Friday
Stop Time	2020/08/11 02:39:24	Tuesday

Period	Start Time	End Time	LAeq	LAmax	LA10	LA90
Daytime	07:00	23:00	45	62	45	32
Night-time	23:00	07:00	38	45	32	22
Working hours	08:00	18:00	45	61	46	34
Working sat	08:00	18:00	49	61	49	34

Figure F-3 – Attended Measurement results

	Location	Date	Start Time	End Time	LAeq	LAmax	LA90
A1	Nr site	31/07/2020	15:40	16:10	41	69	32
A2	Males Farm	13/08/2020	10:00	10:30	44	63	36
A3	Barnsfold Cottages	13/08/2020	11:30	12:00	47	68	35

APPENDIX G

CMRF BUILDING CALCULATIONS

Job No.	Made By	Date Created	Sheet No.
4569	SCS	15/09/20	1
Job Name		Date last revised	Rev
Loxwood		07/10/20	1

Calculation Description				Octave Band Centre Frequency							
Reverberant level from Room Constar				63	125	250	500	1k	2k	4k	8k
Sound power level Lw in dB			111	121	115	108	110	105	102	98	92
Room Volume V (m3)		2000									
Floor	400	Rough concrete		0.02	0.02	0.03	0.03	0.03	0.04	0.07	0.07
Ceiling	400	Steel decking		0.13	0.13	0.09	0.08	0.09	0.11	0.11	0.11
Walls	400	Steel decking		0.13	0.13	0.09	0.08	0.09	0.11	0.11	0.11
Total room surface S	1200	Total absorption sabines		112	112	84	76	84	104	116	116
Reverberation Time Sabine 0.161V/A				2.88	2.88	3.83	4.24	3.83	3.10	2.78	2.78
Average absorption a				0.09	0.09	0.07	0.06	0.07	0.09	0.10	0.10
Room Constant Sa/(1-a)				123.5	123.5	90.3	81.1	90.3	113.9	128.4	128.4
Number of sources		1									
Reverberant sound level											
Lp rev = Lw + 10log(4/R)			97	106	100	95	97	91	87	83	76

			w	l	h	Vol	Long Wall area	Short Wall area	Roof area	Total	Open door (5*8m)
Building volume & Emitting area (sides & roof)			35.00	40.00	7.50	#####	600.00	525.00	1400.00	3650.00	40.00
			m	m	m	m^3	m^2	m^2	m^2	m^2	m^2
Sound reduction index			Rw	63.00	125.00	250.00	500.00	1000.00	2000.00	4000.00	8000.00
steel sheet with trapezoidal	R26, VDI 2571		25.0	10.00	14.00	16.00	20.00	25.00	29.00	23.00	20.00
Open door			0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wall/roof emission/m2				96.29	85.67	78.88	76.82	66.33	58.09	60.10	56.44
Door emission /m2				106.29	99.67	94.88	96.82	91.33	87.09	83.10	76.44
		Area									
Building total SWL (door closed)		3650	113.4	132	121	114	112	102	94	96	92
Building roof SWL	x	1400	109.2	128	117	110	108	98	90	92	88
Building long wall SWL with door (exc door)		560	105.2	124	113	106	104	94	86	88	84
Building open door	x	40	113.3	122	116	111	113	107	103	99	92
Building long wall SWL no door	x	600	105.5	124	113	107	105	94	86	88	84
Building short wall SWL (left)	x	525	105.0	123	113	106	104	94	85	87	84
Building short wall SWL (right)	x	525	105.0	123	113	106	104	94	85	87	84
Building total SWL (door open)			116.3	132	122	116	116	108	104	101	95

Based on plant of internal SWL of 109 dB(A), assoicated with full CMRF and Clay Extraction activity.
Individual activity levels are -3 dB lower for CMRF alone. Building contribution is such that the maximum noise emission can be used throughout the modelling without overprediction of overall noise levels
Assuming an open door elevates the building's overall SWL emission by 3dB. However, the door is faced away from the nearest receptors, and the building is of lesser significance to the total site noise.

APPENDIX H

PREDICTED SOUND LEVELS AND CONTOURS

Figure H.1 – Noise Level Prediction Contour: All Operations. $L_{Aeq,10hr}$

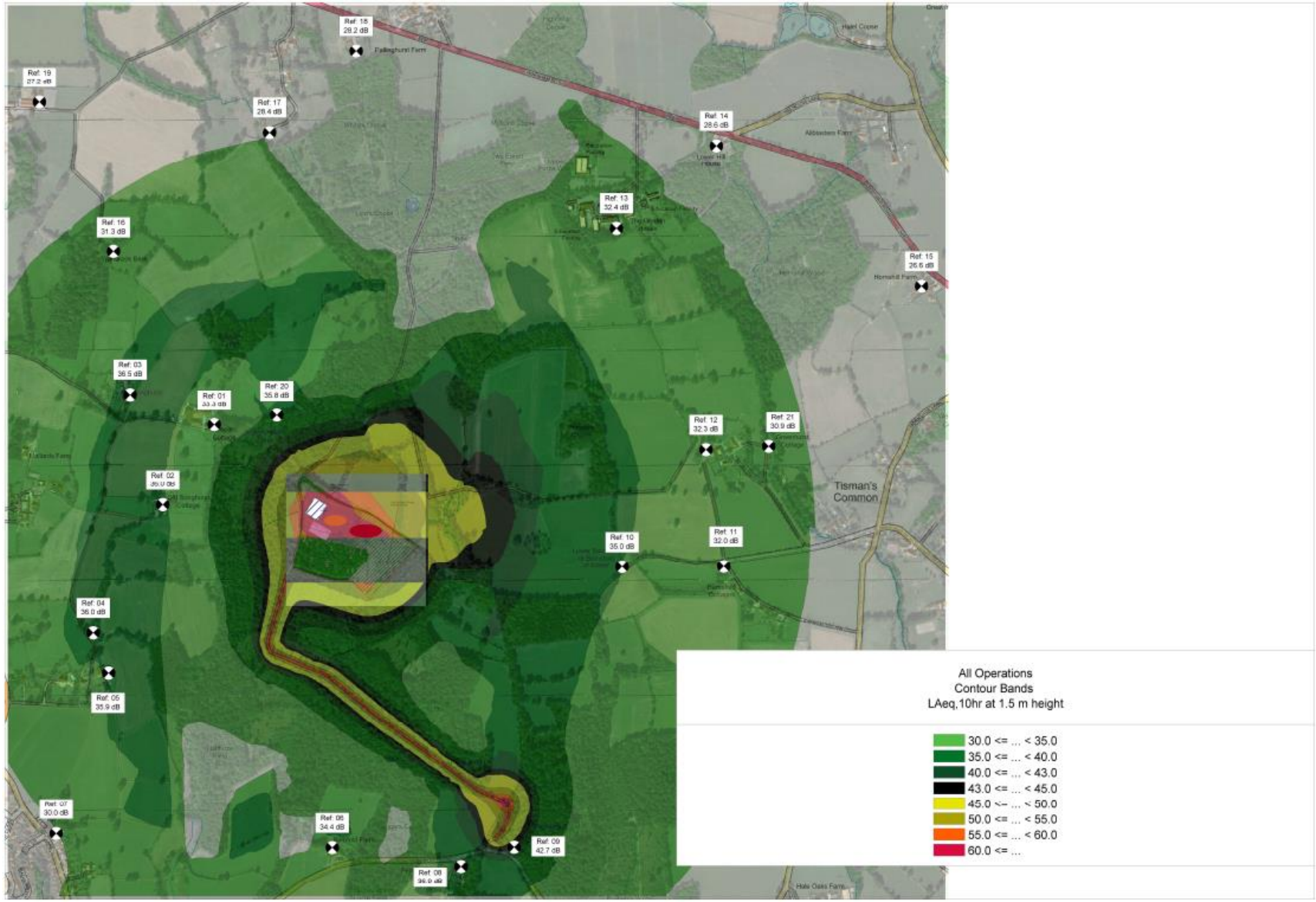


Figure H.2 – Noise Level Prediction Contour: Clay Extraction Operations. $L_{Aeq,1hr}$

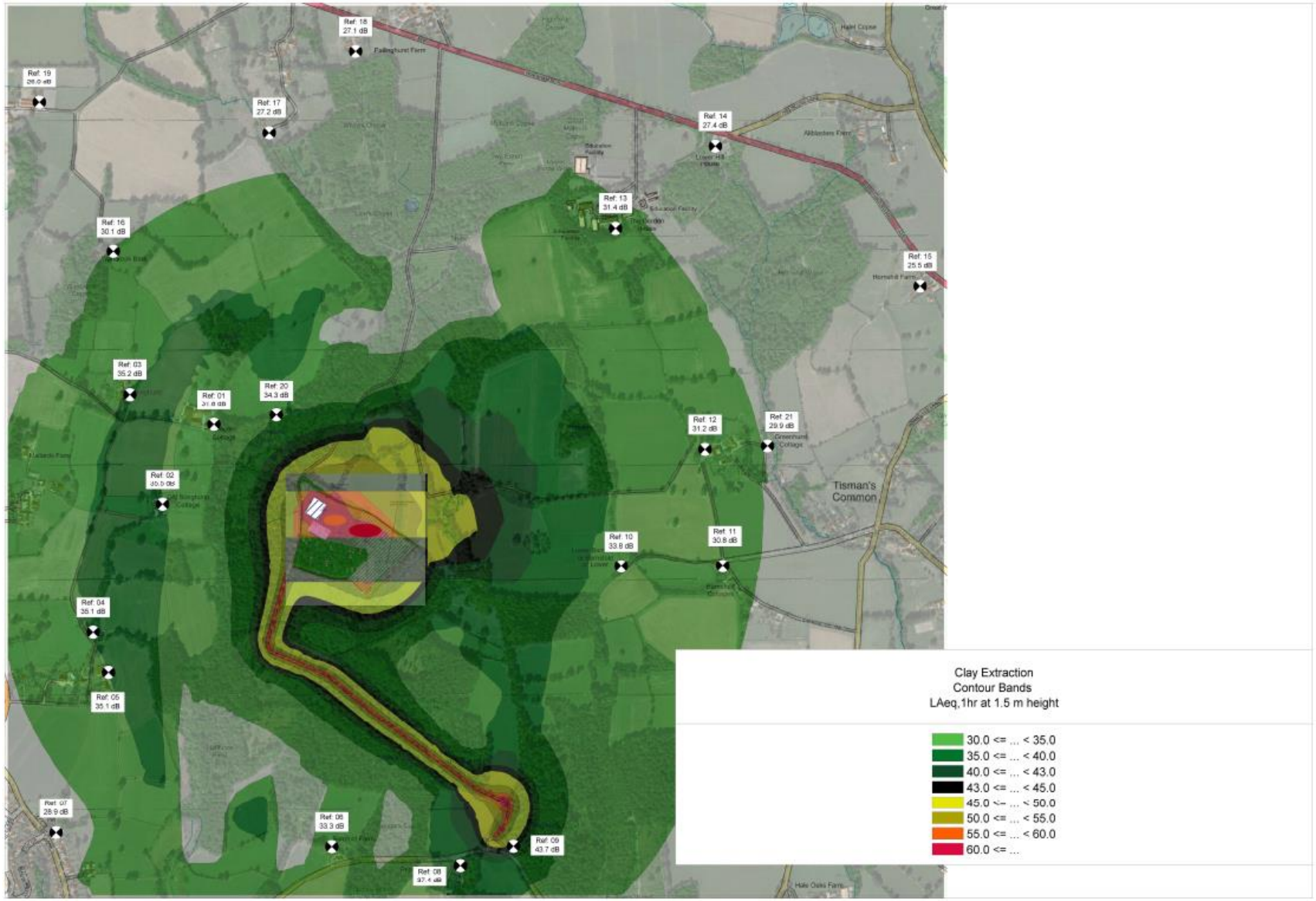


Figure H.3 – Noise Level Prediction Contour: CMRF Operations. $L_{Aeq,1hr}$

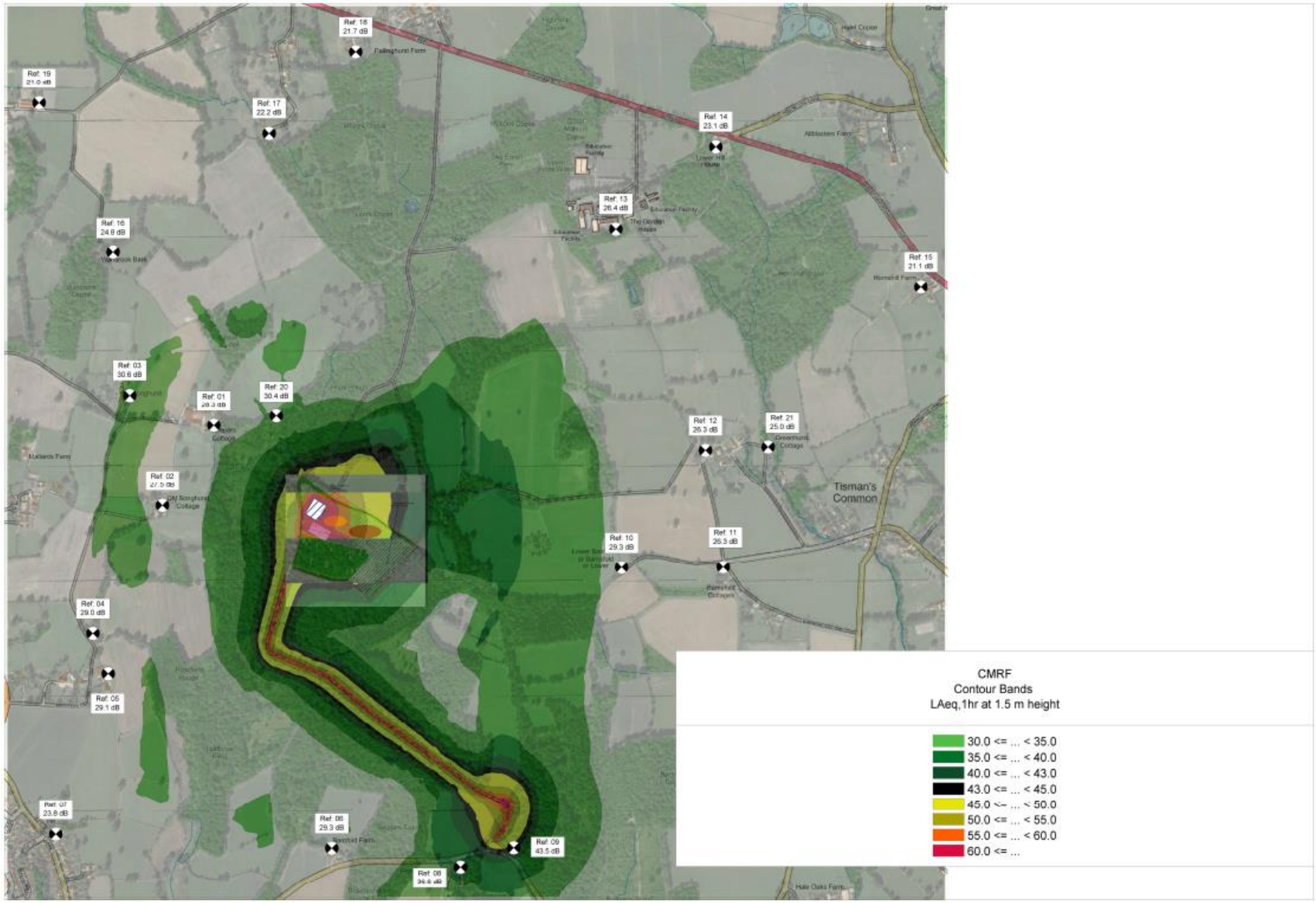
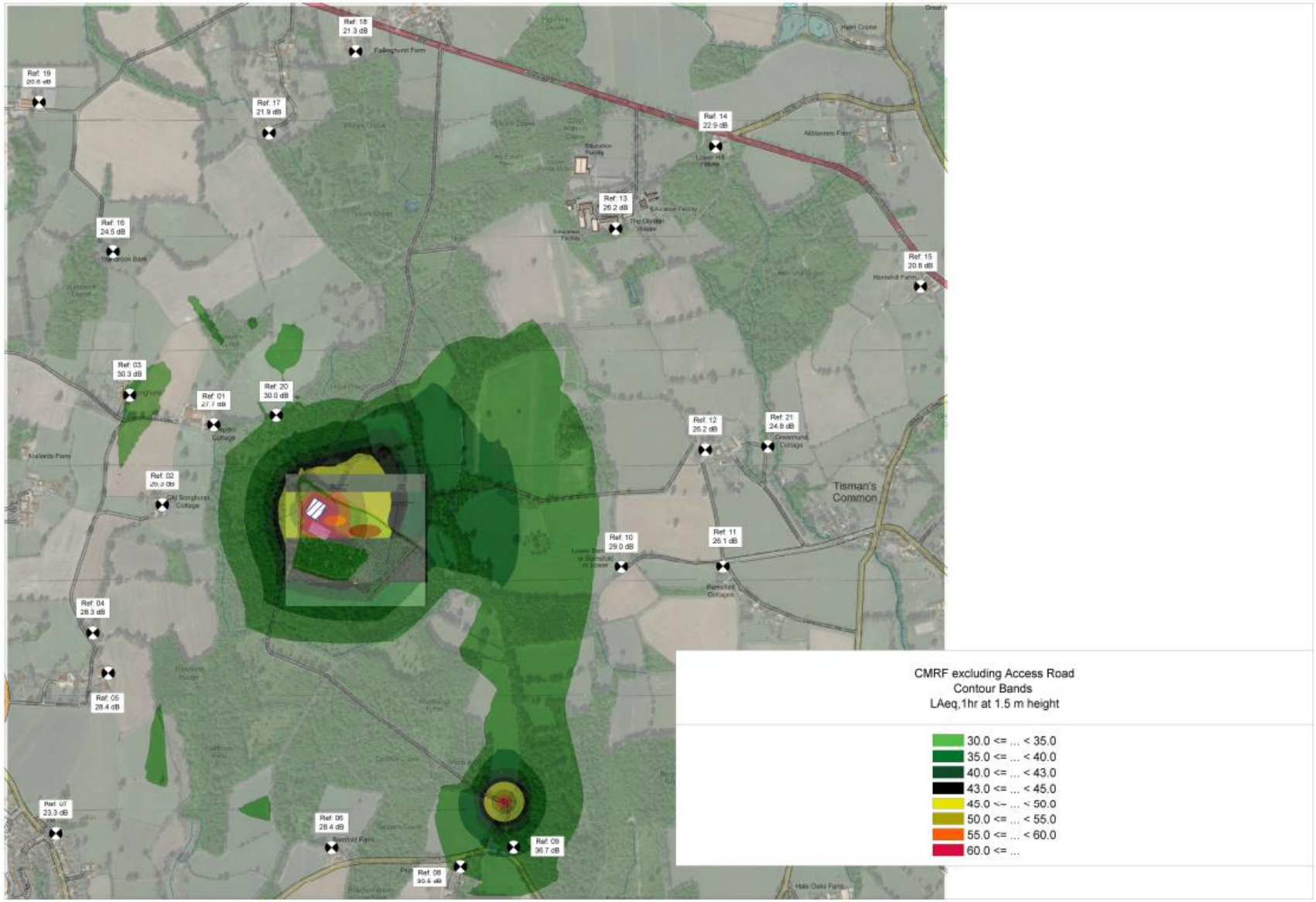


Figure H.4 – Noise Level Prediction Contour: CMRF Operations excluding access route, $L_{Aeq,1hr}$



APPENDIX I

NOISE MANAGEMENT PLAN

NOISE MANAGEMENT PLAN

Noise Control Measures

Appropriate noise control measures would continue to be adopted to ensure noise associated with the operation of the site was minimised and would include where practicable:

- Retain noisy static plant within the building.
- All tipping to be in the CMRF building.
- Noise insulation to the CMRF building.
- Ensuring silencers on plant are effective.
- Minimising drop heights.
- Turning off plant when not in use.
- Using alternative non tonal reversing signals on mobile plant.
- Use of super-silenced generator;
- Clay extraction works to work at depth where practicable to provide increased sound barrier effect.
- CDC, the school and local residents should be kept informed of general and exceptional site activities.
- All plant and equipment should be properly maintained.
- All plant and equipment, including delivery HDVs should be shut down, with engines off when not in use.
- Deliveries to the site should be timed to arrive within the permitted working hours only.
- All reasonable steps should be taken to limit the number of vehicles waiting to access the site.
- Vehicle movements should be arranged so as to minimise noise form reversing warning indicators. White-noise or visual indicators will be used instead of tonal 'beeping' warning signals.
- Site workers and operatives should be regularly advised of the need to work in such a way as to minimise noise and disturbance, with noise minimisation being a point of focus in site meetings.
- A community liaisons representative should be appointed, who shall be responsible for investigating and addressing any complaints received directly by the site.
- The contact details for the community liaisons representative should be advertised, for example at the site access.
- The community liaisons representative shall be empowered to investigate noise complaints and enforce noise mitigation measures as identified to be necessary.
- A complaints log shall be kept of all complaints received, and remedial measures undertaken.
- The community liaisons representative shall be responsible for informing the local community regarding the progress of the works and advising local residents of the timing of particularly noise works in the vicinity of their properties in advance of this commencing.

To ensure potential disturbance is minimised, the access road should be inspected at regular intervals (at least once every week) to ensure that the surface remains in good condition. Where defects are identified, these should be rectified within a reasonable time frame.

The residential property adjacent to the road triangle at start of the access road, Ivyhurst, is the most vulnerable property to noise impacts due to vehicles accessing the site. To limit these effects: HVs should only use the western branch of the triangle to enter and leave the access route, i.e. avoiding passing directly in front of Ivyhurst; and HVs should not park up on the road triangle, for example if waiting for the site to open. These measures should be controlled by the site's operating procedures.

Noise Monitoring

The assessment within this report indicates that noise levels associated with the working of the site would remain within acceptable noise limits.

Given the low noise levels calculated and the predicted noise levels being around or below the ambient noise level, no regular noise monitoring has been proposed for the clay extraction and recycling operations.

Should it be necessary to undertake noise monitoring, e.g. following a complaint or following a written request from the regulatory authority, this should be carried out using the following methodology:

1. Attended measurements to be undertaken, by a competent person of $L_{Aeq,5minute}$ noise levels over a period of 1 hour at appropriate monitoring locations.

2. Details of equipment used for monitoring to be provided. An instrument conforming to at least IEC 61672 Class 2 (or better) should be used, which should be calibrated before and after the exercise using a suitable acoustic calibrator. 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 façade or other reflecting surface other than the ground).

3. Monitoring should be carried out during typical working hours with the main items of plant and machinery in operation.

4. The logging of weather conditions, approximate wind speed and direction and both on site and off site events occurring during measurements including 'paused out' extraneous noise events.

5. Monitoring results comparing the measured noise levels to the appropriate criteria defined to be forwarded to the regulatory authority within 14 days of measurement exercise.