



Weaverthorpe-1 Exploration Wellsite, Butt Lane, Foxholes, Driffield, YO25 3HY

Noise and Vibration Impact Assessment to support Planning and Environmental Permit Applications

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Issued to

Egdon Resources U.K. Ltd

Prepared by

Andrew Corkill MSc MIOA
Principal Consultant

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1. INTRODUCTION

Egdon Resources U.K. Ltd ("Egdon") is seeking planning permission to construct, drill and test an exploration well on land north of Butt Lane, Foxholes, Drifffield, YO25 3HY. This relates to the Weaverthorpe gas prospect in the PEDL347/PL081 licence area.

The works involve four phases:

- Phase 1: Construction of wellsite
- Phase 2: Drilling a single exploration well
- Phase 3: Short term operational testing (subject to positive drilling results)
- Phase 4: Suspension or site restoration and aftercare

Spectrum Acoustic Consultants has been instructed by Egdon to undertake a Noise and Vibration Impact Assessment (NVIA) for these activities to support both the planning application and an application for an Environmental Permit.

North Yorkshire Council (NYC) provided helpful guidance on the scope required for the NVIA in their pre-application advice of 15 October 2024. Following a site visit with Environmental Health officers on 18 October 2024, NYC Environmental Health provided further advice about information to be included within the NVIA.

The particular requirements of an NVIA submitted to the Environment Agency (EA) for an Environmental Permit are specified in a number of published documents referred to later.

Responses from NYC to the pre-application request are discussed in section 5. The nearest noise sensitive residential receptor is located in the adjoining East Riding of Yorkshire Council (ERYC) area. The relevant local plan policies in both the development plans of NYC and ERYC have therefore been taken into account. National policy and guidance will be applied too to both areas. This NVIA report seeks to support both a planning application to NYC and an application for an Environmental Permit from the EA.

2. ABBREVIATIONS

BAT - Best Available Techniques	NPPF - National Planning Policy Framework
BS - British Standard	NPSE- Noise Policy Statement for England
EA - Environment Agency	NSR - Noise Sensitive Receptor
EIA – Environmental Impact Assessment	NSTA - North Sea Transition Authority
ERYC – East Riding of Yorkshire Council	NTS - National Transmission System (Gas)
IEC - International Electrotechnical Commission	NQA - National Quality Assurance Limited
ISO - International Standards Organisation	NYC – North Yorkshire Council
LOAEL - Lowest Observable Adverse Effect Level	PPG-N - Planning Practice Guidance – Noise
MPA - Mineral Planning Authority	PPG-M - Planning Practice Guidance – Minerals
NVIA - Noise and Vibration Impact Assessment	SOAEL - Significant Observable Adverse Effect Level
NML - Noise Monitoring Location	UKAS - United Kingdom Accreditation Service
NMP- Noise Management Plan	WHO - World Health Organization
NNG - Night Noise Guidelines for Europe	



3. LOCATION OF PROPOSED EXPLORATION WELLSITE

The location of the centre of the proposed exploration wellsite is to the north of Butt Lane, with its centre 1,100m east of the centre of Foxholes village. The site is accessed via a 350m access track from Butt Lane to the south. The proposed site is located within an area of arable farmland on all sides. The nearest noise sensitive receptor (NSR) is Westfield House located 635m east of the centre of the wellsite. The location of the site is shown in Figure 1.

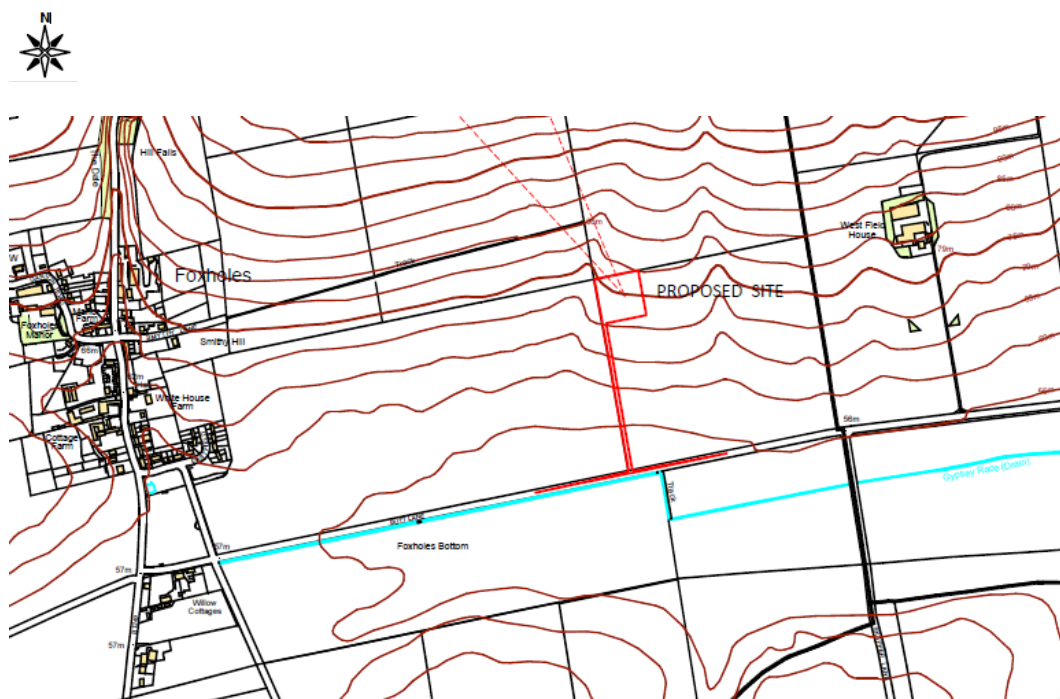


Figure 1: Location of proposed exploration wellsite

The nearest noise sensitive receptors (NSR) to the west are in the village of Foxholes. Other potential receptors at 1,100m or more are considered sufficiently distant that there will be no adverse impact.

Table 1 lists the locations of NSRs and Figure 2 shows their locations.

Noise sensitive receptor (NSR)	NSR Name	Distance (m) and Direction in relation to wellsite centre	OS grid reference
NSR1	Westfield House	635m E	502963E, 473259N
NSR2	7 Eastfield	940m WSW	501407E, 472866N
NSR3	Applegarth, Smythy Lane	975m W	501331E, 473047N

Table 1: Distances and directions from centre of development site to noise sensitive receptors (NSR)

There are no other closer potential sensitive receptors which are consented but not yet built.



Figure 2: Location Map showing Noise Sensitive Receptors (NSRs)

4. PROPOSED DEVELOPMENT

Table 2 shows the various phases of the proposed development of the Weaverthorpe -1 exploration well and identifies, following some consultation, which phases of the development are required to be included in the NVIA.

The planning application requires Phases 1, 2, 3 and 4 (Case B) of the proposed development to be included in the NVIA. If gas is proven then the works to suspend the well (Phase 4 Case A) are similar or less than those involved in constructing the well site, and will be limited to daytime, and so no additional assessment will be required as the conclusion of the Phase 1 assessment will apply.

Whilst noise during construction and drilling is of most concern to NYC and of less concern to the EA, the flow testing (Phase 3) is a matter that the EA is particularly interested in.

	Needs to be included in NVIA submitted for Planning or for Permitting	
	Planning	Permit
Phase 1: Construction of a temporary drilling pad.	Yes	No
Phase 2: Drill single exploratory borehole	Yes	No
Phase 3: Flow testing (24hr/day for 2 weeks)	Yes	Yes
Phase 4: Suspend or restore site		
Case A: Proven gas	No	No
Case B: Insufficient or no gas	Yes	No

Table 2: Stages of the development to be included in the Noise Impact Assessments (NVIA)

Appendix A includes site layouts of each of these phases of work, showing the location of temporary equipment and plant on the site for each stage.



5. PRE-APPLICATION RESPONSE FROM NYC

A request for pre-application advice was submitted on 20th August (NY/2024/0021/PRE) and a response was received from NYC on 15th October 2024.

The advice identified the following policies as being relevant and also requested considering the potential impact of ground vibration and noise impact to ecological receptors.

National Planning Policy Framework (NPPF) (December 2023)

National Planning Practice Guidance (NPPG).

MWJP Minerals Policies: M16, M17 and M18.

MWJP Development Management Policies: D01, D02, D03, D04, D05, D06, D07, D08, D09, D10, D11, D12.

Ryedale District Council: Local Plan Strategy (2013): SP12, SP13, SP14, SP15, SP17, SP19 and SP20.

In addition key issues to be covered were:

- Impact upon the open countryside and landscape character;
- Environmental protection & local amenity impacts (vibration, dust, noise); and
- Impact upon heritage assets/archaeology.

Following a site visit by the NYC Environmental Health Officer on 18 October 2024, the following scope of work for the NVIA was advised by NYC:

A full and complete noise and vibration assessment to be undertaken which assesses the impact on nearest sensitive dwellings and other premises for which there could be a material adverse impact being:

Noise from the construction phase of the drilling rig and associated infrastructure
Drilling operations- including onsite equipment
Deliveries and removal of materials
Vehicles onsite including reversing/noise audible warnings
Flare noise
Start-up alarms
Noise from communications equipment

Noise management plan and incident response protocols should be included

References to BS4142 & BS 5228 should be applied as appropriate.

Noise and vibration should be kept to a minimum by methods of work that conform with the 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (See BS 5228-1:2009+A1:2014, and EC and UK Noise Legislation, as applicable).

There has been no specific consultation in advance with the EA in relation to noise and vibration matters and their particular requirements, however full account has been taken of the relevant



published guidance. Full guidance is published in an EA guidance document and full account has been taken of this guidance in carrying out this assessment, along with other requirements previously raised by the EA on other similar projects

Following the pre-app responses from NYC, the following points are covered within this NVIA with reasons and justification for this approach being included:

- Noise aspects of tranquillity
- Details of noise mitigation
- The issues raised in relation to matters such as disturbance through deliveries, reversing sounders/alarms on site vehicles and communications equipment
- Vibration impacts from mechanical sources

The following can now be confirmed:

- The noise monitoring locations (NMLs) are considered to be representative of the noise sensitive receptors, and their selection is justified within the NVIA
- This NVIA is a comprehensive single document being submitted both to support a planning application to the MPA and a permit application to the EA. .
- The 'cumulative impacts' proposed to be scoped out would be those generated by recently consented new industrial developments, including oil and gas, which have not yet been built.
- The noise impacts to be assessed are to existing residential sensitive receptors (NSRs) and also to sensitive residential receptors, which are not yet built but have planning permission. It is confirmed however, that there are no such NSRs nearer to the proposed development, to those that are already built and selected as NSRs in this assessment.
- The baseline noise survey was undertaken during fine weather and light wind conditions and was carried out between 6th and 8th March 2025. The location of the proposed site is rural with some road traffic being the main contributor to the baseline noise environment. Whilst the survey period did extend into the weekend period, this effect is typically small and not significant in the case of this particular site. This will be discussed later in this report.
- Measurements of wind speed and direction, and observations about rain and wet road surfaces, were made during all attended measurements.
- Computer model files will be submitted in both the original formats as well as QSI data exchange format to the EA directly. An excel spreadsheet output from the unattended noise monitor will be forwarded to the EA, if requested.
- Baseline noise survey data recorded and reported within this NVIA includes, as requested, date, time, $L_{A90,T}$ and $L_{Aeq,T}$ for each noise measurement. Weather data includes date, time, wind speed (average), wind direction and precipitation.



- The soundscape is described from observations made at receptors of acoustically dominant and contributory sources.
- A Best Available Techniques (BAT) assessment is included within the NVIA in relation to the testing phase noise, acknowledging this as fulfilling the requirements for a Cost Benefit Analysis of mitigation methods.

6. MATTERS SCOPED OUT

- Assessment of noise from vehicles associated with the proposed development, when travelling on public roads. Vehicles travelling along the site access road within the red line development boundary are included in the assessment.
- Detailed assessment of noise impact to ecological receptors. This is a matter that applies, in the case of terrestrial ecology, primarily to bird species and then only at nationally designated areas. The nearest such area is Fordon Chalk Grasslands SSSI 3 km northeast of the site. The large setback distance will mean that during drilling and testing, levels of noise would be less than 10 dBA and inaudible. Natural England's report¹ (September 2024) on noise disturbance in the Solent advised that *'birds are more likely to respond to noise disturbance when the sound pressure levels at the location of the birds are at least 20.0 dB(A) above the typical background noise level. However, the visual nature of any noise disturbance is also likely to cause responses from the birds'*. With lowest background noise levels at the SSSI likely to be in the range 20-25 dBA, the threshold of impact would therefore be 40-45 dBA. The 10 dBA expected from activities from the proposed site is well below this threshold.
- The 'cumulative impacts' proposed to be scoped out would be those generated by recently consented new industrial developments, including oil and gas, which have not yet been built
- Any matters that would only normally be considered if an Environmental Impact Assessment was required.

¹ Noise Disturbance – Baseline Level Monitoring in the Solent, September 2024, Natural England Commissioned Report NECR570



7. POLICY CONTEXT

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF)² sets out the Government's planning policies for England and how these should be applied when determining planning applications.

Paragraph 187 (e) requires prevention of new or existing development from contributing to, or being adversely affected by, unacceptable levels of noise pollution.

Paragraph 198 states that new development should be appropriate to its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so it is required to:

'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 life³;

'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'

The NPPF also sets out a framework for the sustainable use of minerals, with a further three paragraphs being relevant to noise:

'It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation' (paragraph 222).

'Planning policies should [...] when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction' (paragraph 223).

'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: [...]

b) 'ensure that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality;

c) 'ensure that any unavoidable noise [...] and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties; [...]' (paragraph 224)

² National Planning Policy Framework, MHCLG, December 2024

³ See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24, Department for Environment, Food & Rural Affairs, 15 March 2010).



NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The NPSE was published in March 2010 and sets out the long term vision of Government noise policy as follows:

- *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The NPSE aims to clarify the principles and aims in existing policy documents, legislation and guidance that relate to noise. Its long term vision is supported by 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'*

These aims are developed by reference to concepts from toxicology, namely NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). NPSE also refers to SOAEL (Significant Observed Adverse Effect Level).

It recognises that there is no universally applicable measure for the concepts. Consequently, the SOAEL is likely to be different for different noise sources and receptors and at different times. Even so, significant effects should be avoided, taking account of sustainability aims.

Where noise impact is between LOAEL and SOAEL, the NPSE requires that all reasonable steps should be taken to mitigate adverse effects while taking account sustainable development aims. It notes (Para. 2.7) that *'the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation.'*

NORTH YORKSHIRE COUNCIL MINERALS AND WASTE JOINT PLAN 2022

The following text relating to noise has been extracted from the relevant policies:

Policy M17: Other spatial and locational criteria applying to hydrocarbon development

The sections of this policy particularly relevant to noise impact are:

2) Cumulative impact

- Hydrocarbon development will be permitted in locations where it would not give rise to unacceptable cumulative impact, as a result of a combination of individual impacts from the same development and/or through combinations of impacts in conjunction with other existing, planned or unrestored hydrocarbons development. Applications for appraisal and production activities should specifically address the potential for cumulative impacts of development upon climate change and where appropriate, propose such mitigation and adaptation measures as may be available and are consistent with Policy D11 and the requirements of other relevant regulators.*



ii) *Well pad density and/or the number of individual wells within a PEDL area will be limited to ensure that unacceptable cumulative impact does not arise. Assessment of the contribution to cumulative impact arising from a proposal for hydrocarbon development will include (but not necessarily be limited to) consideration of:*

- a. *The proximity of a proposed new well pad site to other existing, permitted or unrestored well pads, and the extent to which any combined effects would lead to unacceptable impacts on the environment or local communities, including as a result of any associated transport impacts;*
- b. *The duration over which hydrocarbon development activity has taken place in the locality and the extent to which any adverse impacts on the environment or local communities would be expected to continue if the development were to be permitted;*
- c. *The sensitivity of the receiving environment, taking into account the nature and distribution of any environmental constraints, proximity to local communities, the availability of adequate access links to the highway network and the need to ensure a high standard of protection in line with other relevant policies in the Plan.*

Where results from any earlier exploration and/or appraisal activity are available, proposals for production of unconventional hydrocarbons should include information on how the proposal is intended to fit within an overall scheme of production development within the PEDL area and should ensure as far as practicable that production sites are located in the least environmentally sensitive areas of the resource.

3) Local economy

Hydrocarbon development will be permitted in locations where a high standard of protection can be provided to environmental, recreational, cultural, heritage or business assets important to the local economy including, where relevant, important visitor attractions. The timing of short term development activity likely to generate high levels of noise or other disturbance, or which would give rise to high volumes of heavy vehicle movements, should be planned to avoid or, where this is not practicable minimise, impacts and take into account seasonal variations and peaks in traffic movements.

4) Specific local amenity considerations relevant to hydrocarbon development

- i) *Hydrocarbon development will be permitted in locations where it would not give rise to unacceptable impact on local communities or public health. Adequate separation distances should be maintained between hydrocarbon development and residential buildings and other sensitive receptors in order to protect against unacceptable adverse individual and cumulative impacts on amenity and public health, in line with the requirements of Policy D02. Proposals for surface hydrocarbon development, particularly those involving hydraulic fracturing, within 500m of residential buildings and other sensitive receptors, will only be permitted in following the particularly careful scrutiny of supporting information which robustly demonstrates how in site specific circumstances an unacceptable degree of adverse impact can be avoided.*
- ii) *Proposals should refer to any relevant data from baseline monitoring and other available information to ensure that a robust assessment of potential impacts is undertaken, and that comprehensive mitigation measures are proposed where necessary.*



Policy D02: Local amenity and cumulative impacts

d. *Proposals for minerals and waste development, including ancillary development and minerals and waste transport infrastructure, will be permitted where it can be demonstrated that there will be no unacceptable impacts on the amenity of local communities and residents, local businesses and users of the public rights of way network and public open space including as a result of:*

- *noise,*
- *dust,*
- *vibration,*
- *odour,*
- *emissions to air, land or water*
- *visual intrusion,*
- *site lighting*
- *vermin, birds and litter*
- *subsidence and land instability*
- *public health and safety*
- *disruption to the public rights of way network*
- *the effect of the development on opportunities for enjoyment and understanding of the special qualities of the National Park*
- *cumulative effects arising from one or more of the above at a single site and/or as a result of a number of sites operating in the locality*

Proposals will be expected as a first priority to prevent adverse impacts through avoidance, with the use of robust mitigation measures where avoidance is not practicable.

It remains a design objective of the proposed development to avoid significant adverse impacts and endeavour to avoid if possible, or minimise if not, those impacts which once mitigated remain marginally adverse.

RYEDALE LOCAL PLAN STRATEGY (2013)

The following text relating to noise has been extracted from the relevant policies:

SP13 – Landscapes character

Development proposals should contribute to the protection and enhancement of distinctive elements of landscape character that are the result of historical and cultural influences, natural features and aesthetic qualities including:

- *The ambience of the area, including nocturnal character, level and type of activity and tranquillity, sense of enclosure/exposure*

SP20 – Generic development management issues – Amenity

New development will not have a material adverse impact on the amenity of present or future occupants, the users or occupants of neighbouring land and buildings or the wider community by virtue of its design, use, location and proximity to neighbouring land uses. Impacts on amenity can include, for example, noise, dust, odour, light flicker, loss of privacy or natural daylight or be an overbearing presence.



Developers will be expected to apply the highest standards outlined in the World Health Organisation, British Standards and wider international and national standards relating to noise.

EAST RIDING OF YORKSHIRE AND KINGSTON UPON HULL JOINT MINERALS LOCAL PLAN 2016-2033 (ADOPTED NOVEMBER 2019)

Policy EM2: Exploration Boreholes

Proposals for exploration boreholes will be supported provided:

- 1. They are located in the least environmentally sensitive part of the geological prospect as practically possible, taking into account environmental, geological and technical factors to minimise impacts on any identified asset;*
- 2. Mitigation, including the possibility of directional drilling, is provided to ensure that they do not cause unacceptable disturbance to the occupiers of residential properties, or other land uses and their users nearby;*
- 3. They include measures to avoid pollution of ground water, aquifers, and potable water supplies;*
- 4. Mitigation is provided to ensure that operational processes and gas flaring, or other arrangements for the disposal of unwanted gas, do not cause unacceptable disturbance to the occupiers of residential properties, or other land uses and their users nearby;*
- 5. Site selection takes account of impacts over the proposed lifetime of the borehole and the potential for it to be retained for long term appraisal and development; and*
- 6. It makes full assessment and provides information to the satisfaction of the authority for mitigation of any adverse environmental impacts if the borehole is retained for long term appraisal and development.*

Policy DM1: Impacts of Mineral Development

Mineral development will be supported where it can be demonstrated that:

- 1. There is a clear need for the development proposed;*
- 2. The development would avoid harm to the environment or communities. Where harm is outweighed by the need for the development, the impacts on communities and the environment can be mitigated to within acceptable levels, both individually and cumulatively (including the impact of the factors in part B below) with other existing and proposed mineral and other forms of development; and*
- 3. Enhancement opportunities are taken as part of development or its restoration.*

In determining applications for minerals development, including the proposed order and method of working, the overall programme of extraction and the proposed restoration and aftercare of the site, the following must be addressed where relevant:

- (1-10 but only no.2 listed)*
- 2. Noise, dust, fumes, illumination and visual intrusion;*



Policy DM2: Protecting Residential Amenity and Other Uses

Minerals development will be supported provided it does not generate unacceptable adverse effects from noise, dust, vibration, odour, emissions, illumination, visual intrusion or traffic to adjacent land uses and their users.

EAST RIDING LOCAL PLAN UPDATE 2025-2039 (ADOPTED APRIL 2025)

Policy ENV6: Managing Environmental Hazards

Environmental hazards, such as flood risk, coastal change, nutrient deposition, aerial pollution, groundwater pollution and other forms of pollution, will be managed to ensure that development does not result in unacceptable consequences to its users, the wider community, and the environment.

8. GUIDANCE AND STANDARDS

PLANNING PRACTICE GUIDANCE – NOISE (PPG-N)

Planning Practice Guidance on Noise⁴ (PPG-N) sets out government guidance on ‘*how planning can manage potential noise impacts in new development*’.

Whilst it does advise that noise can override other planning concerns, ‘*where justified*’, it states that ‘*it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern*’ (paragraph 002).

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE⁵. The noise exposure categories are summarised below.

- No Observed Adverse Effect: Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response.
- Observed Adverse Effect: Noise can be heard and causes small changes in behaviour, attitude or other physiological response.
- Significant Observed Adverse Effect: The noise causes a material change in behaviour, attitude or other physiological response.

⁴ PPG - Noise, MHCLG, 22 July 2019

⁵ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20, DEFRA, 15 March 2010)



- **Unacceptable Adverse Effect:** Extensive and regular changes in behaviour, attitude or other physiological response, and/or an inability to mitigate effect of noise leading to psychological stress.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there are significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs, which represent the onset levels of adverse effects and significant adverse effects, respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- The source, its absolute level and the time of day.
- For intermittent sources, the number and duration of events;
- The spectral frequency content of the noise

And other factors will need to be considered in many cases, which are more fully described and detailed in paragraph 6 and 8 of the Noise PPG but include matters such as:

- The cumulative impacts with other sources
- Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)
- Whether existing noise sensitive locations already experience high noise levels,
- Where Noise Action Plans, and, in particular Important Areas are identified nearby.
- The effect on wildlife especially on nationally designated sites.
- The use of external amenity spaces intrinsic to an overall design and including private gardens.
- The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.
- Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquillity.

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. However, reference is made to documents published by other organisations, such as:

- *BS 8233:2014– Guidance on sound insulation and noise reduction for buildings (British Standards Institute 2014);*
- *Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, 2014);*



- *ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise- New Residential Development (Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health, May 2017).*

This should not be considered an exhaustive list, however, as reference may also be made to other existing British Standards, where relevant, and to scientific exposure-response studies or reviews relating to noise and its effects on human and, where appropriate, animal populations.

PLANNING PRACTICE GUIDANCE – MINERALS (PPG-M)

PPG-M (17 October 2014) provides further detail for noise assessment of developments specifically related to minerals extraction.

Paragraph 19 sets out how minerals operator should seek to control noise emissions. It advises that 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'*

Paragraph 20 states that, *'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. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.'*

Paragraph 21 states that *'mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property.'* During the daytime (07:00-19:00) and evening (19:00-22:00) periods the noise limit from the proposed activities should be set at a value less than 10dB above the background sound level, $L_{A90,1hr}$. (Taking account of the acoustic character of the sound, this may be potentially greater than, the threshold of significant adverse impact as defined in BS 4142). It recognises, however, that even this is often not achievable without imposing unreasonable burdens on the mineral operator and suggests that where this is the case, noise levels from operations should be as near that level as possible and should not exceed $L_{Aeq,1hr}$ 55dB.

Paragraph 21 also states, *'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.'*

During the night-time period (22:00-07:00) it is advised that noise from operations should not exceed $L_{Aeq,1hr}$ 42dB (free field). No reference is made to any comparison with the background sound level for this period, suggesting that a BS 4142 style assessment is not considered to be an appropriate assessment methodology for the night-time period.



Paragraph 22 suggests that it may be appropriate to set higher noise limits for some particularly noisy but short term activities, identifying *'activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.'*

It states, *'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.'*

It further recommends that *'where work is likely to take longer than 8 weeks, a lower limit over a longer period should be considered, and that, 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.'*

The suggested noise limits for minerals extraction sites, as set out in the PPG Minerals guidance, are higher than those that would typically apply to other permanent industrial/commercial developments. This reflects the position of the NPPF by recognising the economic and social benefits being derived from minerals extraction and that the range of potential site locations is limited by the location of the natural resource.

The guidance does not specifically define what noise level would be considered to represent a SOAEL. What is clear, however, is that the SOAEL varies with duration of impact and that any assessment must consider both the level and duration when establishing thresholds.

For site preparation works during the day, guideline levels are typically L_{Aeq} 70dB, reducing to L_{Aeq} 60dB for the first and final hour or so of daytime activity. During the night-time period, a guideline noise level of L_{Aeq} 45dB is indicated.

For operation of temporary sources such as a drilling rig, daytime guideline levels are up to L_{A90} + 10dB (in reference to the background sound level), reducing to L_{A90} + 5dB during the evening period. At night, the guideline level is L_{Aeq} 42dB.

For operation of permanent plant installations, Paragraph 112 advises *'– whilst planning conditions may be imposed to prevent run-off of any liquid from the pad, and to control any impact on local amenity (such as noise), the actual operation of the site's equipment should not be of concern to mineral planning authorities as these are controlled by the Environment Agency and the Health and Safety Executive'*

BS 5228-1:2009+A1:2014 CODE OF PRACTICE FOR NOISE AND VIBRATION CONTROL ON CONSTRUCTION AND OPEN SITES – PART 1:NOISE

Construction site noise is assessed differently to noise from permanent installations as it is recognised that some degree of noise is an inevitable by-product of required works and that the construction works are a transient activity.

Annex E of BS 5228-1 provides guidance on assessing the significance of noise effects resulting from construction activities. It sets out two general methodologies for assessment. The first is based on absolute noise limits, which was principally developed for the determination of eligibility for noise



insulation. The second (ABC Method) is based on noise level change and is used to indicate a '*potential significant effect*'.

The ABC Method takes account of the existing baseline noise condition by defining three baseline categories (A, B, and C) for which different criteria apply. Noise from construction activities is then assessed against this criteria. Where a potential significant effect is indicated, further consideration of other factors (number of affected receptors, duration, acoustic character, etc.) should be taken into account to establish whether or not there is a significant effect.

GUIDELINES FOR COMMUNITY NOISE (GCN) – WORLD HEALTH ORGANISATION (WHO), 1999

New guidance from WHO titled Environmental Noise Guidelines for the European Region (ENG) was published in 2018. The document takes a very different approach to guidance set out in the previous Guidelines for Community Noise (GCN) document by identifying separate thresholds for specific sources rather than for community noise as a whole. Consequently, much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states that '*indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.*'

GCN gives guidance on suitable noise levels for sleeping and resting conditions in dwellings. It recommends internal noise levels of 30dB(A) at night for bedrooms, and 35dB(A) during the day for living-rooms. The guideline levels are based on annual average data.

To avoid sleep disturbance in bedrooms during the night-time period, it also recommends that noise levels from single sound events should not regularly exceed L_{Amax} 45dB. WHO defines 'regular' as not more than 10-15 events per night.

WHO also gives guidance on suitable noise levels for outdoor living areas such as gardens. The WHO guidelines state that '*to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB Laeq for a steady continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB Laeq.*'

The preface to GCN states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood.

NIGHT NOISE GUIDELINES FOR EUROPE, WHO, 2009

Night Noise Guidelines for Europe (NNG) was published in 2009 as an extension to Guidelines for Community Noise (WHO) 1999. It provides additional guidance in relation to the observed adverse effects of noise on sleep and proposes two external noise level criteria for the purposes of limiting these effects. The lowest noise criterion is based on the LOAEL. However, it recognises that achieving LOAEL will not be feasible in many circumstances and suggests that a higher Interim Target (IT) may be used instead as a guideline. However, the IT is not related to health based observations and should not, therefore, be interpreted as a threshold for SOAEL, which may be higher.

The document states that '*all Member States are encouraged to gradually reduce the proportion of the population exposed to levels over the IT within the context of meeting wider sustainable development*



objectives. While the guidelines provide useful information relating to the effects of noise on sleep, they have not been adopted into UK legislation, standards or guidance. The suggested guideline night-time noise levels presented should not therefore be applied as a standardised criteria for assessment but may be useful when interpreting the significance of the impact of noise within the wider context of the development. Based on empirical evidence, it suggests that the LOAEL is $L_{\text{night, outside}} 40\text{dB}$. Below this level there would be no observable adverse effects. Therefore, there would be little value in setting limits below this level.

BS 4142:2014 METHOD FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The scope of BS 4142 states that it is aimed at the assessment of sound from fixed installations and mobile plant that form an intrinsic part of the overall sound emanating from an industrial/commercial premises or process. It is not intended to be used for the assessment of temporary activities such as construction and demolition, which are outside the scope of the Standard.

The principle of BS 4142 is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an 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.'*

However, BS 4142 also advises that, in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises *'Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.'*

It also indicates that impacts estimated during *'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'*

Drilling, workover, and testing for 2 weeks are also all short term, temporary activities. The equipment used cannot be considered a fixed installation nor a mobile plant that forms an intrinsic part of the overall sound emanating from premises or processes at the site over the long term.

Therefore, it is not supported in guidance to use BS 4142 to assess these activities. Other more relevant Standards and guidance are available for this purpose and these are well established. In them, it is recognised that sound levels that might be considered to cause a potential significant adverse effect over the long-term period, may be acceptable over the short term. A balance must be made between potential temporary adverse effects over the short term with the economic and social benefits afforded to the wider community over the long term.



RELEVANT PERMITTING GUIDANCE FROM THE ENVIRONMENT AGENCY

The Environment Agency provides appropriate guidance in relation to noise in the form of:

- a) Noise and Vibration Management: Environmental Permits 31 January 2022 (32 pages)
- b) Noise impact assessments involving calculations or modelling 18 August 2022 (5 pages)
- c) Method Implementation Document (MID) for BS 4142 27 March 2023 (27 pages)

Within section 13.6 (Noise Monitoring) of Onshore Oil and Gas Sector Guidance, 23 January 2020, it advises : *Mining waste and installation permits include a noise management condition. You may need to produce and implement a noise management plan. As part of this plan, you may be asked to survey potential sources of noise including:*

- *pumps*
- *diesel generators*
- *pneumatic controllers*
- *flares, engines and vents*
- *gas leaks*



9. ASSESSMENT METHODOLOGY

The objective of any proposed noise mitigation is to achieve levels better (lower) than the SOAEL and approach the LOAEL, as far as is reasonably practicable, in line with NPSE and PPG guidance. The following sections set out the thresholds used in the assessment to determine the potential for significant adverse effects to arise and scope for mitigation as required to minimise these potential effects.

9.1 CONSTRUCTION NOISE

Construction activity occurs during phases 1 and 4 (Case A and B) as described in table 2. During phase 4 (Case B – site restoration) a workover rig will be used to plug the well; scheduled work that will be undertaken only during the daytime.

The assessment thresholds for construction noise are based on the values given in BS 5228-1:2009+A1:2014 Table E.1 (ABC Method) for the identification of potential significant effects. The table presented in the Standard is copied below in Table 3.

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (23.00–07.00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75
NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. NOTE 3 Applied to residential receptors only.			
^{A)} Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. ^{B)} Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. ^{C)} Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. ^{D)} 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

Table 3: Construction noise assessment thresholds (table copied from BS 5228-1)

Construction activities would be carried out during the daytime period only. This is proposed to be 07:00-17:30 Monday to Friday with 07:00-13:00 on Saturday. During mobilisation of equipment on site activity may continue during weekdays up to 19:00. This means that according to table 3 definitions there would be no weekend or evening construction activity and so thresholds only need to be considered for daytime and nighttime periods. Where existing daytime ambient noise levels are less than $L_{Aeq,T}$ 63dB, the Category A threshold would apply. Under these conditions the SOAEL would be $L_{Aeq,T}$ 65dB. Where existing ambient noise levels are higher, a higher threshold for SOAEL would apply. The Standard advises that Category B thresholds apply when ambient noise levels are above



$L_{Aeq,T}$ 63dB during the day and $L_{Aeq,T}$ 43dB at night. However, when this arises, there is an argument that for a robust assessment, a cautious approach is taken with the Category A values adopted anyway. The existing daytime ambient/residual levels in Table 7 are shown to be typically $L_{Aeq,T}$ 47 dB, so the Category A values apply.

BS 5228 does not provide any indication of what might be considered a LOAEL for construction noise. WHO GCN, however, states that community noise includes construction and suggests that where noise levels do not exceed L_{Aeq} 50dB in external amenity areas, moderate annoyance would be avoided. This is, therefore, considered to be a reasonable threshold for LOAEL during the daytime period. If there is any construction activity at night WHO GCN suggests the value of the LOAEL is $L_{night,outside}$ 40dB. It suggests at night-time, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB L_{Aeq} , so that people may sleep with bedroom windows open. This value may be considered the SOAEL at night.

Assessment period	LOAEL	SOAEL
	$L_{Aeq,1hr}$ (dB)	$L_{Aeq,1hr}$ (dB)
Daytime period (07:00-23:00)	50	65
Night-time period (23:00-07:00)	40	45

Table 4: Construction activity assessment (SOAEL and LOAEL) thresholds

9.2 NOISE FROM DRILLING AND TESTING

Drilling and testing are phases 2 and 3 of the development as described in table 2.

Drilling and testing are temporary activities but may have different durations. For this project the drilling phase is 6 weeks, of which 4 weeks would be operational drilling, and the testing phase is 4 weeks, of which 2 weeks would comprise actual flow testing, albeit that the flow testing duration is limited to 96hrs by the North Sea Transition Authority (NSTA).

The various recommended criteria in the described policies, guidance, and Standards, reveal a consistent view of what is considered to constitute a significant adverse effect in relation to noise from temporary activities such as those proposed at this site.

Drilling and some of the testing activities would be carried out on a 24hr/day basis. The night-time period will, therefore, be critical to the assessment of noise from these activities.

Although the proposed activities are short term and temporary and would, therefore, not be assessed under BS 4142, it may still be useful to consider some of the guidance provided within this Standard, as it does relate to noise from industrial sources, albeit aimed at permanent, long term installations. BS 4142 states that *'where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.'* The Standard, therefore, recognises the importance of consideration of absolute noise levels and points to other Standards and guidance such as BS 8233 and WHO guidance. This is particularly relevant to rural areas.

BS8233 suggests that within bedrooms *'for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in the table below'*.



Activity	Location	07:00-23:00	23:00-07:00
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hour}}$	30 dB $L_{Aeq,8\text{ hour}}$

The Standard also recognises that even with windows open, there will be a 10-12 dB difference typically between the outside and inside noise levels, and so external noise levels of 40-42 dB would meet the desirable internal noise limit at night.

Empirical evidence is also referenced by WHO NNG and indicates that the night-time LOAEL is L_{night} 40dB, for all sources. WHO suggests this level as a target designed to protect the public, including the most vulnerable groups such as children, chronically ill and elderly people. Below this level there would be no observable adverse effects and little benefit in carrying out an assessment under BS 4142.

Likewise, an absolute threshold for SOAEL may also be considered, below which there would be no significant adverse effects. For industrial sound, BS 4142 indicates a difference between the onset of adverse impact and significant adverse impact of 5dB (i.e. $SOAEL = LOAEL + 5dB$). The SOAEL for industrial sound at night could, therefore, be considered to be L_{night} 45dB. Also WHO CGN aligns with this by suggesting at night-time, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB L_{Aeq} , so that people may sleep with bedroom windows open. This value may be considered the SOAEL at night. Above this value, the significance of industrial sound may then be considered in context with the existing acoustic environment, as per the methodology in BS 4142.

The NPPF requires that planning policies and decisions should ensure that new development is designed so as to mitigate and reduce to a minimum any potential adverse impacts. In other words, the aim of mitigation is to avoid exceeding the SOAEL and to approach and ideally achieve LOAEL as far as is reasonably practicable, within design constraints.

Additionally, PPG-M guidance states that local authorities should establish a planning noise level limit for minerals extraction sites, and suggests a value of $L_{Aeq,1hr}$ 42dB at night. Noise levels from minerals extraction activities, as referred to in the PPG-M, would typically be variable. The suggested night-time limit of $L_{Aeq,1hr}$ 42dB would, therefore, be a maximum allowable limit for any given one-hour period during the night. Accounting for some variation in operational noise levels, this might be equivalent to a long term annual average value of L_{night} 40dB, suggested to be the LOAEL by WHO.

The PPG-M (Paragraph 21) also states that *'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.'* This reflects the position of the NPPF (Para. 223g), which states that *'planning policies should [...] when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction.'*

Table 5 summarises the assessment thresholds for drilling, completion and production testing both for the day and night-time periods. The daytime LOAEL and SOAEL is based on WHO GCN guidance for external amenity spaces. A cautious approach has been taken by setting the thresholds over one-hour periods, rather than the full day or night-time periods from which the values are derived.



Assessment period	LOAEL $L_{Aeq,1hr}$ (dB)	SOAEL $L_{Aeq,1hr}$ (dB)
Daytime period (07:00-23:00)	50	55
Night-time period (23:00-07:00)	40	45

Table 5: Drilling and testing assessment thresholds

9.3 VIBRATION FROM DRILLING AND OTHER MECHANICAL EQUIPMENT

The set back distances of NSRs is sufficiently large that vibration effects from mechanical equipment on site, to both buildings and sensed by people within buildings, will be highly unlikely to be noticeable at any stage during the proposed development.

However, an assessment of vibration from equipment was specifically requested during consultation with NYC, so it is included within this report.

Guidance on potential effects of vibration levels is provided in Annex B of BS 5228-2, with Tables B.1 and B.2 of the Standard providing, respectively, guide values for human response and cosmetic damage to buildings. The guidance is summarised in Table 6.

Effect on people/building	Vibration level Peak Particle Velocity (mm/s)
Vibration might be just perceptible in the most sensitive situations and at most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	0.14
Vibration might be just perceptible in residential environments.	0.3
It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	1.0
Vibration is likely to be intolerable for any more than a very brief exposure to this level.	10.0
Guide values to avoid cosmetic damage to buildings – Residential buildings.	15.0 at 4Hz increasing to 20.0 at 15Hz increasing to 50.0 at 40Hz and above
Guide values to avoid cosmetic damage to buildings – Industrial buildings.	50.0 at 4Hz and above

Table 6 : Effects of Vibration, taken from BS 5228-2

Note c) to Table B.1 of BS 5228-2 states that single, or infrequent occurrences at the levels indicated would not necessarily correspond to the stated effect, in every case.

In line with the above guidance, it is considered that assuming appropriate warnings are provided to residents, vibration levels of below 1.0 mms⁻¹ would be tolerated and therefore would have a negligible adverse impact. Some degree of adverse impact would occur when vibration (either continuous, or for frequent periods) exceeds Peak Particle Velocity (PPV) 1.0 mms⁻¹.

Whilst the Table does not provide guidance as to the potential different effects within the PPV range 1–10 mms⁻¹, the magnitude of adverse impact would likely increase from small (1-3mms⁻¹), to medium (3-7 mms⁻¹) to large (7-10 mms⁻¹).



At PPV levels above 10 mms-1, the more usual concern is potential building damage and commonly a PPV limit is set at this level to ensure the PPV 15 mms-1 threshold for cosmetic damage is adequately protected.

10. ENVIRONMENTAL NOISE BASELINE

10.1 REQUIREMENTS IN BS 4142

An initial indication of the noise impact of activity during a long-term activity can be established using the procedure outlined within BS 4142. Where Rating Levels and Background Sound Levels are low, the Standard accepts that absolute levels may be a more relevant indication of noise impact.

From experience of the likely noise levels from this type of development, and in this particular case, the very large set back distances of over 600m to the nearest residential receptor and then typically above 950m to any other sensitive receptors, the noise levels generated will be low. Furthermore, whilst road traffic noise may be a factor during the daytime and even the evening periods, it is clear that at night when road traffic levels in the countryside drop away markedly, the background noise levels will be very low. The relevance of BS 4142 for this particular site will be limited. Reference to other criteria will be important.

The survey has been carried out in accordance with both the requirements of BS 4142 and also taking note of the detailed guidance provided by the EA.

10.2 MEASUREMENT SURVEY METHODOLOGY

A noise measurement survey has been carried out at the site to establish the background (L_{A90}) and residual (L_{Aeq}) sound levels at the nearest noise sensitive receptors (NSR).

Because of the large set back distances to NSRs and the rural location likely resulting in very low baseline noise levels, especially at nighttime, it was considered at the outset that the noise impacts will be low at this site. Under these circumstances, whilst some baseline noise data is useful, a large dataset is unnecessary for the assessment as baseline noise levels are not likely to be critical in considering noise impact. A reasonable indication of baseline noise levels at this site is considered sufficient.

A mix of both unattended and attended measurements was therefore considered to be appropriate. An unattended noise logger was put in place for duration of the survey from 6th to 8th March 2025 and this was supplemented with attended measurements made at both the two noise measurement positions during the day and night periods. This allowed observations to be noted about the soundscapes at different times of day, and direct measurements of wind speed and direction to be made.

Attended measurements were made at NML 1 (representing NSR 1) and attended and unattended measurements were made at NML 2 (close to NSR 3 but also representative of NSR 2). These positions are shown in Figure 3 however the complete map in a larger scale is included in Appendix B.

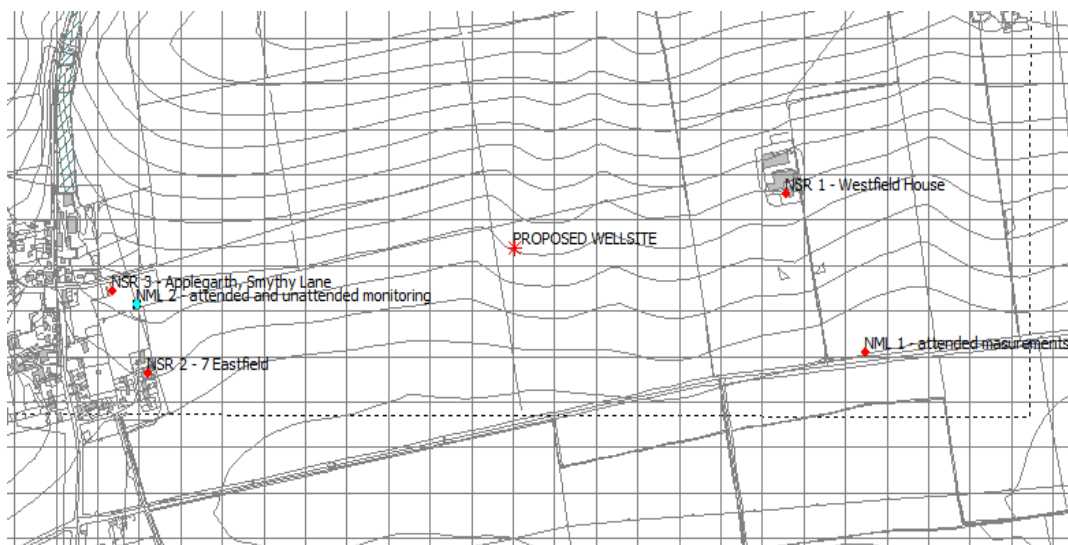


Figure 3: Noise sensitive receptors (NSR 1-3) and noise monitoring locations (NML 1 unattended; NML 2 attended and unattended).

Photos of the instrumentation at the receptors are included in Figures 4a and 4b.



Figure 4a: NML 1 – near NSR 1 Westfield House



Figure 4b: NML 2 – near NSR 3 Applegarth, Smythy Lane

NML1 was selected as being at the nearest practical location to NSR 1 Westfield Farm. This farm is a working farm with pigs and also dogs. Access is provided along a private drive. It was deemed that attended measurements at the house would disturb animals and representative baseline noise levels would not be established. The position selected whilst more affected by local road traffic, was deemed to provide a more accurate and representative value for background $L_{A90,7}$ noise.

NML 2 was selected as being able to provide representative baseline noise levels for a number of residential properties on the east side of the village of Foxholes. Short term attended measurements



were made here as well as continuous unattended measurements. The purpose of the attended measurements was to establish the instantaneous differences between each receptor and to calibrate attended measurements against the unattended continuous monitor values.

The following equipment was used in the course of the survey:

For unattended monitoring:

At NML 2 – near NSR 3 – Applegarth, Smythy Lane

- Bruel & Kjaer Type 2250 Light Sound Level Meter s/n 3006950
- Bruel & Kjaer Type 4952 Microphone s/n 2922638
- Weatherproof cases, carbon fibre microphone poles, all weather microphone protection.

For attended measurements

At NML 1 (near NSR 1 Westfield House) and NML 2 (near NSR 3 – Applegarth, Smythy Lane)

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3023840
- Bruel & Kjaer Type 4189 Microphone s/n 3130623
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3030524
- Eole JDC anemometer

Before and after the survey, the sound level meters were field-calibrated in accordance with the manufacturer's guidelines; the calibration values, along with the date of instrument external calibration, are included within Appendix B. Calibration certificates are available on request. However, the results show no significant drift duration the survey periods. The meters, microphones and field calibrators are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

10.3 MEASUREMENT RESULTS

Soundscape description

During the daytime, the predominant source of noise audible at the east side of the village was distant road traffic from the relatively busy B1249, particularly the 800m long section to the south of the village of Foxholes, which is straight and rises up to Highfield Farm at a hill crest. In the vicinity of Westfield House 1.7km east of the village, there was less noise from the B1249, but some contributions from road traffic along Butt Lane. Again, this road was straight, and noise from vehicles travelling along it, including from individual farm vehicles and fast travelling motorbikes, was audible for long periods of time, as vehicles approached and passed the drive to Westfield House. This is an extensive arable farming area, and there was noticeable farm machinery activity in nearby fields. This noise would, however, vary depending on season.

At night, whilst there were occasional vehicles on public roads, this didn't affect $L_{A90,T}$ background levels which were established as being very low, as expected.



Attended Noise Measurements

The full set of attended measurements are given within Appendix B Table 7 gives a summary of these results, ignoring invalid data obtained during a short period when rain was falling which resulted in a significant temporary increase from what were otherwise very low levels. The $L_{Aeq,T}$ values at NML 1 are substantially affected by local passing road traffic both during the day and night so these values are shown in parenthesis indicating that they are not representative of levels at the receptor NSR 1 – Westfield House.

Location	Log average residual sound levels $L_{Aeq,T}$ (day/night)	Mean background sound levels $L_{A90,T}$ (day/night)
NML 1 – near NSR 1 Westfield House	(67)/(44)	36/23
NML 2 – near NSR 3, Applegarth, Smythy Lane	47/34	40/22

Table 7: Post processed attended noise measurements at NML 1 and NML 2

The results of the attended measurements show the metric for background noise levels having moderate daytime values in the range $L_{A90,T}$ 36-40 dB with substantial contributions from steady road traffic noise. During the night the levels drop to very low values $L_{A90,T}$ 22-23 dB especially during periods of low wind velocity.

Residual/ambient daytime noise levels at NSRs are $L_{Aeq,T}$ 47 dB.

Unattended Continuous Noise Monitoring

Graphical representation of the unattended noise monitor output for the full 2 days of the survey is shown in Figure 5. The light green areas are daytime periods and the light blue shaded areas nighttime (23:00-07:00)

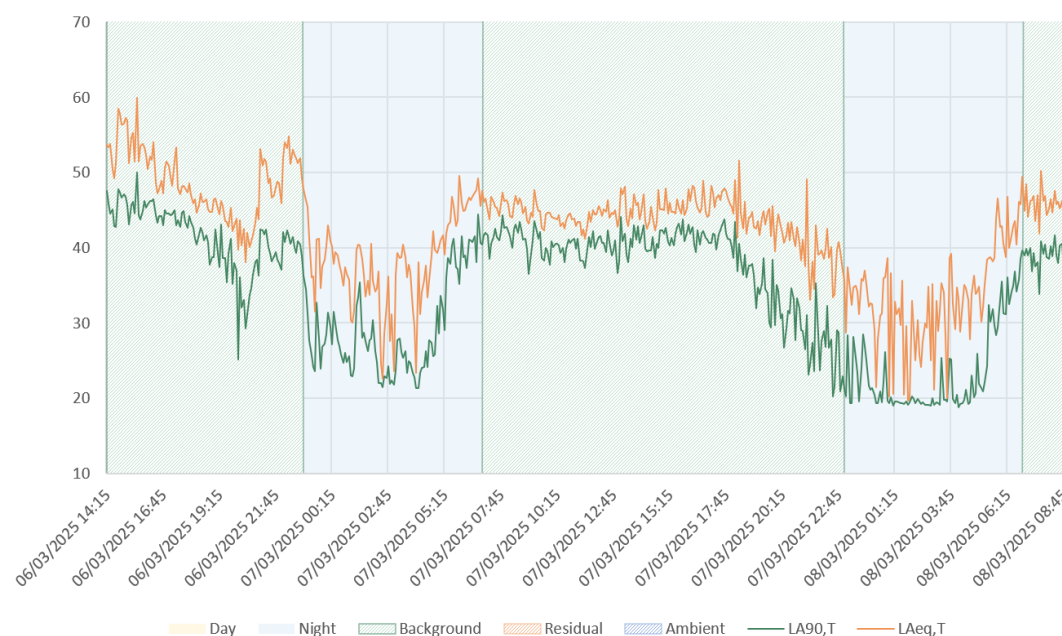


Figure 5: Baseline noise monitoring graphical output at NML 2 – near NSR 3 Applegarth, Smythy Lane



Post processing of this data is included within Appendix B, however, the summary results from the unattended monitor is compared with the summary results from attended measurements at the same position in Table 8.

Location	Log average residual sound levels $L_{Aeq,T}$ (day/night)	Mean background sound levels $L_{A90,T}$ (day/night)
Unattended measurements	48/32	39/23
Attended measurements	47/34	40/22
Difference Δ	1/2	1/1

Table 8: Comparison between unattended and attended measurements at NML 2 during the day and night (23:30-02:00 only).

The correlation between the attended measurements and the unattended measurements made at the same time is very good and therefore at NML 2, both instruments are measuring the same values for noise.

However, in considering what levels of background noise are 'representative' and should potentially be used in the assessment, particular consideration must be given to the most sensitive periods for sleep disturbance, namely, falling asleep and waking up in the morning. Waking up typically arises between 06:00-07:00 when traffic noise has increased markedly, and so levels used in any formal assessment must take into account noise during these periods of the night as well.

For the purposes of assessment and establishing the representative background sound level, the most relevant values must come from statistical processing of the full unattended monitor dataset covering the whole of the day and separately, the whole of the night periods. These are shown in Appendix B and summarised in Table 9.

Receptor	Background sound level, $L_{A90,T}$ (dB) (day/night)	Quality of data	Representative?
NML 1 – near NSR 1 Westfield House	36/23	Medium quality as sampled for part of the period. This did not include the end of the night when noise levels rise sharply with increasing road traffic	Not fully representative. Add 3 dB to allow for effects of higher traffic noise 06:00-07:00
NML 2 – near NSR 3, Applegarth, Smythy Lane	39/26	High quality as based on 2 full days and statistical post processed data for whole day and night periods.	Yes

Table 9: Post processed values of background sound levels $L_{A90,T}$ at NML 1 and NML 2



In practice, from Table 9, the representative background sound levels are considered to be the same at both NML 1 and NML 2, with $L_{A90,T}$ values during the day being 39 dB and during the night, 26 dB. These levels are consistent with the observations made during the survey. These values will therefore be used as a starting point in carrying out initial assessments in accordance with BS 4142. At night the baseline noise levels however are so low that the assessment falls outside the scope of BS 4142, and that absolute noise limits would be more likely to apply.

In considering the potential impacts at weekends, the main contributor to ambient noise is road traffic, and whilst there can be some reduction in the numbers of HGVs on roads at weekends, there is often no reduction in total traffic numbers at weekends over the course of the day and night. The transport assessment⁶ for this site provides some automatic traffic count (ATC) data for Butt Lane. This confirms that typically, total daily traffic flows at weekends are no less than during the week. Recent measurements, including a survey at a similar rural site in North Yorkshire⁷ show that where weekend levels are lower than those during the week, the difference is typically just 1-2dB, which is not significant.

10.4 TRANQUILLITY

Earlier in this report (Section 8) tranquillity was mentioned briefly in relation to PPG-N⁴. Paragraph 6 of this guidance explains further what is meant by tranquillity.

What factors are relevant if seeking to identify areas of tranquillity?

For an area to justify being protected for its tranquillity, it is likely to be relatively undisturbed by noise from human sources that undermine the intrinsic character of the area. It may, for example, provide a sense of peace and quiet or a positive soundscape where natural sounds such as birdsong or flowing water are more prominent than background noise, e.g. from transport.

Consideration may be given to how existing areas of tranquillity could be further enhanced through specific improvements in soundscape, landscape design (e.g. through the provision of green infrastructure) and/or access.

Care needs to be taken to establish a precise definition of tranquillity as it has meaning beyond consideration of noise alone. The PPG talks only of a 'sense of peace' and 'sense of quiet', it does not talk about low noise levels per se. The term 'sense of' is critical. It would be clear that a sense of peace can be achieved by a running mountain stream, or on a seashore, both places often having high ambient noise generated by natural non-anthropomorphic (man-made) sources. The PPG does indeed go on to link tranquillity also to a positive soundscape from natural sounds such as birdsong or flowing water. The key word used briefly as an example of a noise source which counters tranquillity is 'transport'. Transport noise, including road traffic, aircraft and trains, are considered in practice the main sources of noise that need to be absent for an area to be defined as tranquil.

⁶ Weaverthorpe Exploratory Wellsite, Transport Assessment, Transport Planning Associates, 2502-009/TA/01, April 2025

⁷ Cloughton-2 Appraisal Wellsite, Coastal Road, Burniston, Scarborough, YO13 0DB. Noise and Vibration Impact Assessment to support Planning and Environmental Permit Applications, ARC7281/24160/V3, 21.1.2025



A potentially useful reference is published by CPRE⁸ to assist in identifying areas of tranquillity. This is a tranquillity map of England and the section of this around the proposed site, extending from the North Sea coast into the North Yorkshire, is shown in Figure 6. The map is essentially a pattern reflecting a road map, with the most tranquil areas, of which there are a large areas, shown as a green, in practice just remote from roads. The area around the proposed site is identified as a blue circle on this figure and is a mixed area bounded by major east-west trunk roads however it is not shown as being one of the most tranquil areas.

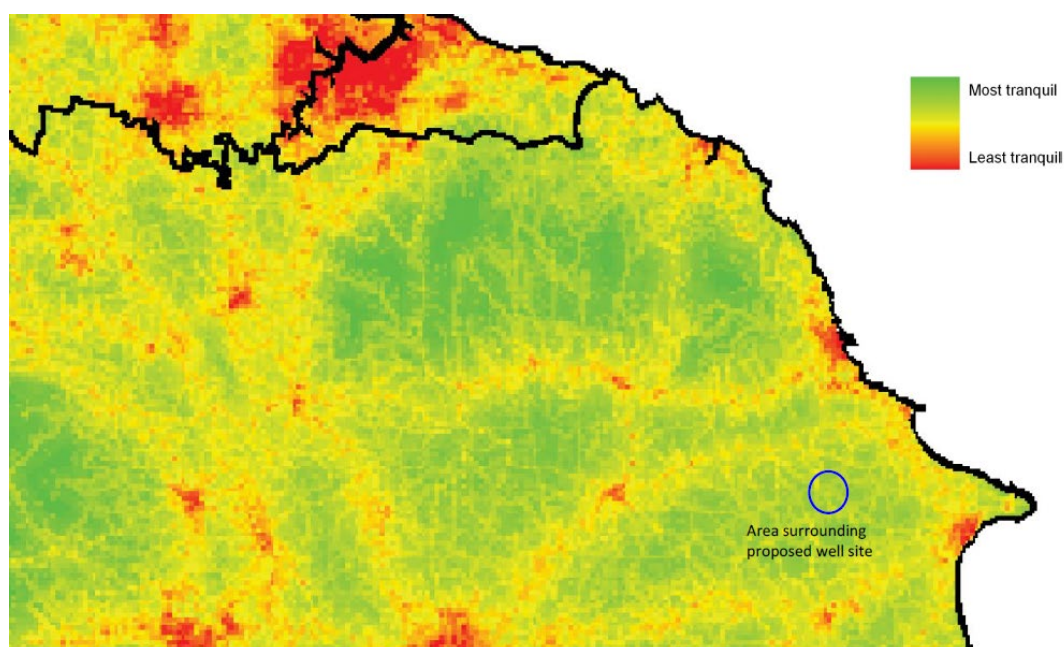


Figure 6: CPRE tranquillity map, 2007

It is important however to understand the limitations built into the CPRE map. The methodology used to define tranquil areas by the CPRE, in the particular context of road traffic, is simplified in that it considers traffic flows and set back distances from roads only. However it assumes flat terrain over the whole country, which is not a reasonable assumption at this site where there are hills. The observations made on site and detailed under the description of the soundscape in section 10.3, confirms that during the daytime and evening, road traffic noise carries substantial distances because of an 800m long straight section of the B1249 that is set on the side of a hill overlooking the whole area. Site observations, as might be expected, do provide more site specific information on tranquillity, than the CPRE map.

⁸ Campaign for the protection of rural England, tranquillity map, 2007



11. NOISE IMPACT ASSESSMENT

11.1 GENERAL AND NOISE MODELLING

The potential significant effects have been assessed during construction, drilling and testing.

All noise predictions have been carried out using the highest available quality of calculation package. The particular prediction software used for this analysis is DGMR INoise which was the package formerly known as Softnoise Predictor. This acoustic model implements the procedures set out in ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine noise levels" and is Quality Assured to all parts of ISO 17534:2015 "Acoustics – Software for the calculation of sound outdoors". The INoise model takes account of the following features in its calculation procedure:

- Source sound power level (for point, line and area sources)
- Reflection from nearby structures and source directivity
- Distance from noise source (geometric spreading)
- Atmospheric absorption
- Acoustic screening of intervening structures and topography
- Ground absorption
- Ground effects (which includes the height of ground relative to the noise source)

Full details of the equipment modelled including existing equipment and their respective sound power outputs are presented in Appendix C. This model input data also includes information in relation to where this information was obtained (for example, for construction activity, mainly BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*). Data for drilling rigs is cited as being directly measured, with full information provided on where these were made. For testing, measurements have been made on site on existing flow testing sources.

Noise has been assessed for each of the four phases at the nearest sensitive receptors to the site, namely NSR 1, 2 and 3, as shown in Figure 2. There are two noise results at each NSR. The first is at ground floor level and should be used for daytime noise assessment; the second is at first floor level and should be used for assessment at night.

In response to specific points raised by NYC in their pre-app advice relating to particular sources of noise to be considered, the following can be advised:

- a) Noise associated with the delivery and removal of materials is included within the models used for the assessment, and may be observed as a line source along the access track, for example on the noise contour map for daytime construction activity in Figure 7. Its effect can be seen to be small.
- b) Audibility of vehicle reversing sounders at NSRs will not arise if they are of the broad band rather than narrow band, type. It is proposed to require all relevant vehicles based on the site (including construction equipment but excluding visiting HGVs) to be fitted with broad band reversing sounders; this to be covered in a suitably worded planning condition
- c) In relation to the use of any start-up alarms the Operator has advised that this type of device is not normally used for this type of development.



- d) In relation to the audibility of communications equipment (i.e. a PA or Tannoy system) the Operator has advised: *'There will be no Tannoy systems on the rig. Radios are used for communication ordinarily; however, the rig horn is used only in the event of an emergency, with aerosol horns as back-up'*

11.2 CONSTRUCTION (PHASE 1)

This section assesses the potential noise impact of construction of the site.

The approach to be adopted in this is to consider a worst-case scenario covering the potential simultaneous activity of all equipment, during the construction phase.

The full noise simulation contour map for the construction phases is shown within Appendix D. The map is also shown in Figure 7.

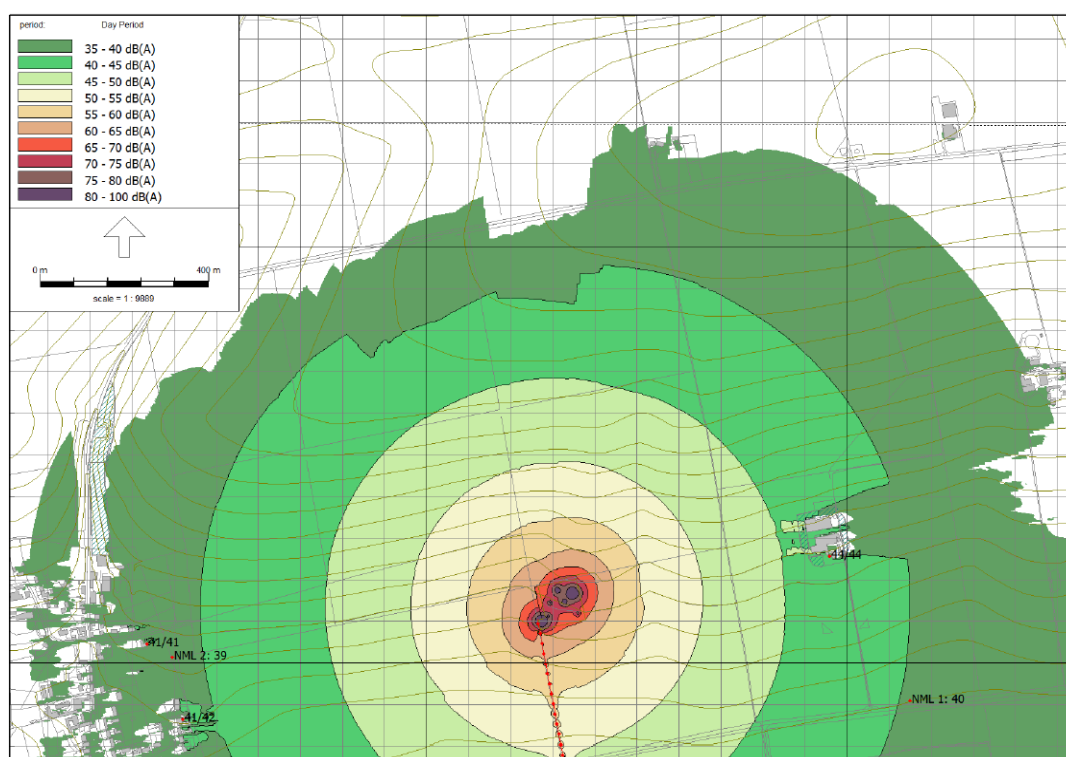


Figure 7: Predicted noise contours during daytime construction activity

Receptor	Noise level, $L_{Aeq,1hr}$ (dB)	Level of effect	Significant? (Yes/No)
NSR1 - Westfield House	44	$\leq$ LOAEL	No
NSR 2 - 7 Eastfield	41	$\leq$ LOAEL	No
NSR 3 - Applegarth, Smythy Lane	41	$\leq$ LOAEL	No

Table 10: Daytime predicted noise levels during construction phases



With the range of daytime noise predicted being $L_{Aeq,T}$ 41-44 dB depending on location, all values are below the LOAEL for daytime construction noise which is 50dB. With the threshold of significance being much higher still at 65dB, the levels provided avoid significant impacts by a very large margin.

There would be no construction activity in this phase during weekends (except Saturday morning), during the evening nor at night.

11.3 DRILLING (PHASE 2)

One single exploration well is proposed to be drilled. Drilling must continue once started for well integrity reasons so it will operate 24 hours/day until the target depth has been achieved.

It is proposed that one of a number of candidate drilling rigs will be used.

- Consortium Rig 4 (with recently installed noise mitigation upgrades)
- Marriott Drillemec HH-220
- Edeco Rig 407
- Marriott Rig 18

Appendix E includes full details of some of these candidate rigs along with the sources of the noise data for each. Sound power levels, LwA information in Appendix C, of these rigs are established as being LwA 105 dB +/- 3dB. Final rig selection will be made at a later date when timings and rig availabilities can be established.

During this period of activity, it will be the night period where the potential noise impact is greatest. The full noise prediction contour map is included in Appendix F, with Figure 8 showing the noise contours at night and Table 11 showing the levels at each NSR against the appropriate LOAEL criterion. The LOAEL for night drilling is $L_{Aeq,T}$ 40 dB and the SOAEL 45 dB.

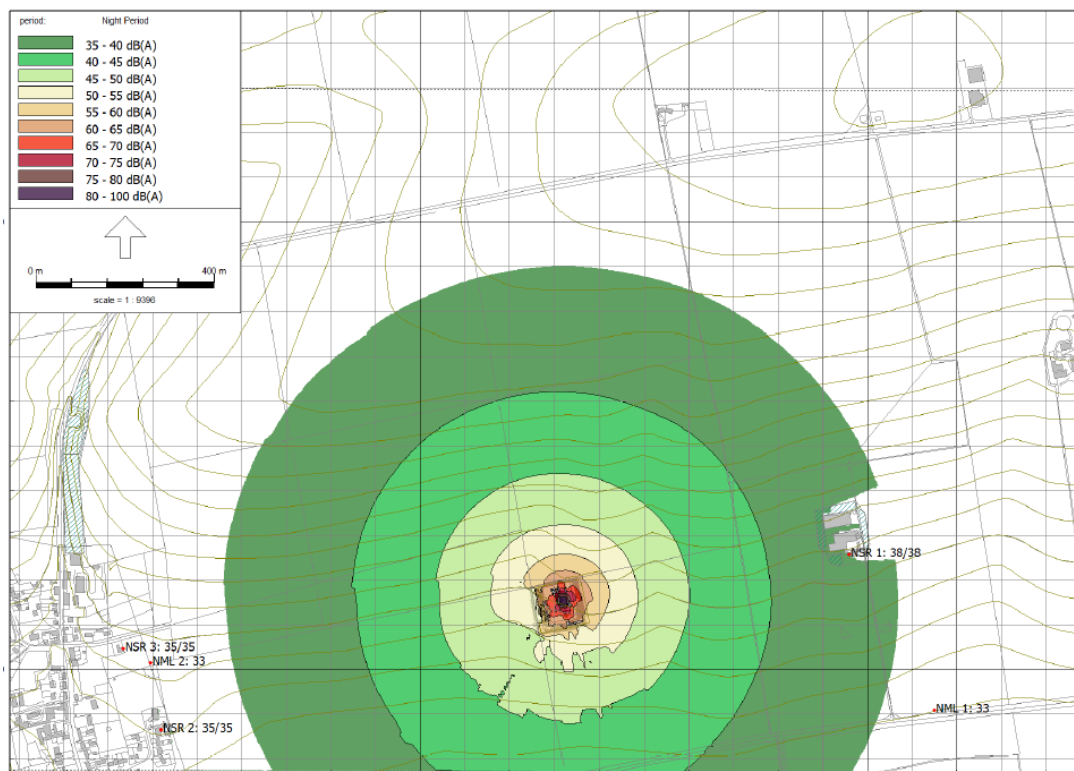


Figure 8: Predicted noise contours during night-time drilling

Receptor	Noise level, $L_{Aeq,1hr}$ (dB)	Level of effect	Significant? (Yes/No)
NSR1 - Westfield House	38	$\leq$ LOAEL	No
NSR 2 - 7 Eastfield	35	$\leq$ LOAEL	No
NSR 3 - Applegarth, Smythy Lane	35	$\leq$ LOAEL	No

Table 11: Night-time predicted noise levels during drilling phases

The results indicate that at all receptors, drilling noise levels would be below the LOAEL of $L_{Aeq,T}$ 40 dB and well below the SOAEL of $L_{Aeq,T}$ of 45 dB. Therefore, no adverse or significant adverse effects would arise at any of the residential receptors closest to the wellsite. With the activity continuing on a 24-hour basis, and thresholds being higher at periods other than the night, there would be no adverse or significant adverse impacts during the daytime, evenings or weekends either.

Additionally, drilling noise levels would be well below $L_{Aeq,1hr}$ 42dB, suggested as a potential night-time noise level limit by PPG-M, for minerals extraction operational activities over the long term. The noise impact resulting from the proposed shorter-term activities would be acceptably low.

11.4 FLOW TESTING (PHASE 3)

Flow test equipment would be moved to site and installed, comprising of flow manifold, separator, storage tanks, shrouded ground flare and associated welfare cabins and facilities. A coiled tubing unit and/or slickline unit may be required to facilitate well flow. Flow testing is planned over a short period



of around 2 weeks, with the actual flow testing period limited to the 96 hrs as defined and regulated by the NSTA.

Although testing will not progress at full flow for this period, the worst-case assumption has been used as there may be some testing overnight with a certain amount of equipment running and noise being generated. The equipment will generate low levels of noise and, being equipment designed to operate at night, will be fitted with appropriate noise mitigation to minimise radiated noise.

There are no plans to undertake well stimulation such as proppant squeeze, at this well.

Noise from a shrouded ground flare will depend upon flowrate. For the purpose of noise assessment an assumption will be made of a flow of typically 2.5mmscfd. In practice, lower flows will generate lower levels of noise. Noise data for this type of ground flare system has been measured and full data is shown in Appendix H.

Flow noise is also generated at pressure reduction points in the temporary gas processing system of vessels, pipes and valves.

The full results of the noise predictions during overnight testing are included in Appendix G, with Figure 9 showing the noise contours at night and Table 12 showing the levels at each NSR against the appropriate LOAEL criterion.

The LOAEL for testing is the same as for drilling at night which is $L_{Aeq,T} 40$ dB and the SOAEL is 45 dB.

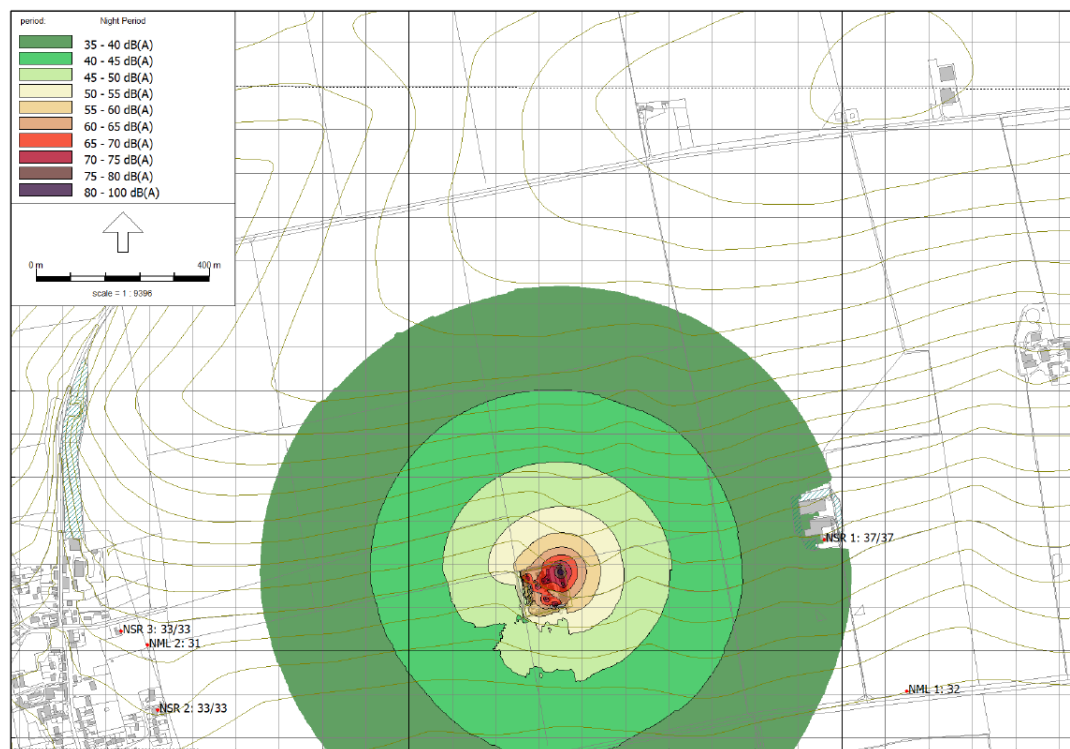


Figure 9: Predicted noise contours during night-time testing activity



Receptor	Noise level, $L_{Aeq,1hr}$ (dB)	Level of effect	Significant? (Yes/No)
NSR1 - Westfield House	37	$\leq$ LOAEL	No
NSR 2 - 7 Eastfield	33	$\leq$ LOAEL	No
NSR 3 - Applegarth, Smythy Lane	33	$\leq$ LOAEL	No

Table 12: Night-time predicted noise levels during testing.

The highest noise impact is predicted to arise at NSR 1 Westfield House and is just $L_{Aeq,T}$ 37 dB at night. This is well below the LOAEL of $L_{Aeq,T}$ 40 dB and the SOAEL of $L_{Aeq,T}$ 45 dB. The noise impact is considered to be low.

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

For planning purposes, strict compliance with national and local policy and relevant guidance has been used, along with the necessary reference to LOAEL and SOAEL thresholds.

It is not considered essential therefore to consider how a short period of well gas flow testing might be assessed in accordance with other Standards, such as BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. This Standard for example is strictly applicable to permanent installations (for example, production well sites), and an exploration well with short-term testing is not a permanent installation. However, it is recognised that testing activities do run for a period of time, and when this does happen, there is interest in what a BS 4142 assessment might conclude, particularly as this considers the level of noise compared with the existing background noise.

The Environment Agency have key responsibilities on noise in regulating well sites during all operational phases. Although this planning application is not for a production site, the Environment Agency is a key consultee at this stage and make it clear that they would normally assess operating noise using BS 4142:2014+A1:2019.

Empirical evidence referenced by WHO NNG indicates that the night-time LOAEL is L_{night} 40dB, for all sources. WHO suggests this level as a target designed to protect the public, including the most vulnerable groups such as children, chronically ill and elderly people. Below this level there would be no observable adverse effects and therefore it must be concluded that there is little benefit in carrying out an assessment under BS 4142.

Likewise, an absolute threshold for SOAEL may also be considered, below which there would be no significant adverse effects. For industrial sound, BS 4142 indicates a difference between the onset of adverse impact and significant adverse impact of 5dB (i.e. $SOAEL = LOAEL + 5dB$). The SOAEL for industrial sound at night could, therefore, be considered to be L_{night} 45dB.

However, for context and to provide further reassurance to stakeholders, including the EA, a formal assessment with conclusions is also carried out in accordance with BS 4142,

The principle of BS 4142⁹ is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source,

⁹ BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*



with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an 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.'*

However, BS 4142 also advises that *'when making assessments and arriving at decisions [...] it is essential to place the sound in context'* so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises *'Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.'* It also indicates that impacts estimated during *'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'*

Assessment of the predicted levels of noise during testing, in accordance with BS 4142 procedures is summarised in Table 13. Although the generated noise will be steady and unlikely to have noticeable character, a precautionary character correction of +3dB is included, but only where the specific sound level is above the background level. Where it is at a lower level than even this, no character correction need be applied as the noise is generally unlikely to be audible.

The background sound levels in this assessment are those established in the baseline noise survey (see section 10.3).

Noise Sensitive Receptor	Specific sound level, L_s (dB)	Rating level, $L_{A_r, Tr}$ (dB)	Background sound level L_{A90} (dB)	Difference or Rating minus Background levels (dB)	Initial Impact defined within BS 4142
Daytime					
NSR1	37	37	39	(-2)	Low
NSR2	33	33	39	(-6)	Low
NSR3	33	33	39	(-6)	Low
Night-time					
NSR1	37	40	26	+14	Potentially significantly adverse
NSR2	33	36	26	+10	Potentially adverse
NSR3	33	36	26	+10	Potentially adverse

Table 13: BS 4142 assessment of **initial** noise impact of testing (Phase 3) before considering context.

During the daytime periods, the initial indication of noise impact from this BS 4142 assessment is that it would be low.



In consideration of the effects of potential differences in background noise levels at weekends, these are typically between 1-2 dB lower⁶ during the weekends, and in the context of the BS4142 would be of no consequence. The potential impacts during the weekend of testing noise would be unchanged from weekdays.

Context

BS 4142 describes a methodology for assessing noise impact, however it states clearly this is only an 'initial indication' of noise impact. Other factors need also to be considered before a final assessment can be concluded. This is the consideration of context. The EA provide additional notes regarding context. They consider that *..... absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.* It also indicates that impacts estimated during *'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'* The highest Specific Sound Level, i.e. the value before any character correction, is just 37dB and this is 3 dB below the LOAEL as defined earlier in this section. So every indication is that at NSR 1 where the level at night for this period is just $L_{Aeq,T}$ 37 dB, the level of impact is not adverse but low. Internal noise levels within bedrooms at night, at just 25 dB, are well below the internal noise limit for steady characterless noise advised in BS 8233.

So in this case, because the levels of sound are low, consideration of absolute levels, as advised within BS 4142, are indeed a better method of assessment. The conclusion of consideration of absolute levels is that the noise impact is not significantly adverse, nor just adverse, but low, and the formal conclusion of a BS 4142 assessment, after consideration of context, is that the impact will be low.

The conclusion, that the noise impact is low when considered against the LOAEL threshold, and now also after considering BS 4142, confirms that it may be considered low in overall noise assessment terms.

This is also a short-term impact, limited to a flow test period of just 96 hrs, so the impact will be less still.

It may be noted that just one property (NSR 1- Westfield House) experiences the highest levels of predicted noise, those more numerous properties to the west of the site on the edge of Foxholes village, will all experience levels at least 4dB lower.

Taking note of the above, the assessment concludes that both during the day and the night periods, the final level of noise impact is more appropriately assessed through consideration of absolute noise levels, and these show the impact to be low.

That said, for the permit application, guidance given by the EA requires demonstrating suitable noise mitigation measures are put in place and this should be demonstrated in a BAT assessment, where individual contributions are established for each of the major equipment items and the approach to minimising noise from these, is explained. This is covered in section 12 of this report.

Uncertainty

A Noise and Vibration Impact Assessment, carried out in accordance with BS 4142, must consider and report the level of the effect that uncertainty in measurements and calculations has on the



assessment's overall conclusions. This will typically be expressed in qualitative rather than quantitative terms. The amount of effort put into minimising such uncertainties should be proportionate to the noise impact risk that the site presents,

With this project, uncertainty both in measurement data and also calculations, has been considered and minimised in the following way:

Reductions in uncertainty of measurement data

Measurements made have been post processed to ensure all data then used in the assessment has been obtained in appropriate weather conditions. That is in wind speeds (peak) less than 5m/s and other adverse weather conditions not significantly affecting data.

- All single measurements used to quantify particular noise sources have, where possible, been made in the acoustic far-field to avoid nearfield effects arising.
- Where measurements have been made at particular locations, distances have either been directly measured on site, or identified precisely from maps or site plans, rather than being estimated.
- The noise sources arising and the potential time variations of noise level have been specifically investigated and accounted for in planning the times and durations of measurements made, and to ensure particular events and operating conditions are measured and assessed.
- Consistency in sound field description is achieved through all measurements being made under free-field conditions, unless specifically expressed as façade measurements.
- The instrumentation used to measure sound levels on this project is all classified class 1 (Precision Grade) to IEC 61672-1:2002/ BS EN 61672-1:2003. This offers lower uncertainty in measurement than class 2 (survey grade) instrumentation.
- All instrumentation is fully calibrated, and independently verified by external auditors and global certification body, NQA, to ISO 90001:2015 as part of Spectrum's Quality System. Records are kept of dates of calibration. Results of field calibration tests are reported where drift over the duration of the survey is found to have exceeded 0.5dB at 1kHz.

Reductions in uncertainty of calculations and assessment

- Where sound level predictions are extrapolated out to sensitive receptors, this has been done using appropriate algorithms having uncertainty reflecting the degree of risk the site presents¹⁰.
- Substantial effort in the assessment has been put into minimising uncertainty, and this in spite of the predicted impacts of the development plant, equipment and facilities showing impacts, in most cases, comfortably within the low impact category.

¹⁰ For this critical site extrapolation calculations are undertaken using computer modelling adopting ISO 1996-2:2007 *Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*.



Assessor Competency

- The uncertainty in the assessment conclusions is also minimised as it has been carried out by a competent person as defined within BS 4142. This is someone who is a qualified acoustician and can demonstrate competency in environmental noise work. The assessment has been carried out by Andrew Corkill, Principal Consultant level with an MSc in Acoustics, Noise and Vibration from Imperial College and over 35 years of acoustic consultancy experience.

The measures taken to reduce uncertainty on this project will not change the outcome of the assessment. The noise impact at night will be 'low' during the testing activities.

Conclusion of assessment of testing Phase 3 – 24-hourly testing activity (night)

During the night, there are very low background noise levels of 26 dB, which is well below the 30-35 dB range of values below which BS 4142 should not be used. So, no conclusion regarding the difference in levels between predicted and background noise levels can be drawn for this site. BS 4142 itself advises that alternative criteria should apply in such cases. This means it is necessary to reference the LOAEL thresholds as indicated at Table 13 of 40 dBA at nighttime. Furthermore, with open windows to NSR properties, levels inside NSR 1 bedrooms would be 12 dB lower than external values i.e. $37 - 12 = 25$ dB. This is well below the value of 30 dB mentioned in BS 8233 and in section 9.2 of this report, relating to reasonable noise levels within bedrooms, for sleeping. The noise during testing at night is assumed steady and continuous and is unlikely to have any significant noticeable character to it.

11.5 SITE RESTORATION (PHASE 4 CASE B)

Should gas be discovered (Case A) the site will be suspended, and a limited amount of work will be undertaken to the site with equipment similar to that in the construction phase (Phase 1) and similar or lower noise levels generated.

In the event of insufficient or no gas being discovered (Case B) the well will be plugged and the site restored, again using similar equipment to that used during construction (Phase 1). However, plugging the well will involve the use of a workover rig during this period.

Figure 10, Appendix G and Table 14 show the noise contours and noise level values just from the operation of the workover rig, at each noise sensitive receptor during well plugging activities .

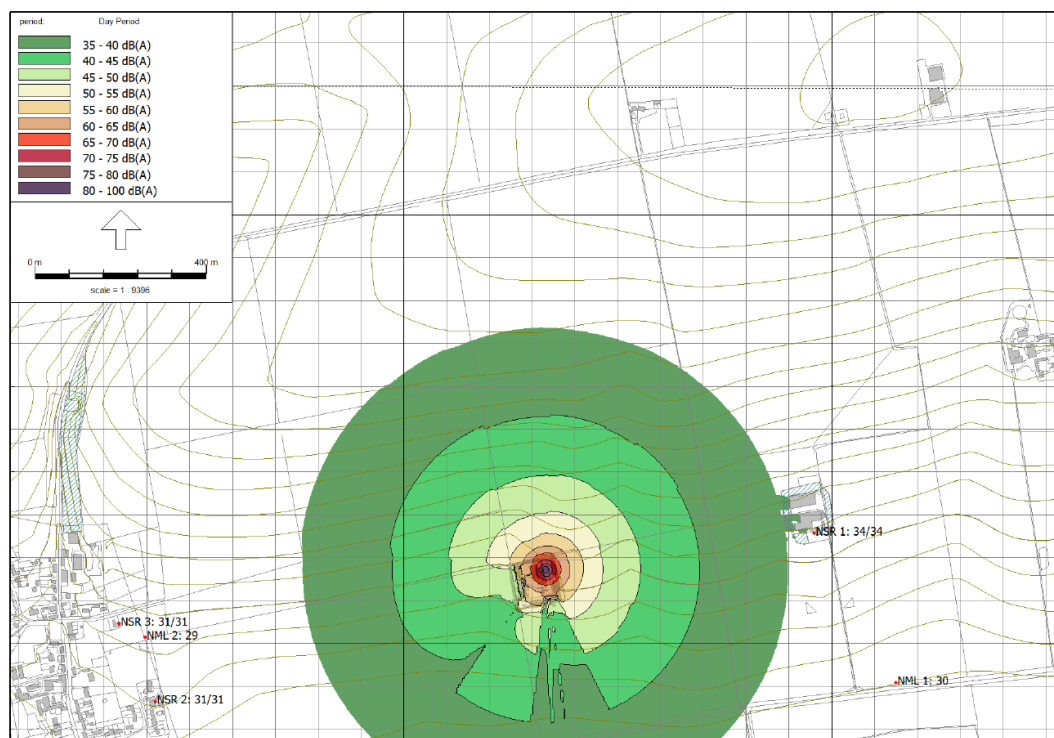


Figure 10: Predicted noise contours from the workover rig during site restoration activity (daytime).

During this time there will be some other construction equipment operating, notably relating to earth moving, however the amount of construction activity during use of the workover rig, will be dependent upon the detailed design. For the purpose of assessment, a worst-case assumption of the same intensity of construction equipment as used in phase 1, will be assumed during site restoration..

The assessment of noise during this phase will take as the total noise level, the noise from the workover rig as shown in Figure 10, added to that during the construction phase (Phase 1). These total values are shown in Table 14. It should be noted that at the nearest NSRs the contribution from the workover rig is 10 dB less than that from the total of other construction equipment that might be active during site restoration, and so that the workover rig will not result in any numerical increase in those levels that arose during the Construction phase (Phase 1).

During the day the LOAEL is $L_{Aeq,T} 50\text{dB}$ and the SOAEL is $L_{Aeq,T} 55\text{dB}$

Receptor	Noise level, $L_{Aeq,1hr}$ (dB)	Level of effect	Significant? (Yes/No)
NSR1 - Westfield House	44	$\leq$ LOAEL	No
NSR 2 - 7 Eastfield	41	$\leq$ LOAEL	No
NSR 3 - Applegarth, Smythy Lane	41	$\leq$ LOAEL	No

Table 14: Daytime total predicted noise levels from construction equipment during site restoration phase (Phase 4 – Case B) at 1.5m height



The noise impact range is $L_{Aeq,T}$ 41-44dB during the site restoration phase, depending upon position, the highest levels being predicted at NSR 1 Westfield House. However, at this position the level of 44dB is 6dB below the LOAEL and 11 dB below the SOAEL. Therefore, the predicted noise impact is judged to be low.

11.6 VIBRATION FROM DRILLING AND OTHER MECHANICAL EQUIPMENT

The level of ground-borne vibration arising from drilling and mechanised construction works at a receptor position is difficult to predict, as there are a number of factors that may influence the production and transmission of vibration in the ground, including:

- Local ground (or soil) conditions at the site;
- The distance between source and receiver;
- The ground geology between source and receptor (the transmission path); and
- Local ground conditions at the receptor position

Whilst BS 5228-2 (Annex E) provides empirical formulae to allow the prediction of resultant PPV values from mechanised construction works, the parameter range for input distance only extends to 110 m, which would tie in with the expectation that prediction of vibration to larger distances would have limited accuracy.

Annex D and E of BS 5228-2 provides historic case data on vibration levels produced by various equipment including in its Table 6, rotary piling which is a similar activity to rotary drilling.

As would be expected, the majority of the presented data relates to vibration produced at short distances, with the highest furthest distances where measurements were made being 30m. Here values of up to 1 mms⁻¹ were recorded. Table E1 of the Standard shows the fall off of vibration with distance, and between 30m and 350m (a much shorter distance than the 650m distance to the nearest NSR) the attenuation is large such that residual vibration would typically be no greater than 0.01 mms⁻¹.

The predicted level of vibration at the nearest NSR from mechanical equipment including a drilling rig on site would be no greater than 0.01mms⁻¹. This is well below the threshold of human perception of 0.14mms⁻¹ shown in table 6. There would therefore be no vibration effects.



12. BAT ASSESSMENT

12.1 GENERAL

The EA requires a BAT Assessment of noise control or 'appropriate measures justification' to be carried out as part of a permit application.

The EA guidance¹¹ sets out what information is required as part of a BAT assessment. The conclusion must be a justification that the applicant will be using BAT to prevent or minimise polluting noise emissions. The key elements in justifying noise mitigation measures stated in the guidance are:

- Concentrate on the dominant noise sources (and where necessary consider the influence of individual sub-components within a system)
- Detail all existing noise attenuation measures (enclosures, silencers, location of kit, operating time restrictions and maintenance regimes)
- For dominant noise sources, consider all noise reduction techniques and come to a reasoned determination of what is achievable.
- Where upgrades are identified – state the predicted impact of the works and commit to time completion timescales
- Develop a noise management plan (if there will be a noise impact beyond the site boundary)

In relation to noise (other impacts may be different), the EA have previously confirmed that noise during construction activities and drilling need not be considered. The phase of the development that is of particular interest to them is Testing (Phase 3).

This BAT assessment will therefore cover only the testing phase

The EA does require noise impact to be reduced even when levels are low, however will take the level into account when considering whether additional noise mitigation measures are required. With the level of impact being 5dB below the LOAEL stated in Table 12, or the threshold of an adverse impact, the margin is considered large enough for additional noise mitigation not to be required. Nevertheless, there is significant noise mitigation by design incorporated within the proposals and measures recommended for this project, in achieving these levels.

12.2 INDIVIDUAL SOURCE CONTRIBUTIONS

The underlying principle of BAT is firstly to identify individual sources of noise (equipment) and quantify their contribution to the overall noise arriving at NSRs. During phase 3 Testing, the noise model shows the following contributions at the most critical receptor, NSR 1 – Westfield House

¹¹ Noise and vibration management: environmental permits, Environment Agency, updated 31 January 2022



Rank ordered noise sources	Individual contribution ($L_{Aeq,T}$ at NSR 1 – Westfield House, dB)
Total from whole site	36.8
Shrouded ground flare	35.2
Lighting tower	23.3
Lighting tower	23.2
Lighting tower	23.0
Lighting tower	22.7
Lighting tower	22.4
Diesel generator	21.8
Air compressor	21.6
Diesel generator	21.5
Process flow at separator	13.7
Process flow at separator	13.6
Other sources	Not significant

Table 15: Noise sources and contributions during Phase 3 testing (24hr/day)

There are a number of sources contributing to the total noise, however over 50% of the acoustic energy generated is from the shrouded ground flare system.

12.3 CONTRIBUTORY SOURCE NOISE MITIGATION

Having, identified and quantified individual noise sources, it is then necessary to demonstrate that where any of these has the potential to contribute to an adverse, or significant adverse noise effect, information is provided to show that the noise from this individual item of equipment has been suitably mitigated through engineering or other means.

In this instance, the predicted levels are so low that they don't have the potential to contribute to an adverse effect.

Nevertheless, the noise mitigation strategy for equipment sources listed in table 15 are discussed in decreasing order of magnitude:

12.3.1 Shrouded ground flare

The shrouded ground flare is a source of noise which is not readily silenced. The main component of noise is associated with combustion, although there are much lower levels of noise from gas flow within pipes. There will not be significant flow restrictions within the gas lines which would otherwise be a potential source of noise. Figure 11 shows a typical shrouded ground flare of a type that may be used at this site. Full details are included within Appendix H, including noise data.

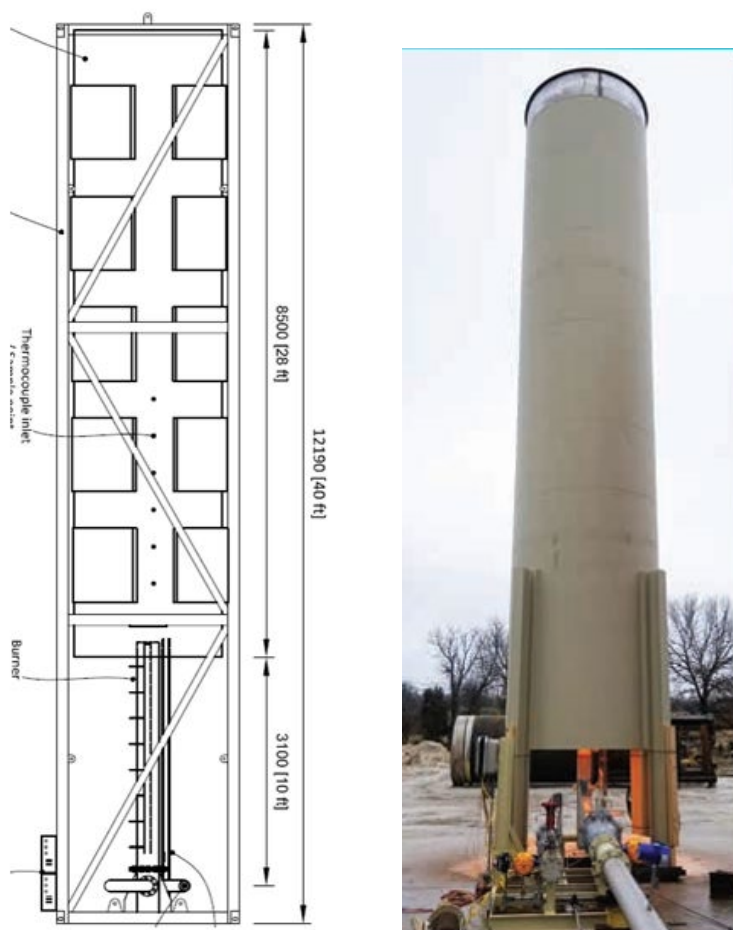


Figure 11: Examples of shrouded ground flares that may be used during testing

The flare is simple but versatile being capable of handling a wide range of unexpected flows consistent with an exploration project. Ignition is guaranteed and sustained through the use of additional fuel (propane) and air at the combustion point. It is not practical to silence the outlet or inlet points to the shrouding, as this will restrict and interfere with the free natural flow of air to support combustion. Any interference with natural airflow risks the possibility of the flare flame becoming extinguished, and uncombusted gases, significantly worse in their greenhouse effects than CO₂, escaping to atmosphere, and would present a significant safety risk.

12.3.2 Lighting towers

The arrangement of the site is likely to require the use of individual self-contained lighting towers, powered by small engines. These are commonly used on construction sites where there is limited access to a stable reliable electrical power supply. Noise data is taken for these items of equipment from BS 5228-1 being information typically used in noise assessment studies.

Figure 12 shows a typical lighting tower arrangements, and it can be seen that the small engine is fitted with a silencer (typically residential grade) in the exhaust and fully enclosed within a close fitting acoustic canopy. Typical sound pressure levels at 1m are 80 dBA. Also shown is a solar panelled



battery powered system that generally produces less light, but is quieter, and would be advantageous. This should be considered if possible.



Figure 12: Example generator powered lighting tower (Towerlight VB9) and potential Alternative solar powered tower (Trime X-Solar 8.5m LED Lighting Tower)

Depending upon the detailed design arrangement, it may be possible to incorporate a different configuration of lighting. This could be a central generator supplying a number of units on the site (cabled), although cabling brings other safety challenges compared with a self-contained unit.

12.3.3 Air compressor/nitrogen generation

Compressed air and Nitrogen are required during the testing and this is often best generated on site avoiding external regular HGV deliveries of bottled gases. Nitrogen is present within atmospheric air and the most common method of generation is to combine a packaged air compression system, fitted within an acoustic enclosure, together with a benign membrane filter system, which itself does not generate noise. These units can be supplied separately or incorporated into one unit. In either case, the presence of an air compressor as a standard package systems will mean a unit having a silenced atmospheric air inlet system, and an acoustic enclosure structure to contain noise. Cooling air for the system will be provided through silenced ventilation apertures. Figure 13 shows an example nitrogen generation unit.



Figure 13: Typical NiGen N2 generator (air compressor and membrane system).



These units are provided fully silenced and have a high degree of noise attenuation. Typical sound pressure levels at 1m are in the range 70-75 dBA

12.3.4 Diesel generator

The arrangements for providing electrical power during the testing phase are not fully detailed at this stage, however provision is allowed for a significant temporary diesel generation to provide some electrical power to the site.

If a diesel generator is to be used during this phase, these are available as standard acoustically packaged units. A high performance system will have splitter type cooling air inlets and outlet silencers, a residential grade engine exhaust silencer and substantial steel acoustic panel wall and roof panels to the enclosure. A typical example is included in Figure 14. This unit generates a sound pressure level at 7m of 65 dBA



Figure 14: Typical acoustically enclosed diesel generator 100kVA (F G Wilson)

12.3.5 Process flow generated pipe noise

Noise associated with flow of gases within pipes and also the separation of liquids from gas is difficult to predict as this is affected significantly by the detailed design of the gas processing systems and of course the particular mix of gases and liquids within the particular field. The geological studies carried out conclude that gas is the likely hydrocarbon in this prospect and so substantial amount of separation may not be required, however some separation will be undertaken and as a precaution, reference will be made to recent measurements of process flow noise associated with gas/liquid separation made at another Egdon Resources UK Ltd site. These measurements were carried out by Spectrum at the Wressle Wellsite at North Lincolnshire and were cited within a planning and permit application NVIA for that project¹².

¹² Wressle-2 Oilfield Development Project Noise Impact Assessment to support Planning and Environmental Permit (Variation) Applications. ARC7235/23150/V3. 23.02.2024



Figure 15: Typical process separation equipment (courtesy of Egdon Resources UK Ltd)

13. EA ENVIRONMENTAL PERMIT NOISE REQUIREMENTS

Whilst it would be consistent with normal planning policy for a Noise Management Plan (NMP) to be submitted for approval by the MPA, a separate NMP may not be required automatically in the case of an Environmental Permit. The wording used to control noise in environmental permits by the EA historically has been standard, and considered appropriate for this development:

From experience, the EA Permit may reference noise through the following requirements:

Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

and/or

The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;



(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

By way of clarification, noise levels likely to cause pollution outside the site would reasonably be assumed to be levels in excess of SOAEL values referenced within this NVIA. Levels below this would not normally be considered pollution.

The NMP as drafted is deemed sufficient to satisfy EA requirements. The predicted noise level are in all cases below LOAEL thresholds.

14. DRAFT NOISE MANAGEMENT PLAN

A draft Noise Management Plan including noise monitoring when required, is included within appendix K. If approved by the MPA, it would be implemented in order to protect the amenity of residents. However, it should be noted that there are large set back distances to sensitive receptors at this site, the impacts to residents would not therefore be expected to be so great as to be of concern to residents. The NMP therefore represents a protocol that is set out to cover, and be responsive to, potential noise issues that might arise from the development.

The plan proposed is in draft form only, and is subject to agreement of the MPA prior to activity commencing on site. If the MPA require changes to the NMP, this can be incorporated into a revised plan after the granting of planning permission. This may be covered by a suitably worded planning condition should the MPA require it, however even without a noise condition, approval will be sought for the NMP submitted with MPA required changes incorporated into an MPA approved final NMP.

15. PLANNING CONDITIONS

Paragraph 21 of PPG-M advises that mineral planning authorities (MPA) should aim to establish a noise limit for normal mineral operations, to be set as a planning condition. Normal operations are considered to be those which would be typical operational activities that persist over the long term.

While some phases within this application do not fall under this category, it would be reasonable to advise noise limits, to be set by the MPA as a Planning Condition.

As a general principle, the noise limits that might be considered by the MPA will be either the levels predicted within this study (+ 3dB design tolerance), or the LOAEL being the threshold for the onset of adverse effects, whichever is the higher. In all cases the proposed limit is well below the SOAEL which is the onset of a significant effect. Potential proposed limits are shown in Table 16.



Phase	SOAEL ($L_{Aeq,T}$)	LOAEL ($L_{Aeq,T}$)	Predicted in this study + 3dB ($L_{Aeq,T}$)	Proposed in planning condition limit ($L_{Aeq,T}$)
1: Construction (daytime)	65	50	44 + 3 = 47	50
2: Drilling (daytime)	55	50	38 + 3 = 41	50
2: Drilling (night-time)	45	40	38 + 3 = 41	41
3: Testing (Daytime)	55	50	37 + 3 = 40	50
3: Testing (Night-time)	45	40	37 + 3 = 40	40
Case A: Site suspension (daytime)	55	50	44 + 3 = 47	50
Case B: Site restoration	55	50	44 + 3 = 47	50

Table 16: Development of potential proposed noise limits ($L_{Aeq,T}$) at the nearest NSR

The proposed wording for noise conditions is often subject to detailed discussions with the MPA. Draft noise conditions for a similar project⁷ have been developed with NYC, and it is considered that whilst this project is for a shorter period being a single exploration well, rather than a longer appraisal well, broadly similar noise conditions may be suitable at this site. The noise conditions put forward for this project are developed using the same method as shown in Table 16:

1. All recommendations outlined in the Noise and Vibration Impact Assessment ARC7300/25034/V4 shall be implemented before each phase and shall be thereafter maintained until end of operations, unless otherwise agreed in writing by the MPA.

REASON: In the interests of residential amenity and in accordance with the local plan.

2. Within one month of the date of the permission being granted, a Noise Management Plan (NMP) shall be submitted to the Mineral Planning Authority (MPA) for review and approval. The Noise Management Plan NMP shall detail the procedures to be adopted to minimise noise and also the process to be followed in the event of a noise complaint being received or a request being made by the MPA for suitable noise monitoring and actions to be undertaken within 48 hours of notification. The NMP shall be complied with at all times.

REASON: In the interests of residential amenity and in accordance with the local plan.

3. Noise limits

The equivalent continuous sound level (L_{Aeq}) at the nearest noise sensitive properties to the site and attributable to the operations subject of this permission, shall not exceed the following values during daytime (07:00-19:00), evening period (19:00-22:00) and nighttime (22:00-07:00) weekdays, Saturdays and where applicable Sundays including bank Holidays.

- Phase 1 and 4 – Construction and site restoration: daytime L_{Aeq} 1hr 50 dB, evening L_{Aeq} 1hr 40dB and nighttime L_{Aeq} 15mins 40dB. Saturday work finish time of 13:00hrs. No work Sundays or bank holidays. No work between 19:00hrs and 07:00hrs on any other day.



- Phase 2 -Drilling: daytime LAeq 1hr 50dB, evening LAeq 1hr 40dB and nighttime LAeq 15 mins 40dB. These values apply on any day of the week during this specific phase only.
- Phase 3- Testing: daytime LAeq 1hr 50dB, evening LAeq 1hr 40dB and nighttime LAeq 15mins 40dB. These values apply on any day of the week during this specific phase only.

REASON: In the interests of residential amenity and in accordance with the local plan.

4. Within one month of commencement of each phase, a verification report detailing the actual noise produced at the commencement of each phase shall be submitted to the MPA. The verification report shall include results of onsite/attended monitoring for a representative monitoring period for each phase covering each of the noise limits detailed in Condition 3 above.

REASON: In the interests of residential amenity and in accordance with the local plan.

5. Vibration from construction work on site and during operation shall not exceed 0.3mm/s (PPV) at any residential property at any time.

REASON: In the interests of residential amenity and in accordance with the local plan.

6. All audible reversing sounders fitted to site base vehicles (not including visiting HGVs) shall be of the broad-band, not narrow-band, type.

REASON: In the interests of residential amenity and in accordance with the local plan.

An outline NMP is included as Appendix K to this report, for NYC to consider.

16. CONCLUSIONS

A Noise and Vibration Impact Assessment (NVIA) has been carried out for the drilling of a proposed exploration well and a short 2-week programme of flow testing, along with initial site construction and either site restoration or suspension. The location is the proposed Weaverthorpe-1 wellsite to the east of the village of Foxholes, near Driffield, YO25 3HY.

This NVIA report addresses the requirements of both NYC and the EA as regards supporting the planning application and the application for an Environmental Permit.

A request for pre-application advice was submitted on 20th August 2024 (NY/2024/0021/PRE). NYC advice in respect of noise and vibration, along with other matters, was issued on 15th October 2024.

In addition, following a site visit of 18 October 2024, NYC provided additional specific requests of what was required to be included within the NVIA.



The most relevant development management policy against which to assess the proposed development's effect upon noise is Policy D02 (Local amenity and cumulative impacts) in the NYC Minerals and Waste Joint Plan 2022 which requires the applicant to:

.....demonstrate that there will be no unacceptable impacts on the amenity of local communities and residents, local businesses and users of the public rights of way network and public open space (subsequent list includes noise)'.

Proposals will be expected as a first priority to prevent adverse impacts through avoidance, with the use of robust mitigation measures where avoidance is not practicable.

In addition, Policy M17 in the Minerals and Waste Joint Plan 2022 (Other spatial and locational criteria applying to hydrocarbon development) has been satisfied. This is specific to hydrocarbon development and requires a high quality and robust assessment of noise requiring substantial details to be included.

Ryedale Local Plan Strategy (2013) policies SP13 and SP20 have also been satisfied.

With the nearest NSR, Westfield House, being located in an adjoining MPA area, Policies EM2: Exploration Boreholes, DM1: Impacts of Mineral Development and DM2: Protecting Residential Amenity and Other Uses, all from the East Riding of Yorkshire and Kingston upon Hull joint minerals local plan 2016-2033 (adopted November 2019) have also been fully satisfied as has Policy ENV6: Managing Environmental Hazards from the East Riding Local plan update 2025-2039 (adopted April 2025)

It has been a design objective of the proposed development to avoid significant adverse impacts above the SOAEL (deemed to be those that are unacceptable) and endeavour to avoid if possible, or minimise if not, those impacts which once mitigated remain marginally adverse above the LOAEL, in accordance with local and national policy.

The set back distances between the proposed exploration well site are particularly large with the nearest sensitive receptor at 635m and the next nearest in excess of 940m.

The predicted noise from all phases of the development have been considered and assessed.

A worst-case prediction scenario with downwind noise propagation conditions has been assumed throughout.

The conclusion of the assessments is that for all phases of the proposed development, and at all the identified NSRs, the noise and vibration impacts will be below the LOAEL threshold and will therefore be low.

A BAT assessment on noise has been carried out as part of the requirements of the EA, for the short 2-week flow testing phase.

Matters raised by NYC relating to vibration impact from drilling and other mechanical equipment and also consideration of protecting tranquil environments have also been discussed within this report. Vibration impacts are predicted to be substantially below the threshold of perception.

The nearest NSRs in the area surrounding the proposed development site, experience significant levels of road traffic noise during the daytime from the rising 800m long section of the B1249,



immediately to the south of Foxholes village. It is considered that the area cannot therefore be categorized as being valued for tranquillity.

Whilst the potential for noise impact to ecological receptors was raised, this is a matter that applies, in the case of terrestrial ecology, primarily to bird species and then only at nationally designated areas. The nearest designated area is Fordon Chalk Grasslands SSSI 3 km northeast of the site. The noise impact from the development to this location at 10 dBA is very low.

Draft planning conditions are proposed within this NVIA for consideration by NYC's Environmental Health Services.

It is considered that the noise mitigation, combined with suitable planning conditions that are put forward in this NVIA are appropriate and proportionate and will adequately protect the amenity of neighbouring residential properties. This therefore accords with *Policy D02: Local amenity and cumulative impacts* and *Policy M17: Other spatial and locational criteria applying to hydrocarbon development*, in the North Yorkshire Council Mineral Waste Joint Plan 2022 and Policies SP13 and SP20 in the Ryedale Local Plan Strategy (2013).

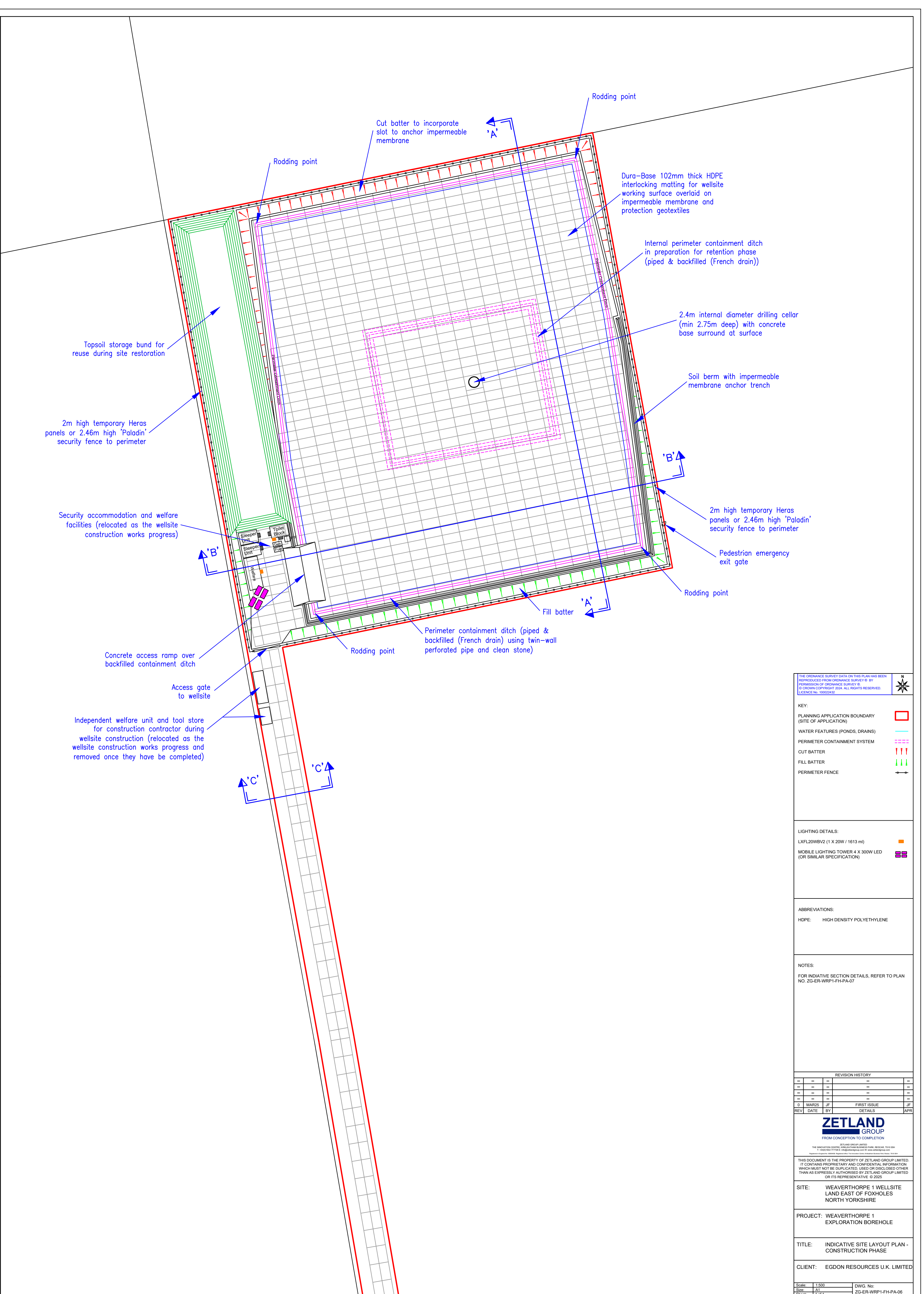
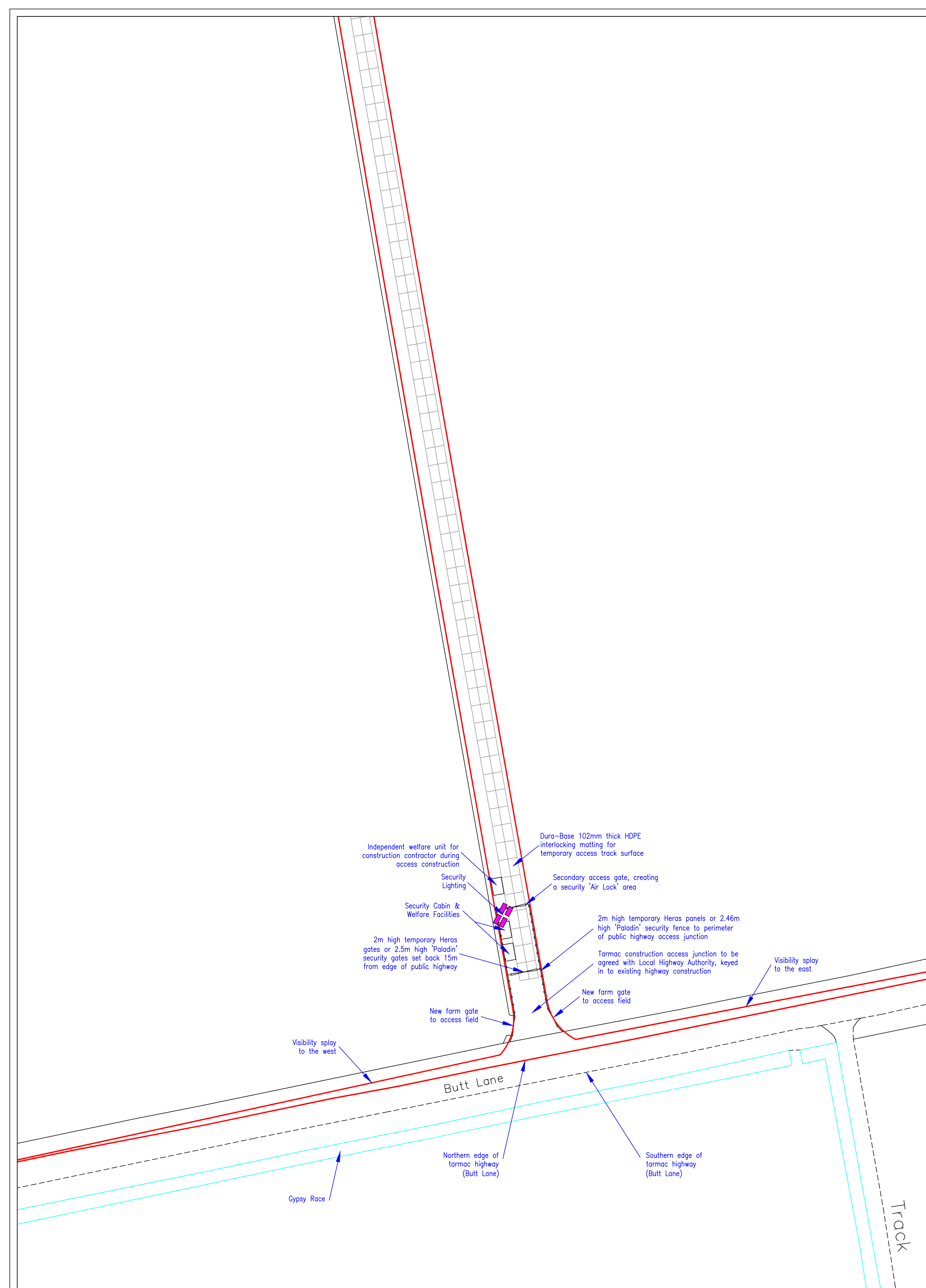
With the nearest NSR being in the adjoining MPA area, the conclusions of this NVIA also satisfy Policies EM2: Exploration Boreholes, DM1: Impacts of Mineral Development and DM2: Protecting Residential Amenity and Other Uses, all from the East Riding of Yorkshire and Kingston upon Hull joint minerals local plan 2016-2033 (adopted November 2019). The conclusions also fully satisfy has Policy ENV6: Managing Environmental Hazards from the East Riding Local plan update 2025-2039 (adopted April 2025).

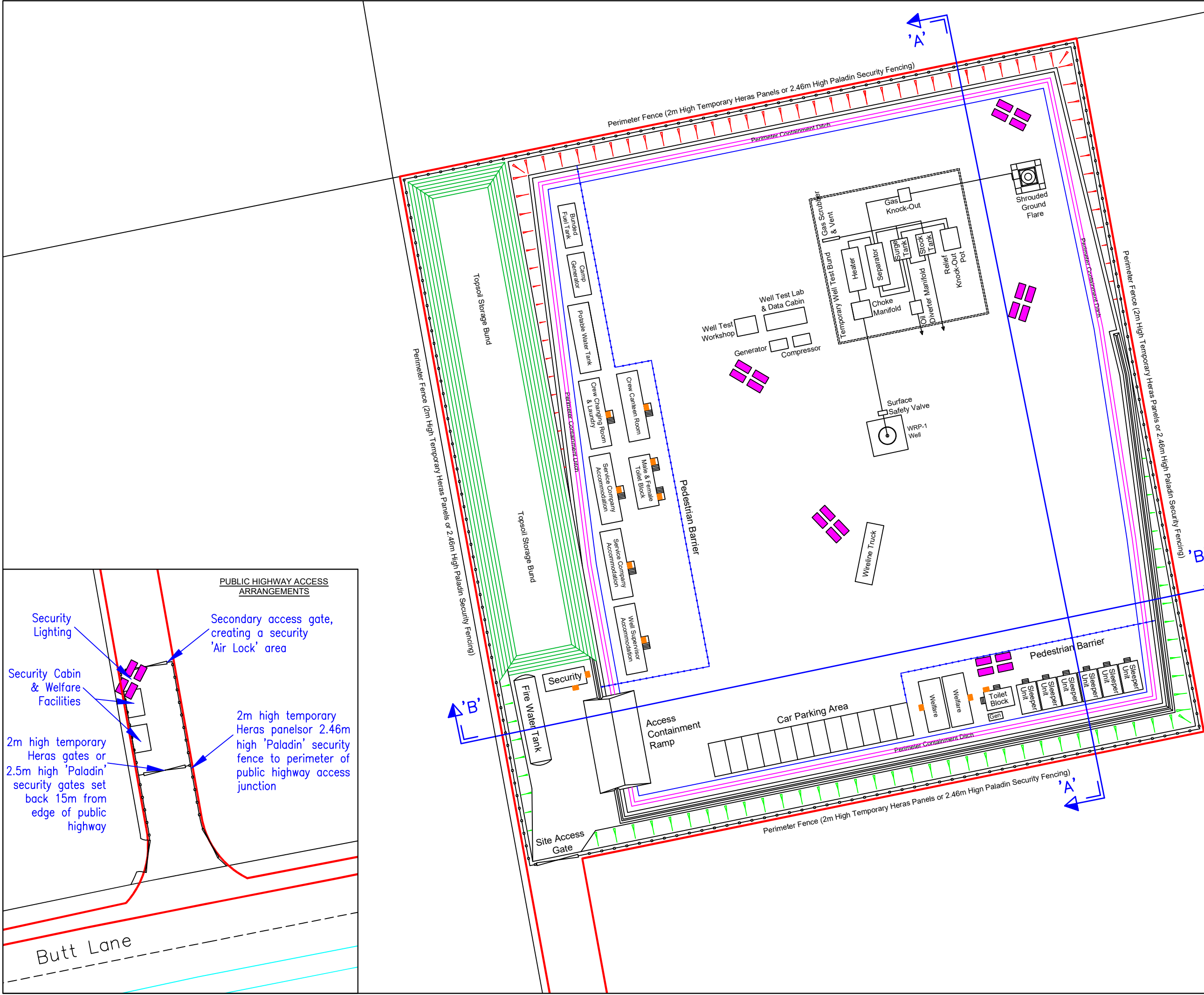
Similarly, whilst the EA has no reason to require an NMP as the predicted noise levels are well below the levels of a significant adverse impact, it is hoped that the proposed outline Noise Management Plan, included in Appendix K, provides the EA with some reassurance that the necessary controls will be in place should they be needed.



A P P E N D I X A

Site layouts of development phases





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N

KEY:

PLANNING APPLICATION BOUNDARY (SITE OF APPLICATION)	
WATER FEATURES (PONDS, DRAINS)	
PERIMETER CONTAINMENT SYSTEM	
CUT BATTER	
FILL BATTER	
PERIMETER FENCE	
PEDESTRIAN BARRIER	

LIGHTING DETAILS:

LXFL20WBV2 (1 X 20W / 1613 ml)

MOBILE LIGHTING TOWER 4 X 300W LED (OR SIMILAR SPECIFICATION)

ABBREVIATIONS:

GEN:	GENERATOR
HDPE:	HIGH DENSITY POLYETHYLENE
WRP-1:	WEAVERTHORPE 1 WELL

NOTES:

FOR INDIATIVE SECTION DETAILS, REFER TO PLAN NO. ZG-ER-WRP1-FH-PA-11.

FOR EASE OF VIEWING THE EQUIPMENT LAYOUT THE 102mm DURA-BASE HDPE MATTING AND INTERNAL PERIMETER DRAINAGE DITCH HAS BEEN REMOVED FROM THIS PLAN. REFER TO PLAN NO. ZG-ER-WRP1-FH-PA-06 FOR THE WELLSITE CONSTRUCTION DETAILS.

REVISION HISTORY					
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0	MAR25	JF	FIRST ISSUE		JF
REV	DATE	BY	DETAILS		APR

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ZETLAND GROUP LIMITED
THE INNOVATION CENTRE, KIRKLEATHAM BUSINESS PARK, REDCAR, TS10 1SH
T: +44(0)1642 777726 E: info@zetlandgroup.com W: www.zetlandgroup.com
Registered in England No. 08404046. Registered office: The Innovation Centre, Kirkleatham Business Park, Redcar, TS10 1SH

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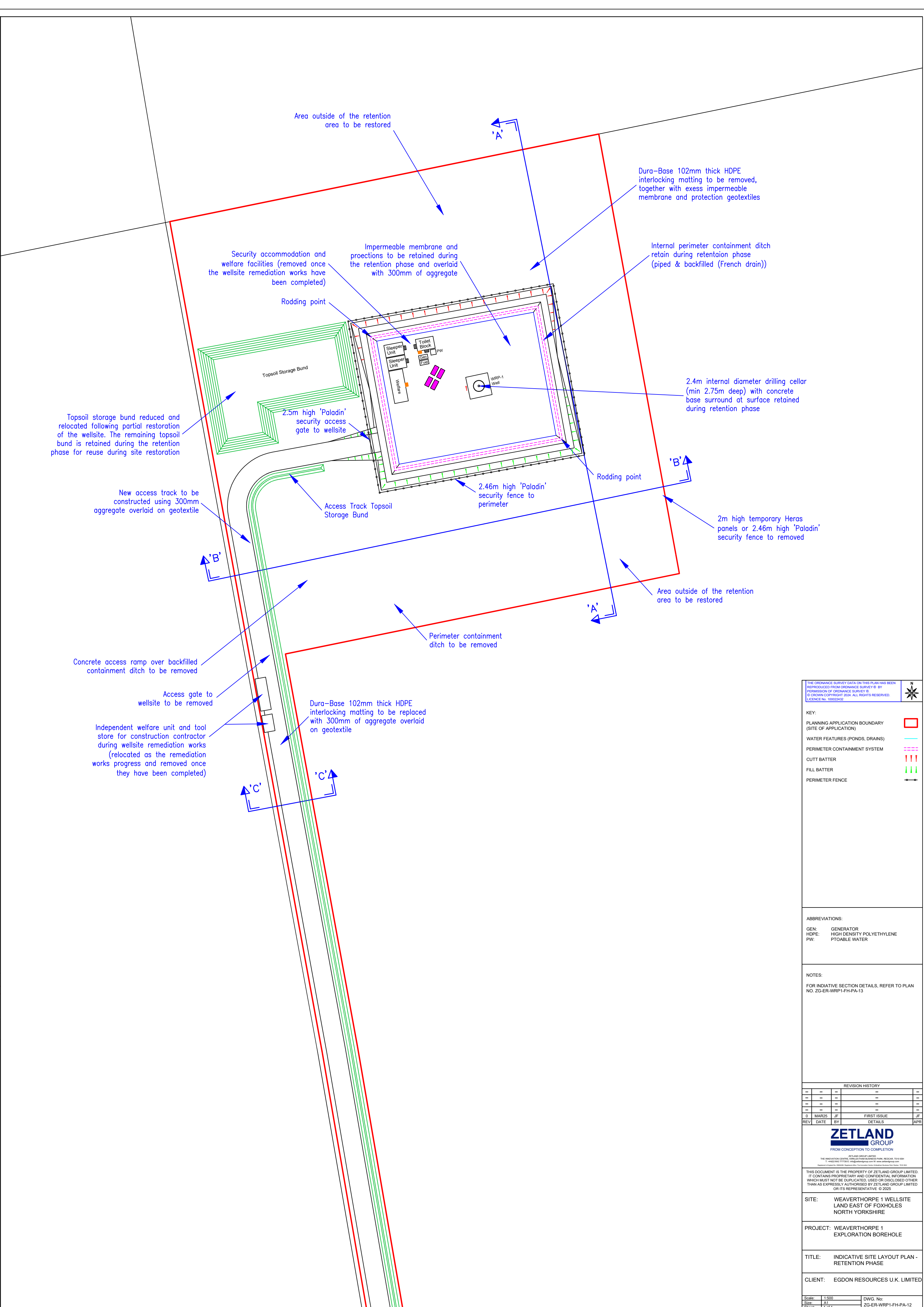
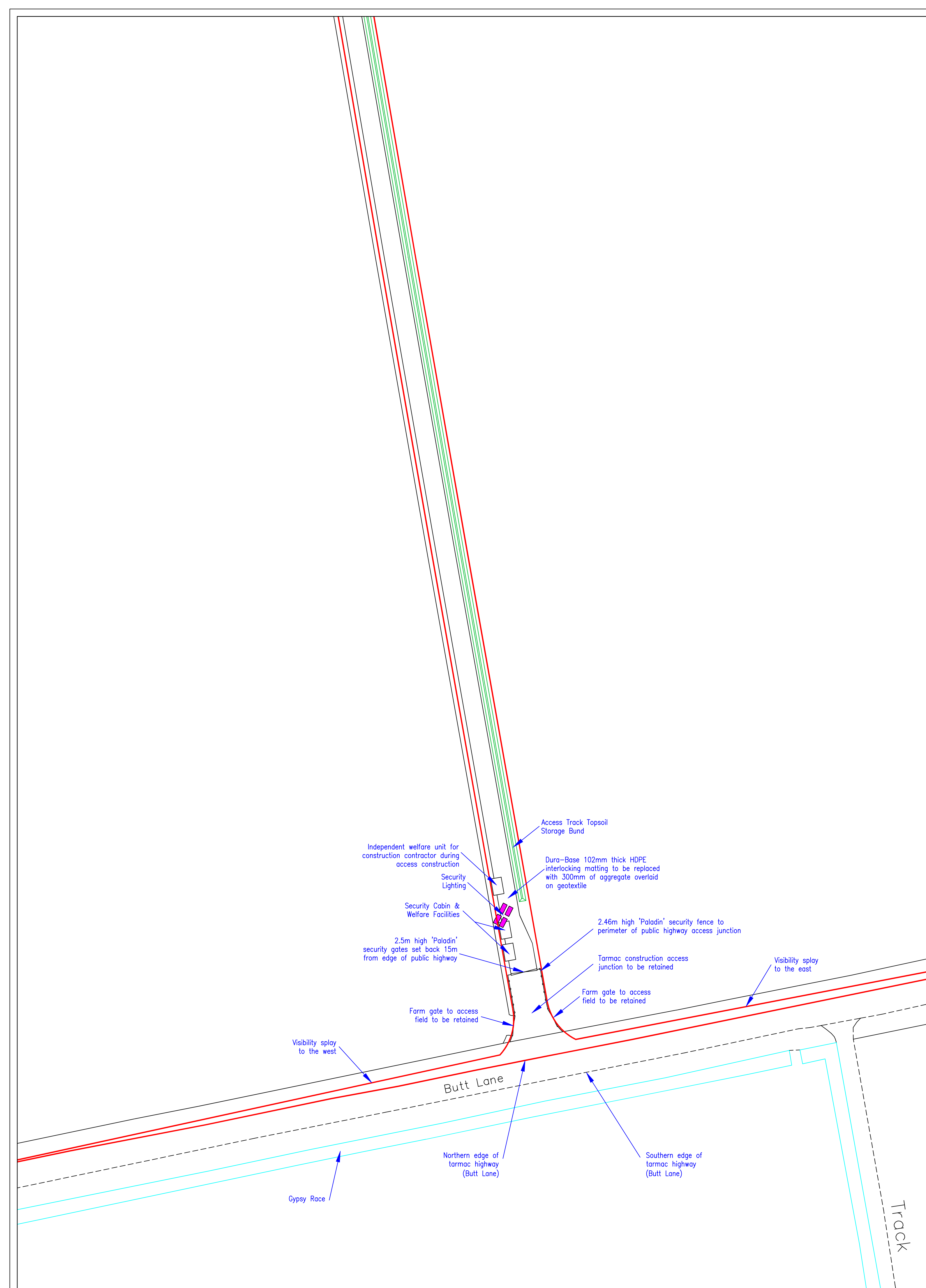
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LAND EAST OF FOXHOLES
NORTH YORKSHIRE

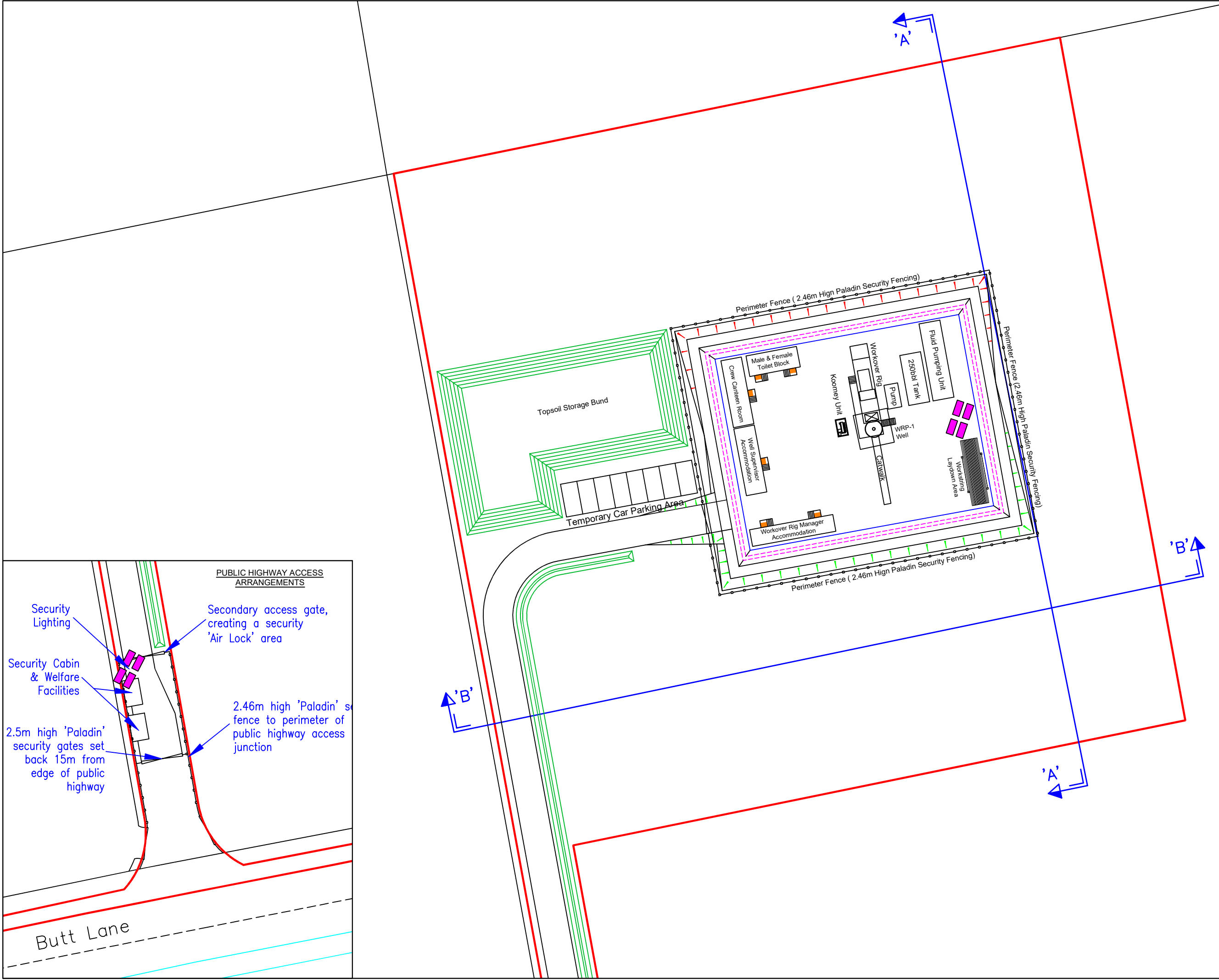
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EXPLORATION BOREHOLE

TITLE: INDICATIVE SITE LAYOUT PLAN -
WELL TESTING PHASE

CLIENT: EGDON RESOURCES U.K. LIMITED

Scale:	1:500	DWG. No:
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KEY:

PLANNING APPLICATION BOUNDARY (SITE OF APPLICATION)	
WATER FEATURES (PONDS, DRAINS)	
PERIMETER CONTAINMENT SYSTEM	
CUTT BATTER	
FILL BATTER	
PERIMETER FENCE	

LIGHTING DETAILS:

LXFL20WBV2 (1 X 20W / 1613 ml)	
MOBILE LIGHTING TOWER 4 X 300W LED (OR SIMILAR SPECIFICATION)	

ABBREVIATIONS:

bbl:	BARREL (159 LITRES)
KOOMEY:	ACCUMULATOR

NOTES:

FOR INDIATIVE SECTION DETAILS, REFER TO PLAN NO. ZG-ER-WRP1-FH-PA-15

REVISION HISTORY				
REV	DATE	BY	DETAILS	APR
0	MAR25	JF	FIRST ISSUE	JF

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ZETLAND GROUP LIMITED
THE INNOVATION CENTRE, KIRKLEATHAM BUSINESS PARK, REDCAR, TS10 1SH
T: +44(0)1642 777726 E: info@zetlandgroup.com W: www.zetlandgroup.com
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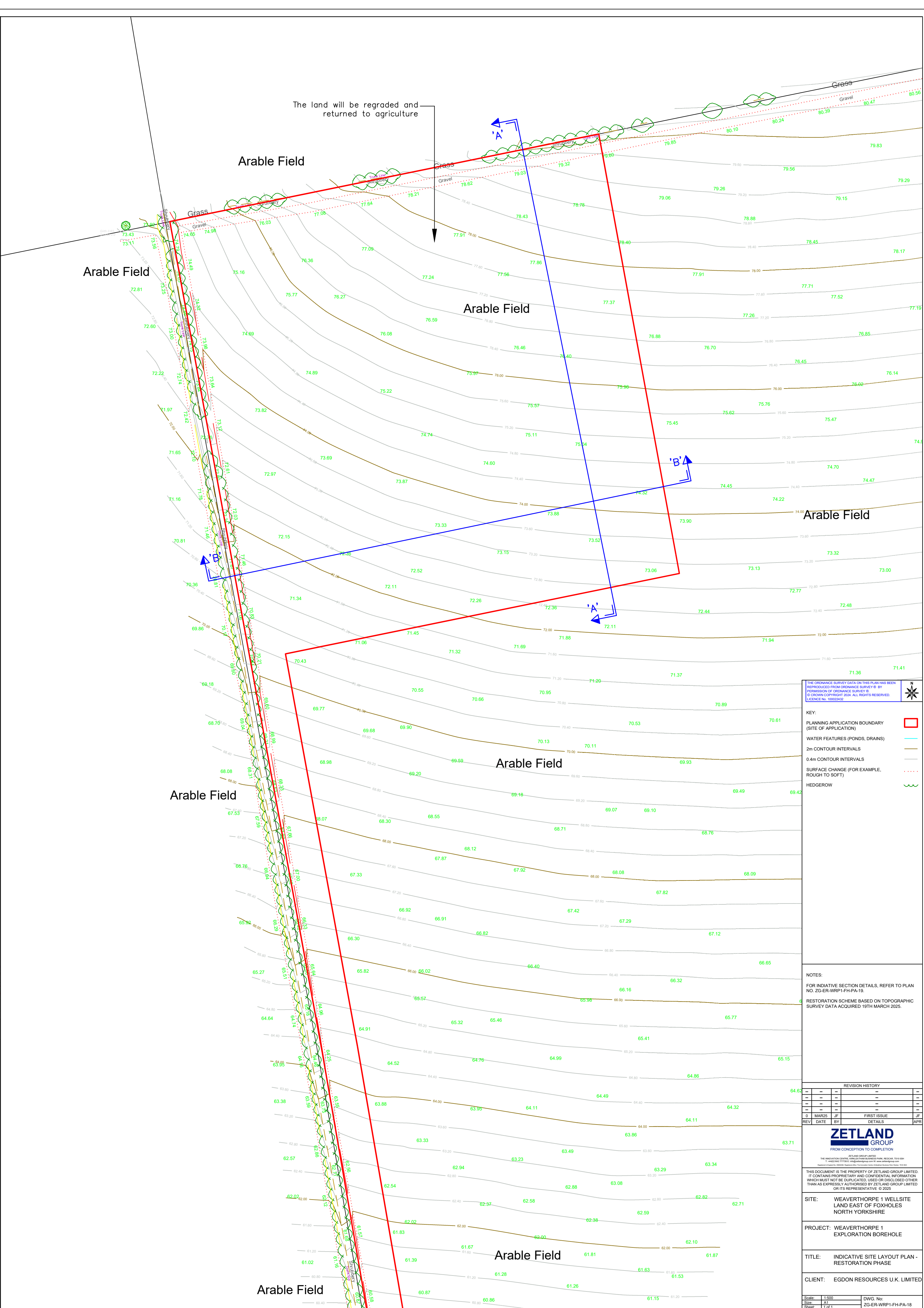
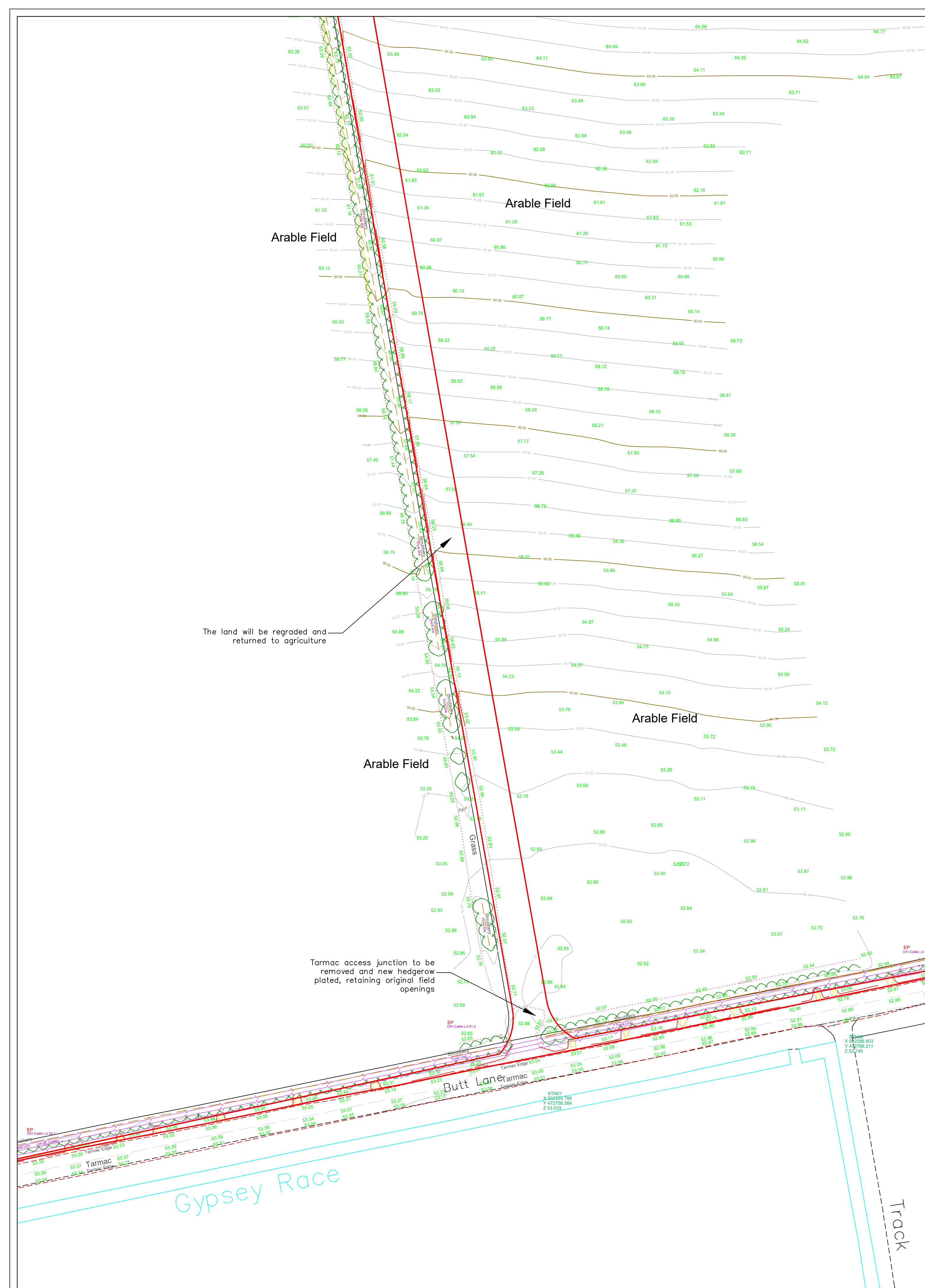
SITE: WEAVERTHORPE 1 WELLSITE
LAND EAST OF FOXHOLES
NORTH YORKSHIRE

PROJECT: WEAVERTHORPE 1
EXPLORATION BOREHOLE

TITLE: INDICATIVE SITE LAYOUT PLAN -
WELL ABANDONMENT PHASE

CLIENT: EGDON RESOURCES U.K. LIMITED

Scale:	1:500	DWG. No:
Size:	A3	ZG-ER-WRP1-FH-PA-14
Sheet:	1 of 1	





A P P E N D I X B

Baseline noise measurement survey

- Noise monitoring locations
- Calibration details
- Attended noise measurements
- Unattended noise measurements



ATTENDED MEASUREMENTS - 2250/7 AND CALIBRATION

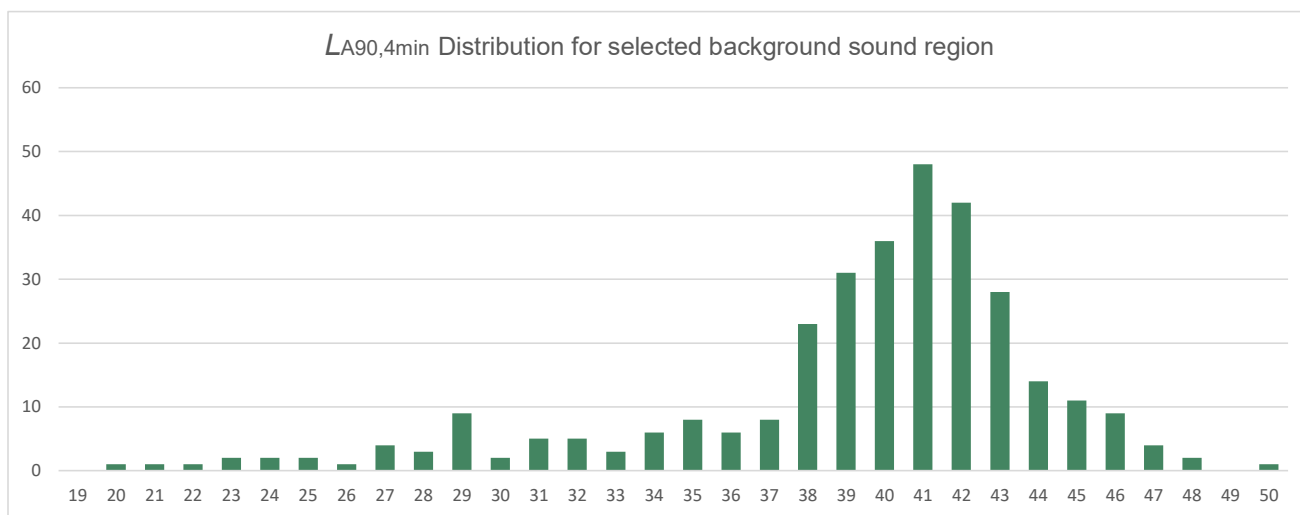
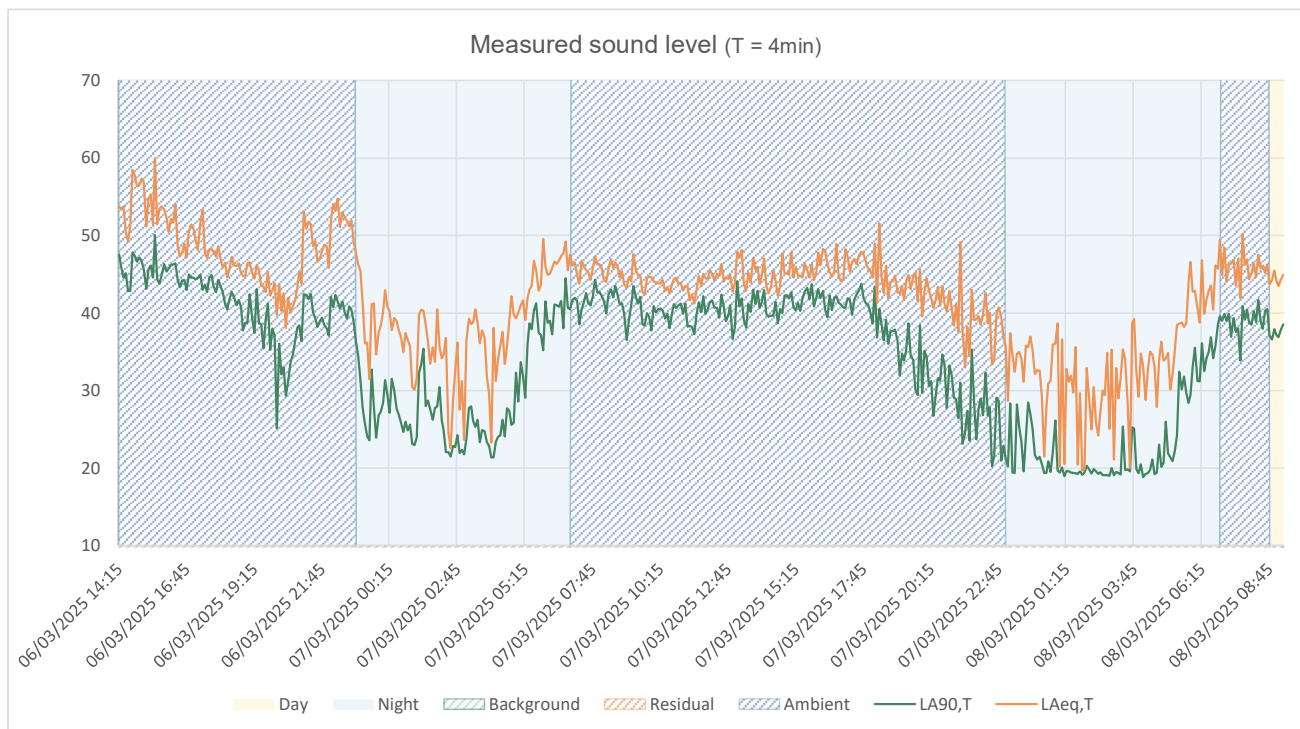
Project Name	Position	Start Time	Elapsed Time	LAFmax	LAeq	LAF90.0	Comment
Project 001	NML 2 - South of Smythy Lane	06/03/2025 13:53	00:22:00	78.8	50.0	41.9	S wind 2-4m/s. Birds, tractor, aircraft
Project 002	NML 2 - South of Smythy Lane	06/03/2025 14:16	00:12:34	71.6	47.4	42.3	S wind 2-4m/s. Birds, tractor, aircraft
Project 008	NML 2 - South of Smythy Lane	07/03/2025 02:23	00:01:34	46.8	32.1	23.2	Calm wind. No rainfall. No cars. Very slight distant traffic noise.
Project 009	NML 2 - South of Smythy Lane	07/03/2025 02:34	00:01:47	51.7	29.4	24.2	Calm wind. No rainfall. No cars. Very slight distant traffic noise.
Project 012	NML 2 - South of Smythy Lane	07/03/2025 13:10	00:09:17	59.4	47.7	41.1	SW wind 2-3m/s. Continous traffic noise from B1249 rising section to the south of Foxholes
Project 013	NML 2 - South of Smythy Lane	07/03/2025 13:20	00:15:12	58.6	44.1	38.9	SW wind 2-3m/s. Continous traffic noise from B1249 rising section to the south of Foxholes
Project 014	NML 2 - South of Smythy Lane	07/03/2025 22:51	00:10:33	59.8	38.0	21.0	Calm wind. Occasional single vehicle on B1249
Project 015	NML 2 - South of Smythy Lane	07/03/2025 23:02	00:05:51	59.8	35.8	20.3	Calm wind. Occasional single vehicle on B1249
Project 020	NML 2 - South of Smythy Lane	08/03/2025 08:59	00:05:36	56.1	45.5	37.4	SE wind 0-1m/s. Continous distant traffic noise from B1249 rising section to the south of Foxholes.
Project 021	NML 2 - South of Smythy Lane	08/03/2025 09:05	00:09:38	57.2	44.6	37.3	SE wind 0-1m/s. Continous distant traffic noise from B1249 rising section to the south of Foxholes.
Project 003	NML 1 - Near entry to drive of West Field House	06/03/2025 14:46	00:15:28	86.4	66.7	37.3	S wind 2-4m/s. Regular passing traffic including speeding motorbikes
Project 004	NML 1 - Near entry to drive of West Field House	06/03/2025 15:02	00:08:23	85.6	67.7	44.8	S wind 2-4m/s. Regular passing traffic including speeding motorbikes
Project 005	NML 1 - Near entry to drive of West Field House	06/03/2025 19:02	00:13:10	86.8	63.3	34.1	SW wind 1-2m/s. Occasioinal passing traffic
Project 006	NML 1 - Near entry to drive of West Field House	07/03/2025 01:56	00:01:46	73.5	53.4	40.0	SW wind 1m/s. No passing cars. Steady rain noise
Project 007	NML 1 - Near entry to drive of West Field House	07/03/2025 02:08	00:00:45	64.2	50.1	42.6	SW wind 1m/s. No passing cars. Steady rain noise
Project 010	NML 1 - Near entry to drive of West Field House	07/03/2025 12:32	00:08:57	87.2	67.2	29.5	SW wind 1m/s. Occasional cars
Project 011	NML 1 - Near entry to drive of West Field House	07/03/2025 12:41	00:13:26	88.4	68.5	31.0	SW wind 1m/s. Occasional cars
Project 016	NML 1 - Near entry to drive of West Field House	07/03/2025 23:21	00:11:06	92.0	60.6	22.9	Calm wind. Occasional single vehicle on B1249. Very faint distant fan tonal at 500Hz.
Project 017	NML 1 - Near entry to drive of West Field House	07/03/2025 23:41	00:01:04	35.8	26.0	23.2	Calm wind. Occasional single vehicle on B1249. Very faint distant fan tonal at 500Hz.
Project 018	NML 1 - Near entry to drive of West Field House	08/03/2025 08:18	00:19:01	89.5	68.3	34.9	Calm wind. Regular passing vehicles, birds
Project 019	NML 1 - Near entry to drive of West Field House	08/03/2025 08:37	00:10:21	89.7	67.5	36.9	Calm wind. Regular passing vehicles, birds

Calibration (93.8 dB) Date/Time	Deviation from last	Deviation from factory set
06/03/2025 13:24	0.01 dB	0.29 dB
06/03/2025 15:13	0.01 dB	0.29 dB
07/03/2025 12:30	0.01 dB	0.29 dB
07/03/2025 23:00	0.02 dB	0.27 dB
08/03/2025 08:15	0.01 dB	0.29 dB

Measured Sound Data Analysis - Daytime



Project	Weaverthorpe Well Site
Project number	25034
Date	March 6-8 2025
Monitoring location	NML 2 - south of Smythy Lane
Analysis	Baseline Noise



Background sound level analysis

Range: 20 - 50 Mean: 39 Mode(s): 41 Median: 40.5 Std. Dev.: 5.1

Residual sound level

LAeq

Ambient sound level

LAeq 48.0

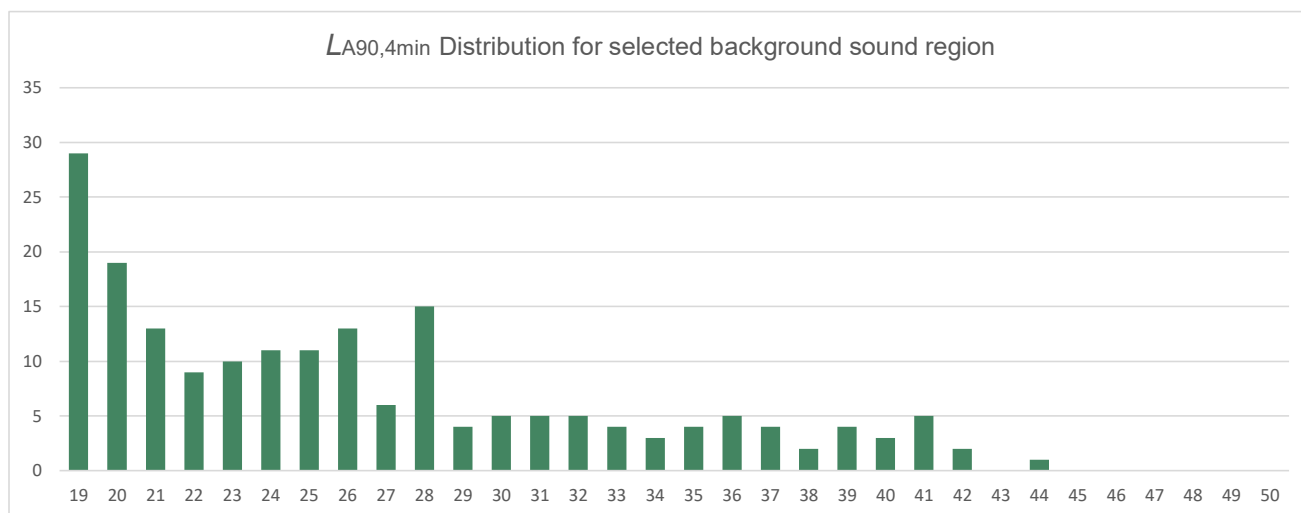
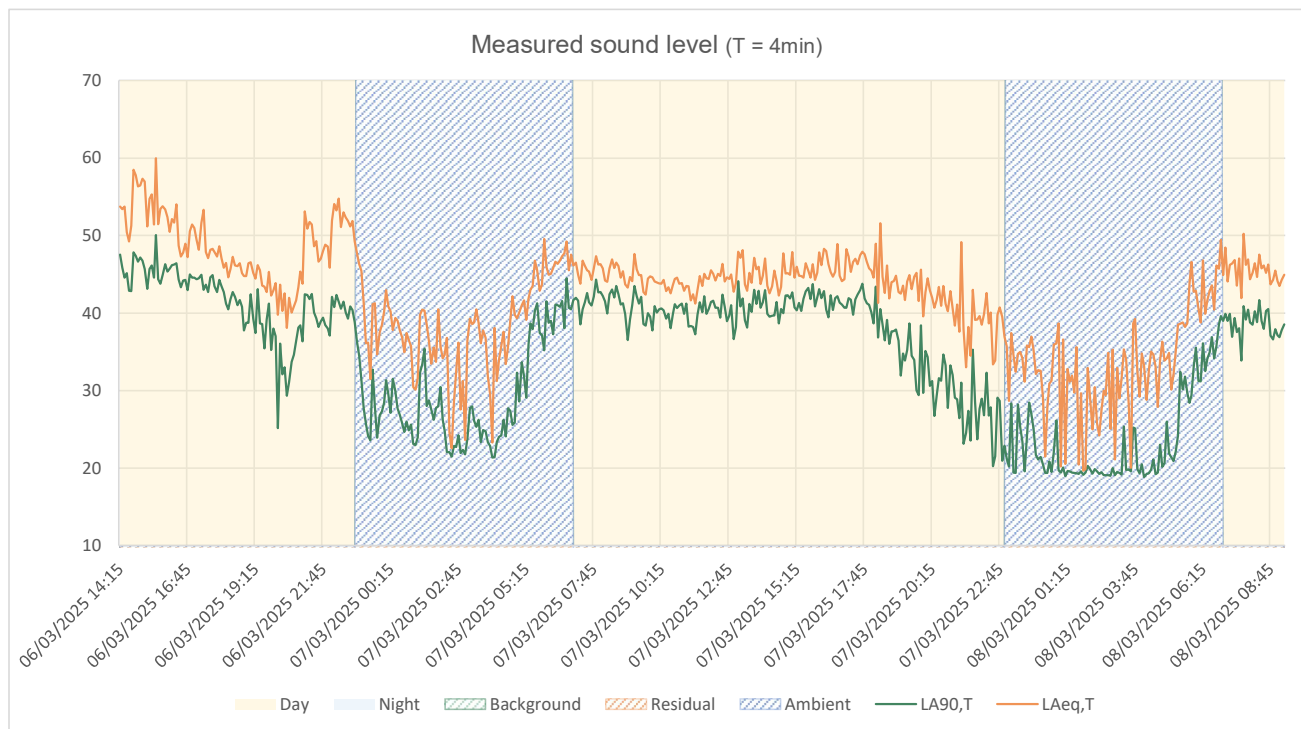
Specific sound level

LAeq -

Measured Sound Data Analysis - Night-time



Project	Weaverthorpe Well Site
Project number	25034
Date	March 6-8 2025
Monitoring location	NML 2 - south of Smythy Lane
Analysis	Baseline Noise



Background sound level analysis

Range: 19 - 44 Mean: 26 Mode(s): 19 Median: 25 Std. Dev: 6.6

Residual sound level

LAeq

Ambient sound level

LAeq 40.2

Specific sound level

LAeq -

COMPARISON BETWEEN ATTENDED MEASUREMENTS AND UNATTENDED MONITORING - 2250 LIGHT/1 AND CALIBRATION

Attended/ Unattended	Date	Start time	LAFmax	Laeq	LAF90.0	Comment
-------------------------	------	------------	--------	------	---------	---------

NML 2 - South of Smythy Lane

Attended	08/03/2025	09:05:00	57.2	44.6	37.3	SE wind 0-1m/s. Continous distant traffic noise from B1249 rising section to the south of Foxholes.
Unattended			54.0	44.0	37.0	Very good correlation
Attended	07/03/2025	22:51:00	59.8	38.0	21.0	Calm wind. Occasional single vehicle on B1249
Unattended			55.0	38.0	22.0	Very good correlation

Calibration (93.8 dB) Date/Time	Deviation from last	Deviation from factory set
06/03/2025 13:20	0.05 dB	0.41 dB
08/03/2025 08:30	0.05 dB	0.36 dB

Last calibrated

Attended monitor: 22.5.2024
Unattended monitor: 24.1.2025

CERTIFICATE OF CALIBRATION

No: CDK2403292

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CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 2739650	Id: -
Microphone:	Brüel & Kjær Type 4189	No: 2983518	
PreAmplifier:	Brüel & Kjær Type ZC-0032	No: 14266	
Calibrator:	Brüel & Kjær Type 4231	No: 3030452	
Software version:	BZ7225 Version 4.7.5	Pattern Approval:	PTBDE-16-M-PTB-0038 Rev 2 / DE-16-M-PTB-0039 Rev 2
Instruction manual:	BE1712-22		

CUSTOMER

Spectrum Acoustics
27-29 High Street
SG18 0JE Biggleswade
Bedfordshire, United Kingdom

CALIBRATION CONDITIONS

Preconditioning: 4 hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Environment conditions: See actual values in **Environmental conditions** sections.

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC 61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 9.1 - DB: 9.10) by using procedure B&K proc 2250, 4189 (IEC 61672:2013).

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device(s) under calibration. The results are only applicable for the specific device(s) listed above.

Date of calibration: 2024-05-21

Date of issue: 2024-05-21



Jeannie Gerd Nielsen
Calibration Technician



Jesper Bo Vedel
Approved Signatory

CERTIFICATE OF CALIBRATION

No: CDK2403280

Page 1 of 6

CALIBRATION OF

Calibrator: Brüel & Kjær Type 4231 No: 3030452 Id: -
Acoustical Adaptor: Brüel & Kjær Type UC-0210 (1/2" Adaptor)
Pattern Approval: DE-21-M-PTB-0029

CUSTOMER

Spectrum Acoustics
27-29 High Street
SG18 0JE Biggleswade
Bedfordshire, United Kingdom

CALIBRATION CONDITIONS

Preconditioning: 4 hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Environment conditions: See actual values in **Environmental conditions** section.

SPECIFICATIONS

The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC 60942:2017 Annex B - Microphone method. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Calibrator Calibration System 3630 with application software type 7763 (version 8.6 - DB: 8.60) by using procedure P_4231_4180_M_1_A01.

RESULTS

Calibration Mode: **Calibration after repair/adjustment.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device(s) under calibration. The results are only applicable for the specific device(s) listed above.

Date of calibration: 2024-05-17

Date of issue: 2024-05-21



Sylvia Wu Andersen
Calibration Technician



Jesper Bo Vedel
Approved Signatory

CERTIFICATE OF CALIBRATION

No: CDK2400523

Page 1 of 12

CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 3023840 Id: -
Microphone:	Brüel & Kjær Type 4189	No: 3130623
PreAmplifier:	Brüel & Kjær Type ZC-0032	No: 26776
Calibrator:	None	
Software version:	BZ7222 Version 4.7.6	Pattern Approval: -
Instruction manual:	BE1712-22	

CUSTOMER

Spectrum Acoustics
27-29 High Street
SG18 0JE Biggleswade
Bedfordshire, United Kingdom

CALIBRATION CONDITIONS

Preconditioning: 4 hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Environment conditions: See actual values in **Environmental conditions** sections.

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC 61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 9.0 - DB: 9.00) by using procedure B&K proc 2250, 4189 (IEC 61672:2013).

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device(s) under calibration. The results are only applicable for the specific device(s) listed above.

Date of calibration: 2024-01-24

Date of issue: 2024-01-24


Lene Petersen
Calibration Technician


Erik Bruus
Approved Signatory

CERTIFICATE OF CALIBRATION

No: CDK2404810

Page 1 of 6

CALIBRATION OF

Calibrator: Brüel & Kjær Type 4231 No: 3030524 Id: -
Acoustical Adaptor: Brüel & Kjær Type UC-0210 (1/2" Adaptor)
Pattern Approval: DE-21-M-PTB-0029

CUSTOMER

Spectrum Acoustics
27-29 High Street
SG18 0JE Biggleswade
Bedfordshire, United Kingdom

CALIBRATION CONDITIONS

Preconditioning: 4 hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Environment conditions: See actual values in **Environmental conditions** section.

SPECIFICATIONS

The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC 60942:2017 Annex B - Microphone method. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Calibrator Calibration System 3630 with application software type 7763 (version 8.6 - DB: 8.60) by using procedure P_4231_4180_M_1_A01.

RESULTS

Calibration Mode: **Calibration after repair/adjustment.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device(s) under calibration. The results are only applicable for the specific device(s) listed above.

Date of calibration: 2024-07-23

Date of issue: 2024-07-23



Sylvia Wu Andersen
Calibration Technician



Nicki Eriksen
Approved Signatory



A P P E N D I X C

Noise source equipment sound power levels

Equipment List Sound Power Levels - Construction phase

[illegible]

Equipment List Sound Power Levels - Phase 2 - Drilling

[illegible]

Equipment List Sound Power Levels - Phase 3 - Testing



Equipment or source	Source Octave Band Sound Power Level, Lw (Linear)								Overall LwA (dB)	Comment (make, model, operating condition, etc)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
<u>24hr testing activity (day and night)</u>										Ancillary equipment, such as power generators and lighting generator continue to operate during the testing phase
Flare typically 2.5 mmscfd	104	103	104	103	102	97	91	83	106	Operates only during testing. Based upon 2018 site test data on PW shrouded ground flare at 1.0 mmscfd. Mean Lp value at ground level 71dBA at 10m flare pipe sized for increased flow to 2.5mmscfd: +3 dB
Air compressor	88	90	95	90	85	80	75	70	92	Typically an acoustically packaged standard air compression system 70-75 dBA sound pressure level at 1m.
Diesel Generator	100	97	95	89	85	83	78	71	92	F W Wilson 100 kVA
Lighting tower	106	99	94	90	87	83	84	77	93	Opeating in hours of darkness, 15kW - Table C.4.86 BS 5228-1
Process gas flow at flow control/separation	81	78	81	79	80	82	70	65	86	Measured at Wressle Wellsite,

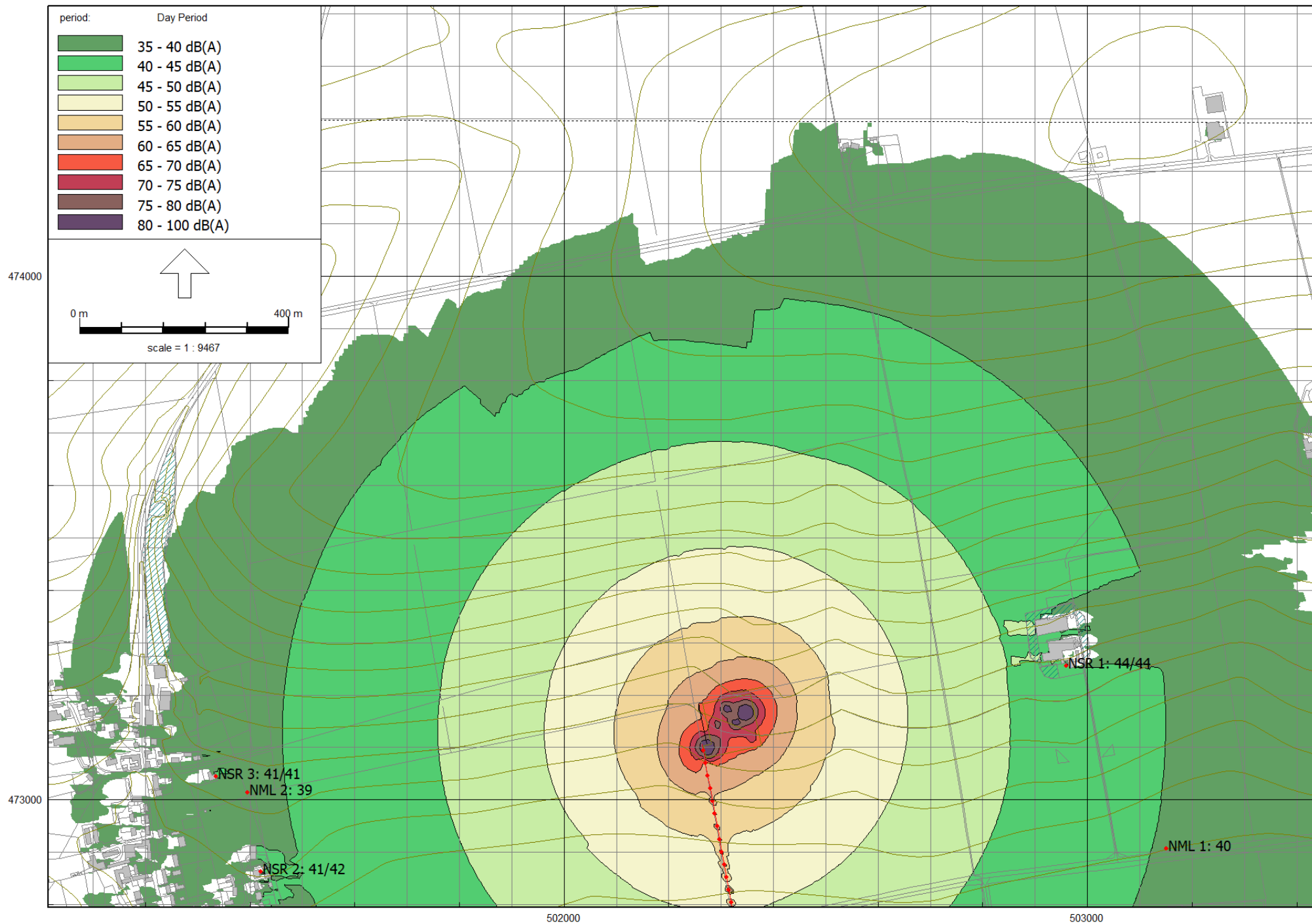
Equipment List Sound Power Levels - Phase 4 - Case B (no gas) workover rig use prior to site restoration

[illegible]



A P P E N D I X D

Predicted noise levels – Construction (Phase 1)



Construction phase - Daytime

Report: Table of Results
Model: initial model
LAeq: total results for receivers
Group: (main group)
Group Reduction: No

Name				
Receiver	Description	Height	Day	
NML 1_A	NML 1 - attended measurements	1.50	39.6	
NML 2_A	NML 2 - attended and unattended monitoring	1.50	39.0	
_A	NSR 1 - Westfield House	1.50	43.7	
_B	NSR 1 - Westfield House	4.50	43.7	
_A	NSR 2 - 7 Eastfield	1.50	41.5	
_B	NSR 2 - 7 Eastfield	4.50	41.6	
_A	NSR 3 - Applegarth, Smythy Lane	1.50	40.7	
_B	NSR 3 - Applegarth, Smythy Lane	4.50	40.8	

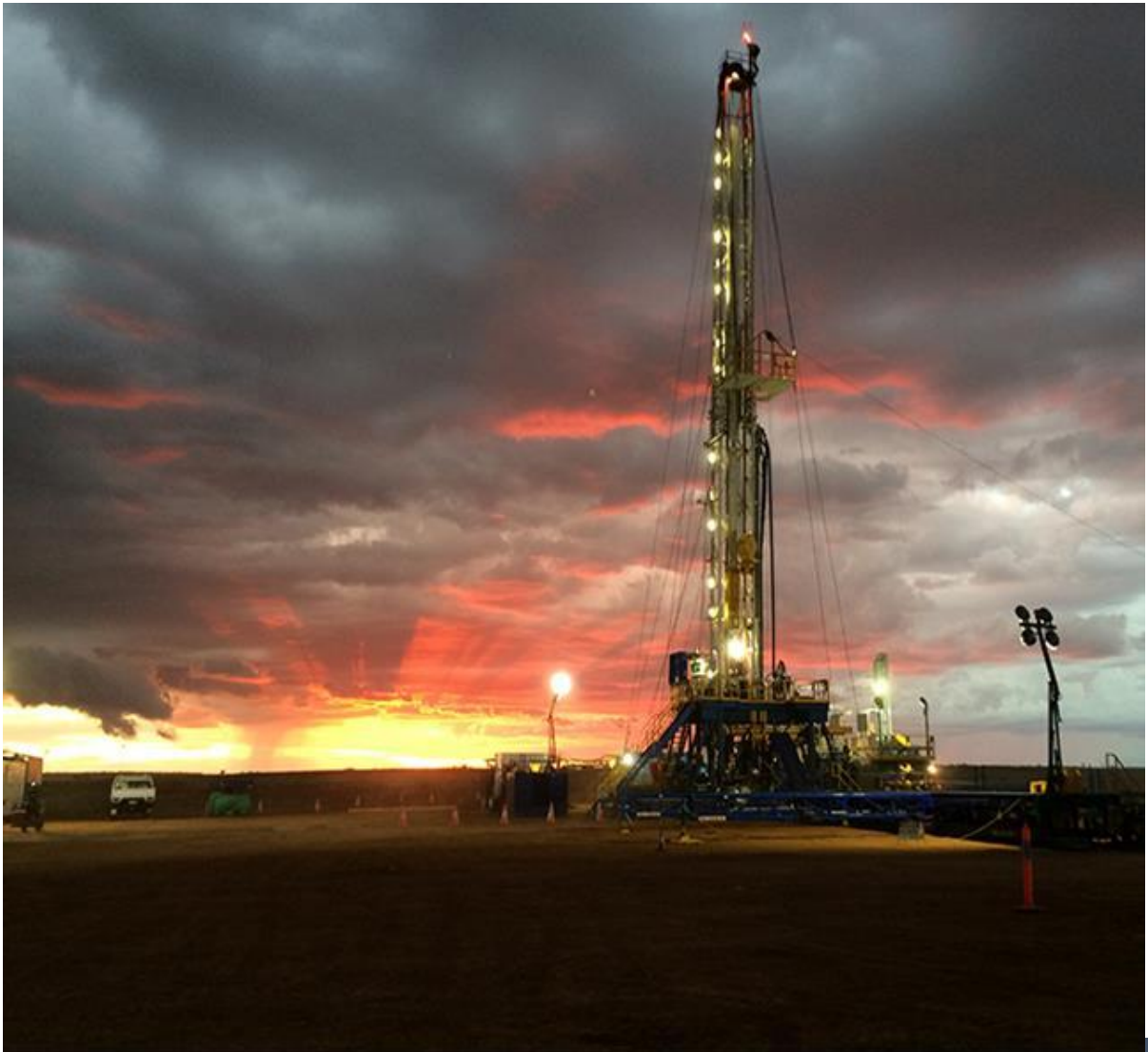
Report: Table of Results
Model: initial model
LAeq: by Source/Group for receiver _A - NSR 1 - Westfield House
Group: (main group)
Group Reduction: No

Name				
Source/Group	Description	Height	Day	
_A	NSR 1 - Westfield House	1.50	43.7	
1	Bulldozer	1.50	40.4	
	Wheeled excavator	1.50	38.9	
	Compactor roller	1.00	33.1	
3	Concrete pouring	1.50	31.3	
2	Crane (wheeled mobile)	1.50	26.6	
	Concrete vibration poker	1.00	24.8	
1	Site compressor	1.00	23.1	
2	Lighting tower	1.00	21.9	
	HGV travelling	1.50	15.8	
1	Site generator	1.00	13.1	



A P P E N D I X E

Candidate drilling rigs



Consortium Drilling Ltd Rig 4 Inventory

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Uncontrolled, If Printed

20230822 Rev 1, Issue 0

Stewart & Stevenson Crown CE 1000 SD

The S&S Crown CE 1000 120,000 lb. quad suspension trailer rig is a fully mobile Pad Skidding unit that can be positioned over any well in various configurations to best suit the programme and any other activities on the wellsite.

DEPTH RATING

4 in drill pipe (m) : 16,500 ft. (5028 m)

RIG TRAILER

Manufacturer	:	Stewart & Stevenson (S&S)
Type	:	Crown King
Engines	:	Two x Detroit Diesel Series 60 diesel engines
Power (HP)	:	14.0L, with intermittent rating of 550 BHP Each
Transmissions	:	Two x Allison CLT-5861S 5-speed (compound)
PTO	:	Two x Chelsea PTO (Transmission Mounter)
Air Compressor	:	Two x Tru-Flo 1000
Hydraulic system	:	2500 psi x 50 gpm
Levelling Jacks	:	Eight (4 x hydraulic, 4 x Mechanical)
Rear axles	:	Four x 120,000 lb
Rear tyres	:	Sixteen x 315/80R22.5

DRAWWORKS

Make	:	Crown King
Type	:	CE 1000 SD
Rating (HP)	:	1000
Depth rating (m)	:	5000 m
Drilling line	:	1-1/4" EIPS
Main brake	:	Drum type
Auxiliary Brake	:	Eaton WCBBD-336 Disc Brake
Hoisting speeds	:	6
Rotary speeds	:	6
Main drum	:	22 in x 46 in

MAST

Make	:	Stewart and Stevenson
Mast Guying	:	External or Internally Guyed for skidding
Design Spec	:	API 4F, using three-dimensional nonlinear dynamic finite element software
Height (ft)	:	118
No of lines	:	10
Capacity (lb)	:	440,000
Fast sheave	:	One x 42 in
Fleet sheaves	:	Four x 36 in
Deadline sheave	:	One x 30 in
Racking Board Gross Capacity	:	4-1/2 in drill pipe 16,500ft (5028m)
Standpipe	:	4 in x 5000 psi
Tong jacks	:	Two hydraulic make up/ break out tong pull jacks

TOP DRIVE

Make	:	Tesco
Model	:	HXI 700 Top drive system
Rated capacity	:	250 Ton
HP	:	700hp 522KW
Max. Continuous drill torque	:	24,000 ft-lb 3,254.5 daN-m
Make-up/Breakout torque	:	32,000 ft-lb 4,339.4 daN-m
Max. Speed	:	200 rpm
Prime Mover	:	D4P – 700 power unit, caterpillar 700 HP C-18 Prime Mover with a 4-pump drive.

SUBSTRUCTURE

Make	:	Stewart and Stevenson
Type	:	Telescoping type substructure
Rig Floor Height	:	18ft
Clear working height (m)	:	16ft
Set-back Capacity	:	300,000lbs
Rotary Support Capacity	:	500,000lbs

BLOCKS

Make	:	Brewster
Type	:	Clevis Block
Capacity (ton)	:	300 (5-sheave)

ROTARY TABLE

Make	:	Hacker International
Model	:	OB20.5
Opening size (in)	:	20 1/2"

RIG SKIDDING SYSTEM (OPTIONAL)

Make	:	Integrated Skidding System
Type	:	Mechanical claw indexing with minimal handling
Skid Ram Length	:	Two foot (2') incremental skid cycle
Skid Length	:	Skid rail to accommodate 0ft to 80ft inline skid

NOTE: Skidding system raises floor height (1) foot when utilized. Hydraulic supply can be powered off of either Top Drive PU or Rig Carrier.

MUD PUMP #1 & #2

Make	:	IDECO
Model & Type	:	T-1600 Triplex
Number	:	Two
Drive & Transmission	:	Cummins KTA50 c/w Allison 9000Series
HP	:	1600
Liner size (in)	:	5.50 to 7.00
Max pump press rating (psi)	:	5000
Max continuous (spm)	:	100
Pre-charge pump (in)	:	5 x 6

GENERATORS

MCC Power Generation (Sound Attenuated)

Make	:	C Dean electrical
Type	:	AC Generator Class H
Gensets Number	:	Two
Size	:	575Kva, 460Kw, 873A, 380-440V, @ 50Hz
Engine	:	Scania
Model	:	DC16-45A

MUD SYSTEM

Tank volume (bbl)	:	1000 (three tanks)
Mud mix pumps number	:	2
Size (in)	:	5 x 6
Power (hp)	:	50
Rpm	:	1750
Mix hoppers	:	2
Shakers	:	Three Brandt VSM 300
Degassers	:	Atmospheric and primary
Agitators	:	Four
Type	:	Brandt & Flygt
HP	:	10

BOP SYSTEM

NOTE: Well control system in line with current API STD 53

BOP stack	:	13 5/8" 5000psi A1, R2
	:	Blind Rams
	:	VBR 2 7/8" – 5"
Valves	:	2 1/16" 5000psi Kill x 2 manual
	:	3 1/8" 5000psi Choke x 1
	:	3 1/8" 5000psi HCR x 1
BOP handling details	:	Trolley system

WELL CONTROL SUBS	:	IBOP to suit drill string
	:	FOSV to suit drill string

BOP CLOSING SYSTEM

Accumulator	:	Advanced Pressure Inc.
Functions	:	5 station
Size (gals)	:	200
Choke Manifold	:	Quality Valve Works USA
Pressure Rating	:	5000psi
Valves	:	Eight

REMOTE CHOKE PANEL

Make	:	Smith Willis
Type	:	Super Choke
Adjustable choke	:	Willis
Press rating (psi)	:	5M
BOP test unit	:	Hydratron

INSTRUMENTATION

Weight indicator	:	Martin Decker
Pump pressure	:	Kane Instrumentation
Standpipe pressure	:	Kane Instrumentation
Stroke counters	:	ElectroFlow
Driller's console	:	Displays all key parameters
Tesco TDS Drillers panel	:	Drill torque and RPM
Travelling Block Crown and Floor	:	Rig Control Products
Anti-collision system	:	

HANDLING EQUIPMENT

Iron Roughneck	:	FH-80
Pipe Spinner	:	FH-80
Torque Wrench	:	3 1/2" to 8"
Rotary Tongs	:	3 1/2" to 13 3/8"
DP & DC Slips	:	SDXL and DCS-L
Elevators	:	18° center latch G Series
Hydraulic Catwalk	:	L'IL Pipe Wrangler c/w 4 x tumble Racks

WINCHES

Hoist Winch (2)	:	Two hydraulic winches
SWL	:	5te (12,000lbs)
Model	:	PD-12C-1

NOTE: One (1) controlled at Driller's position and one (1) controlled at pipe rack side of substructure floor.

Man Riding Winch	:	Ingersoll rand, Set at 150kg with height limit switch
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FUEL TANK

Capacity (l)	:	20,000
		One x double skin tanks

WATER TANK

Volume (bbl)	:	250
Water pumps size (in)	:	2 x 3" x 2" centrifugal pumps
Brake Cooling Skid		

BUILDINGS

Rig Managers Office
Canteen Shack/Change Shack
Doghouse/Driller's station
Toolhouse
MCC Building
Pump Spares Container
Sub & Tubular Container
Spares Container
Mechanical store & workshop
Tumble racks
Oil Storage Container (fully bunded)

SAFETY EQUIPMENT

Stretcher	:	Collapsible steel framed
First Aid kit	:	Two fully stocked kits
Eye wash Station	:	Three Eye wash stations
Fire extinguishers	:	Twelve 9 kg dry powder Foam and CO2 extinguishers
Breathing Apparatus	:	Five 10 min positive pressure escape packs
	:	Four 30 min positive pressure back packs
Mud Saver Bucket	:	3 ½" & 4" drill pipe
Other	:	One escape buggy Two derrick man riding belts Two full safety harnesses for mast Two fall arrester

Wellsite	Date	Location Point Source	Time	Duration	LAeq	Max.level	LCPeak	TWA	Dose	Projected dose	Comments	Weather/Wind Direction	Site Operations
B Site Saltfleetby	04/02/2023	5m N of BOP	13:00	5 mins	68.1	88.2	98.4	56.8dB	0.1%	14.5%	Live gas production ops in progress	13mph WSW	RIH
		10m N of BOP	13:10	5 mins	63.4	79.6	91.1	42.0dB	0.0%	0.5%	Live gas production ops in progress	13mph WSW	RIH
		20m N of BOP	13:20	5 mins	60.4	75.9	88.9	33.2dB	0.0%	0.1%	Live gas production ops in progress	14mph WSW	RIH
		Lease Fence North	13:30	5 mins	54.5	76.5	87.7	28.0dB	0.0%	0.0%	Live gas production ops in progress	14mph WSW	RIH
		5m S of BOP	13:55	5 mins	81.7	96.9	99.8	74.0dB	7.8%	757.2%	Live gas production ops in progress	13mph WSW	RIH
		10m S of BOP	14:05	5 mins	79.8	95	99.7	70.0dB	3.1%	305.1%	Live gas production ops in progress	11mph WSW	RIH
		20m S of BOP	14:15	5 mins	77.1	91	98.9	66.8dB	1.5%	161.4%	Live gas production ops in progress	11mph WSW	RIH
		Lease Fence South	14:25	5 mins	60.9	73.5	99.3				Live gas production ops in progress	12mph WSW	RIH
		Security Office NW of BOP 92m	14:45	5 mins	57	74.9	90.1				1x Skip lorry & 1x Car passed during test	11mph WSW	RIH
		House at Entrance 335m	15:00	5 mins	51.1	67.3	82.7				1x Telehandler & 1x Car passed during test	9mph WSW	RIH
		5m W of BOP	22:00	5 mins	72.7	93.7	99.8	62.2dB	0.5%	49..1%	Live gas production ops in progress	18mph WNW	RIH
		10m W of BOP	22:10	5 mins	67.9	87.5	95.2	56.2dB	0.1%	12.5%	Live gas production ops in progress	15mph WNW	RIH
		20m W of BOP	22:20	5 mins	61	74.3	89.6				Live gas production ops in progress	13mph WNW	RIH
		Lease Fence West	22:30	5 mins	56	63.8	83.7				Live gas production ops in progress	14mph WNW	RIH
		5m E of BOP	22:40	5 mins	66.3	80	93.2	46.5dB	0.0%	1.3%	Live gas production ops in progress	15mph WNW	RIH

Prepared By:

Danny Benniston

Checked By:

Stuart Sinclair

Approved By:

Steve Rogan

Issued:

07/02/2023

		10m E of BOP	22:50	5 mins	63.2	79.8	91.9	46.2dB	0.0%	1.2%	Live gas production ops in progress	15mph WNW	RIH
		20m E of BOP	23:00	5 mins	57.8	74.8	89.6				Diesel Jetwash started & then shut off	14mph WNW	RIH
		Lease Fence East	23:10	5 mins	57.4	69.4	92.5				Live gas production ops in progress	12mph NW	RIH
		Security Office NW of BOP	23:30	5 mins	51.1	68.2	86.5	40.6dB	0.0%	0.4%		10mph NW	RIH
		House at Site Entrance	23:45	5 mins	36.9	50.5	75.1	28.3dB	0.0%	0.0%	1x Car passed	9mph NW	RIH
	05/02/2023	5m W of BOP	12:00	5 mins	73.4	94	99.3	63.1dB	0.6%	60.7%	Live gas production ops in progress	6mph NNW	POOH
		10m W of BOP	12:10	5 mins	67.8	83.7	92.8	56.4dB	0.1%	12.9%	Live gas production ops in progress	6mph NNW	POOH
		20 W of BOP	12:20	5 mins	61.8	75.1	90.2				Live gas production ops in progress	5mph NNW	POOH
		Lease fence	12:30	5 mins	57.1	65	84				Live gas production ops in progress	4mph NW	POOH
		5m E of BOP	12:40	5 mins	71.1	89.2	99.6	60.1dB	0.3%	30.3%	Live gas production ops in progress	4mph NW	POOH
		10m E of BOP	12:50	5 mins	66.2	77.4	94.1	53.3dB	0.1%	6.0%	Live gas production ops in progress	5mph NW	POOH
		20 E of BOP	13:00	5 mins	53.2	67.6	87.8				Live gas production ops in progress	4mph NNW	POOH
		Lease Fence	13:10	5 mins	56.5	68.4	82				Live gas production ops in progress	4mph NNW	POOH
		Security Office NW of BOP	13:30	5 mins	58.1	75.8	91.1				Telehandler passed	3mph NNW	POOH
		House at Site Entrance	13:45	5 mins	51.9	67.7	84.1				1x Car & 1x tractor & trailer passed	3mph NNW	POOH
		5m S of BOP	21:45	5 mins	72.7	93.7	99.8	62.2dB	0.5%	49..1%	Live gas production ops in progress	7mph SSW	POOH
		10m S of BOP	21:55	5 mins	67.9	87.5	95.2	56.2dB	0.1%	12.5%	Live gas production ops in progress	7mph SSW	POOH
		20 S of BOP	22:10	5 mins	61	74.3	89.6				Live gas production ops in progress	7mph SSW	POOH

Prepared By:

Danny Benniston

Checked By:

Stuart Sinclair

Approved By:

Steve Rogan

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		Lease Fence South	22:20	5 mins	56	63.8	83.7				Live gas production ops in progress	6mph SSW	POOH
		5m N of BOP	22:35	5 mins	68.1	88.2	98.4	56.8dB	0.1%	14.5%	Live gas production ops in progress	6mph SSW	POOH
		10m N of BOP	22:45	5 mins	63.4	79.6	91.1	42.0dB	0.0%	0.5%	Live gas production ops in progress	7mph SSW	POOH
		20 N of BOP	22:55	5 mins	60.4	75.9	88.9	33.2dB	0.0%	0.1%	Live gas production ops in progress	7mp SSW	POOH
		Lease Fence North	23:05	5 mins	54.5	76.5	87.7	28.0dB	0.0%	0.0%	Live gas production ops in progress	9mph SSW	POOH
		Security Office NW of BOP	23:15	5 mins	51	67.7	86.1	41.6dB	0.0%	0.4%		11mph SSW	POOH
		House at Site Entrance	23:30	5 mins	37.5	50.8	76.2	27.3dB	0.0%	0.0%		12mph SSW	POOH
	06/02/23	5m N of BOP	09:30	5 mins	68.3	87.8	97.5	56.3dB	0.1%	14.1%	Live gas production ops in progress	8mph SSW	RIH
		10m N of BOP	09:45	5mins	62.9	78.7	90.6	41.6dB	0.0%	0.4%	Live gas production ops in progress	11mph SSW	RIH
		20 N of BOP	09:55	5mins	60.5	76	88.7	33.0dB	0.0%	0.1%	Live gas production ops in progress	12mph SSW	RIH
		Lease Fence North	10:10	5mins	54.2	76.1	87.4	28.0dB	0.0%	0.0%	Live gas production ops in progress	15mph SSW	RIH
		5m S of BOP	15:00	5mins	72.9	88.9	98.4	62.0dB	0.5%	48.8%	Live gas production ops in progress	9mph SW	RIH
		10m S of BOP	15:10	5mins	67.7	87.7	96.1	56.7dB	0.1%	12.5%	Live gas production ops in progress	10mph SSW	RIH
		20 S of BOP	15:25	5mins	62	75.1	90.1				Live gas production ops in progress	10mph SSW	RIH
		Lease Fence South	15:35	5mins	56	63.8	83.7				Live gas production ops in progress	8mph SSW	RIH
		Security Office NW of BOP	15:50	5 mins	67.1	87.3	99.1	56.9dB	0.1%	14.5%	1x Van passed	8mph SSW	RIH

Prepared By:

Danny Benniston

Checked By:

Stuart Sinclair

Approved By:

Steve Rogan

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		House at Site Entrance	16:00	5 mins	62.4	79.2	91.3	42.1dB	0.0%	0.5%	2x Car passed	9mph SSW	RIH
		5m W of BOP	22:00	5mins	71.3	83.4	96.2	60.9dB	0.1%	39.7%	Live gas production ops in progress	7mph SW	Reaming
		10m W of BOP	22:10	5mins	70.1	86.9	96.1	61.5dB	0.3%	31.9%	Live gas production ops in progress	7mph SW	Reaming
		20 W of BOP	22:20	5mins	61.8	62.8	86.7	53.9dB	0.1%	5.7%	Live gas production ops in progress	8mph SW	Reaming
		Lease fence	22:30	5mins	58.7	68.9	81.6	48.9dB	0.0%	2.4%	Live gas production ops in progress	8mph SW	Reaming
		5m E of BOP	22:45	5mins	74.3	91.9	96	64.5dB	0.8%	86.0%	Live gas production ops in progress	8mph S	Reaming
		10m E of BOP	22:55	5mins	77	78.3	95.1	66.9dB	1.5%	130.3%	Live gas production ops in progress	7mph S	Reaming
		20 E of BOP	23:05	5mins	74.2	76.1	96	64.7dB	0.9%	98.6%	Live gas production ops in progress	7mph S	Reaming
		Lease Fence	23:20	5 mins	68	70.5	93.1	57.8dB	0.2%	20.4%	Live gas production ops in progress	8mph SW	Reaming
		Security Office NW of BOP	23:30	5 mins	51.1	67.9	92.5	41.8dB	0.0%	0.5%		8mph SW	Reaming
		House at Site Entrance	23:45	5mins	37.9	51.3	76.9	28.0dB	0.0%	0.0%		8mph SW	Reaming
	07/02/2023	5m W of BOP	14:30	5mins	72.7	91.7	99.8	62.2dB	0.5%	49.1%	Live gas production ops in progress	12mph SSW	RIH
		10m W of BOP	14:40	5mins	67.9	87.5	95.2	56.2dB	0.1%	12.5%	Live gas production ops in progress	11mph SSW	RIH
		20 W of BOP	14:50	5mins	61	74.3	89.6				Live gas production ops in progress	10mph SSW	RIH
		Lease fence	15:00	5mins	56	63.8	83.7				Live gas production ops in progress	10mph SSW	RIH
		5m E of BOP	15:25	5mins	66.3	80	93.2	46.5dB	0.0%	1.3%	Live gas production ops in progress	10mph SSW	RIH
		10m E of BOP	15:35	5mins	63.2	79.8	91.9	46.2dB	0.0%	1.2%	Live gas production ops in progress	10mph SSW	RIH
		20 E of BOP	15:50	5 mins	57.8	74.8	89.6				Live gas production ops in progress	10mph SSW	RIH
		Lease Fence	16:00	5 mins	57.4	69.4	92.5				Live gas production ops in progress	10mph SSW	RIH

Prepared By:

Danny Benniston

Checked By:

Stuart Sinclair

Approved By:

Steve Rogan

Issued:

07/02/2023

		Security Office NW of BOP	16:10	5mins	57	74.9	90.1				2x Car passed during test	10mph SSW	RIH
		House at Site Entrance	16:20	5mins	51.1	67.3	82.7				1x Car passed during test	8mph SSW	RIH
		5m N of BOP	22:25	5mins	71.1	83.6	97	61.3dB	0.1%	40.7%	Live gas production ops in progress	9mph SSW	Reaming
		10m N of BOP	22:35	5mins	70.2	84.3	96	60.5dB	0.3%	33.1%	Live gas production ops in progress	9mph SSW	Reaming
		20m N of BOP	22:50	5mins	62.8	63.9	87.4	52.9dB	0.1%	5.9%	Live gas production ops in progress	9mph SSW	Reaming
		Lease fence	23:00	5mins	59.1	69.7	82.4	49.3dB	0.0%	2.5%	Live gas production ops in progress	9mph SSW	Reaming
		5m S of BOP	23:10	5mins	74.4	92.5	96.1	64.6dB	0.9%	86.1%	Live gas production ops in progress	9mph SSW	Reaming
		10m S of BOP	23:20	5mins	77.1	78.2	95.7	67.1dB	1.6%	163.1%	Live gas production ops in progress	9mph SSW	Reaming
		20 S of BOP	23:30	5mins	74.9	76.5	96.1	64.8dB	0.9%	98.6%	Live gas production ops in progress	9mph SSW	Reaming
		Lease Fence	23:40	5 mins	68.2	70.1	93	58.1dB	0.2%	20.7%	Live gas production ops in progress	9mph SSW	Reaming
		Security Office NW of BOP	23:50	5mins	51.9	67.5	93.8	41.9dB	0.0%	0.5%	Telehandler passed	9mph SSW	Reaming
		House at Site Entrance	00:00	5mins	37.8	51.5	76.5	27.dB	0.0%	0.0%		9mph SSW	Reaming

Prepared By:

Danny Benniston

Checked By:

Stuart Sinclair

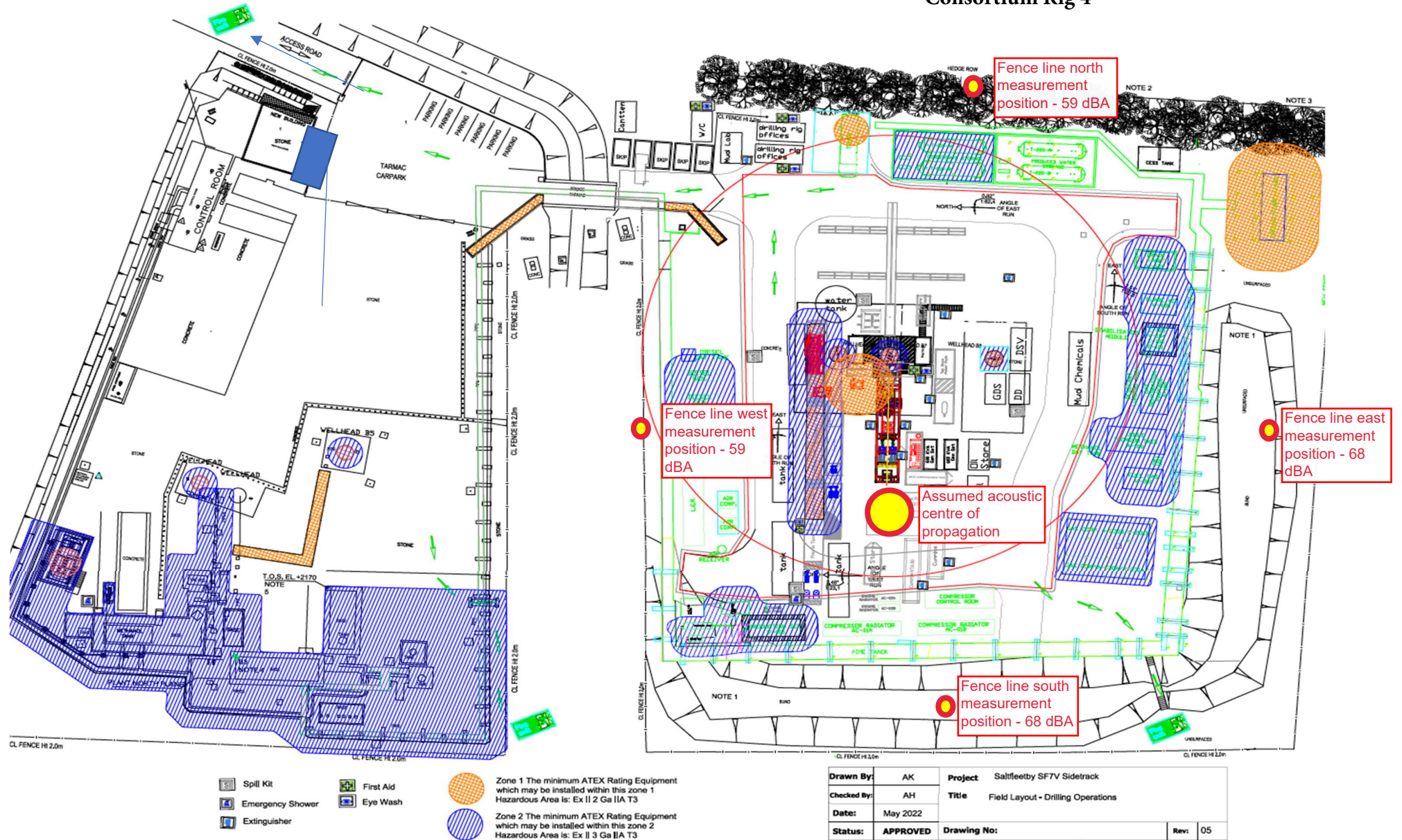
Approved By:

Steve Rogan

Issued:

07/02/2023

Consortium Rig 4

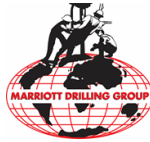


Consortium Rig 4

Measurement position (distance from acoustic centre)	Measured Sound Pressure Level (LpA)	$20\log(\text{distance}) + 10$ (dB)	Sound Power Level, near field (LwA)
Lease fence N (68m)	59.1	46.7	105.8
Lease fence E (60m)	68.0	45.6	113.6
Lease fence S (33m)	68.2	40.4	108.6
Lease fence W (38m)	58.7	41.6	100.3
.			
Total Rig Sound Power Level (LwA)			110

Sound power level of Consortium Rig 4 (Drilling/Reaming) from measurements made at Saltfleetby 7/02/23

The levels appear to vary significantly in each direction, however these measurements are within the near field of the drilling rig equipment, and are both shielded and also subject localised noise sources. At distances greater than 200m, drilling rigs are generally not significantly directional in their sound radiation patterns.

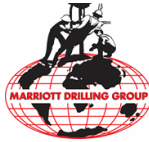


Marriott Rig 18

Rig 18 Equipment Inventory

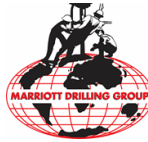


Rig	WEI DS 100 SLANT Hydraulic semi-trailer mounted fitted with independent hydraulic stabilizers for trailer & substructure. Manufactured 2013 (first commissioned 2019)
Drillers Control Cabin (Dog-house)	WEI hydraulically adjustable Heavy Duty steel accessible from ground level
Mast	220,000 lbs capacity 25.5 m height
Substructure	220,000 lbs setback capacity 4.45 m from GL to RT 4 m clear height under RT beams.
Catwalk	catwalk and pipe handling system, manual option used for coring 1.22 m (H) x 1.16 m (W) x 19.58 m (L)



Marriott Rig 18

Draw Works	WEI Hydraulic ram 220,000 lbs capacity 3 no. x 22 mm lines
Rig Engine	Caterpillar C-15 447 kW (600 HP)
Rig Generators	2 x Caterpillar 3406 (635 kVA)
Rotary Table	WEI non-rotating 40" maximum opening Rated to 220,000 lbs capacity c/w various size bowls
Top Drive	WEI DS100 S 220,000 lbs pull-up 3,000 psi Maximum rotary speed = 180 rpm Maximum continuous torque = 21,700 ft-lbs
Rig Floor Winches	3 no. (1t, 3t, rated capacity)
Hook	WEI casing/drill pipe Rated to 180,000 lbs
Mud Pumps	2 x 500HP Ideco T500 <i>(1000 HP electric drive pumps also available see Rates Table 4-1)</i>
Rotary Hose	3 ½" Diameter x 38 ft
Mud Tank System	Active 1 – 135 bbl Active 2 – 135 bbl Premix – 50 bbl Pill – 70 bbl Settlement – 115 bbl
Shaker Tank	120 bbl capacity
Pill Tank	70 bbl capacity
Trip Tank	30 bbl capacity
Mud and Solids Control	3 x 5" x 6" x 11" centrifugal pump 6 x 15kw Mud Agitators 2 x Derrick G 503 shale shakers 1 x Derrick G 503 desander/desilter
Mud Lab	1 x Mud lab c/w PPE store, cupboards, tool-kit, mud balance, marsh funnel, filtration kit, sand content kit and stopwatch
Water Storage Tanks	1 x 300 bbl capacity tank
Fuel Tank (Double Wall)	1 x 20,000 L double skinned Fuel Storage Tank 1 x 2,000 L mobile bunded tank
BOP Stack	7 1/16 in x 5000 psi Annular Preventer 7 1/16 in x 5000 psi Double Gate 10,000 Psi Barton chart recorder



Marriott Rig 18

Koomey Unit	Control systems 26160 3B 20 Bottles - 5,500 psi working pressure 1 x electric driven hydraulic pump + 2 x air driven
Choke Manifold & Ancillaries	Sanyi 2 1/16" minimum ID (5000 psi max. working pressure) 2 1/16" Choke line 2" Kill line 2" armour cement hose x 35 ft (5000 psi)
Iron Roughneck	WEI Iron roughneck for DP tool joints and DC's from 3 1/2" to 20" OD Maximum make-up torque = 57,940 ft-lbs
Compressors	1 x atlas copco GA22 13 Bar working pressure
Test Pump	1 x Enerpac 39 c/w chart recorder 15,000 psi pressure rating
Drill String Handling Tools	DP/Tubing Elevators – to suit 2 7/8", 3 1/2", 4", 5" and 5 1/2" Manual DP Slips - to suit 2 7/8", 3 1/2", 4" and 5" Semi-automatic DP Slips - to suit 3 1/2" – 5" size range DC Slips – to suit 4 3/4" to 8 1/2" size range Tubing Slips – to suit 2 3/8" to 3 1/2" size range DC lift subs – 4 x 8", 8 x 6 3/4"
Elevator Links	1 x 2.6m long rated to 150 tons (3 1/8") 1 x 1.2m long rated at 50 tons (1 1/4")
Safety Valves, Crossovers and Subs	To suit all contractors drill string items provided above
Casing Running & Handling Equipment	1 x WEI make up device body – Casing make up device rotating tool for 5 1/2" to 7", 7 5/8" to 9 5/8", 9 5/8" to 13 3/8" Casing bowls spider – DEN-CON 27 1/2" with inserts for 5 1/2" - 18 5/8" Manual casing slips – to suit 5 1/2" to 13 3/8" range Side door casing elevators – to suit 5 1/2" to 13 3/8" range
Bit Breakers & Gauge Rings	Bit breakers for Tri cone bits: 3 1/2", 4 3/4", 6 3/4", 12 1/4", 14 3/4" and 17 1/2"
Cup Testers	1 x 13 3/8" (Type F) 1 x 9 5/8" (Type F) 1 x 7 5/8" plug tester 4" IF Pin x 4" IF Box
Survey Equipment	1 x shore shot survey equipment (0-7degree range)
Buildings/Accommodation	1 x Rig Managers Office/Accommodation Unit 1 x Mechanics Accommodation Unit Spares and workshops for Contractors equipment
Pipe & Equipment Storage	Pipe baskets and half-racks to suit Contractors equipment
Forklift	Nominal 4 tonne, all terrain telehandler



c/w handling grab for safe operations with onsite tubulars

Welding Set

1 x 110 A Lincoln 305D Ranger portable welding set

Hand-held VHF radios

4 x Motorola VHF intrinsically safe

Safety Apparatus

2 x 30 min DRAGER BA Sets

1 x Defibrillator

1 x Stretcher

3 x H2S Detectors

Fire extinguishers

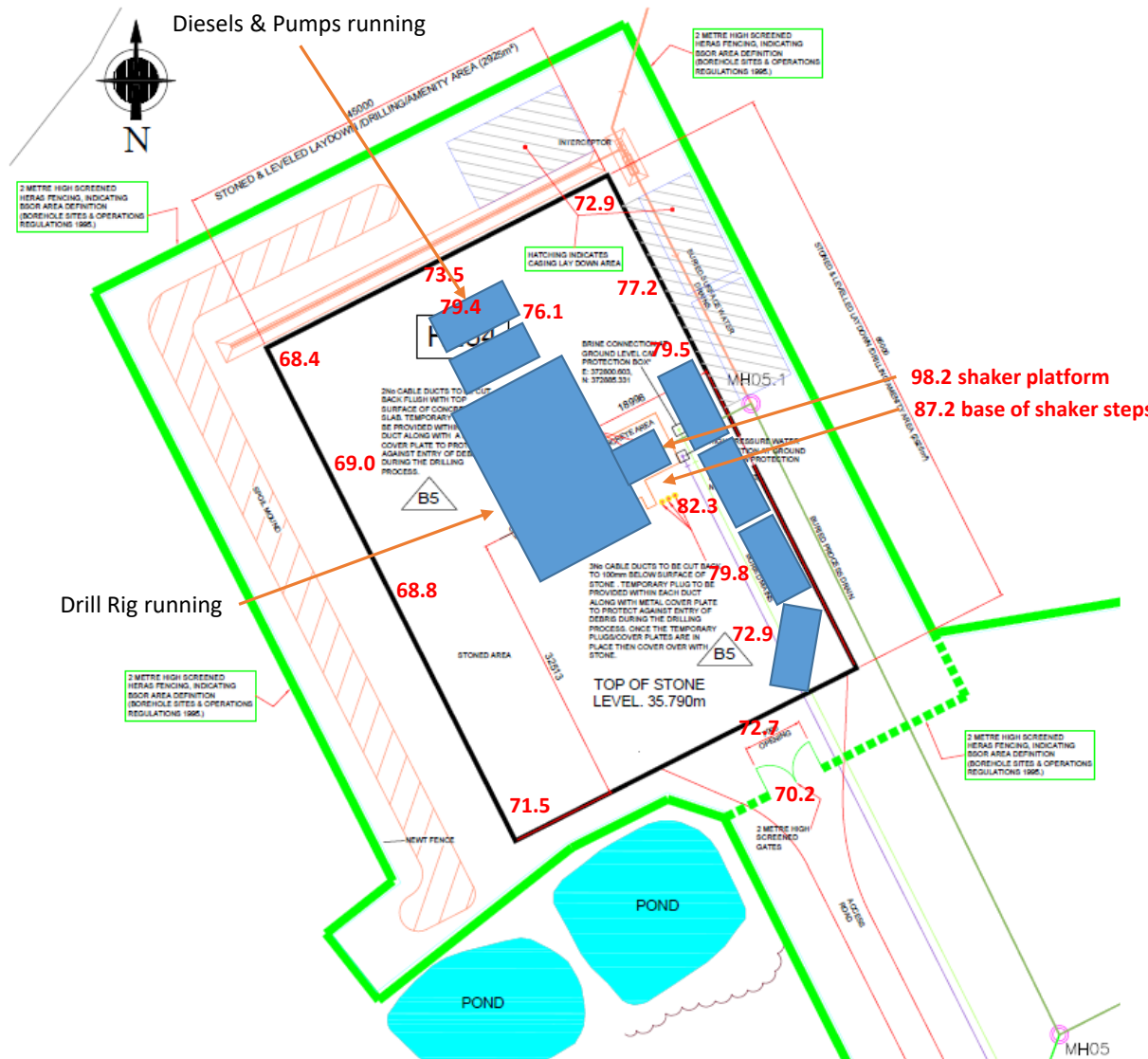
Pumpman escape sets

4 x First aid kits

4 x Eye-wash stations

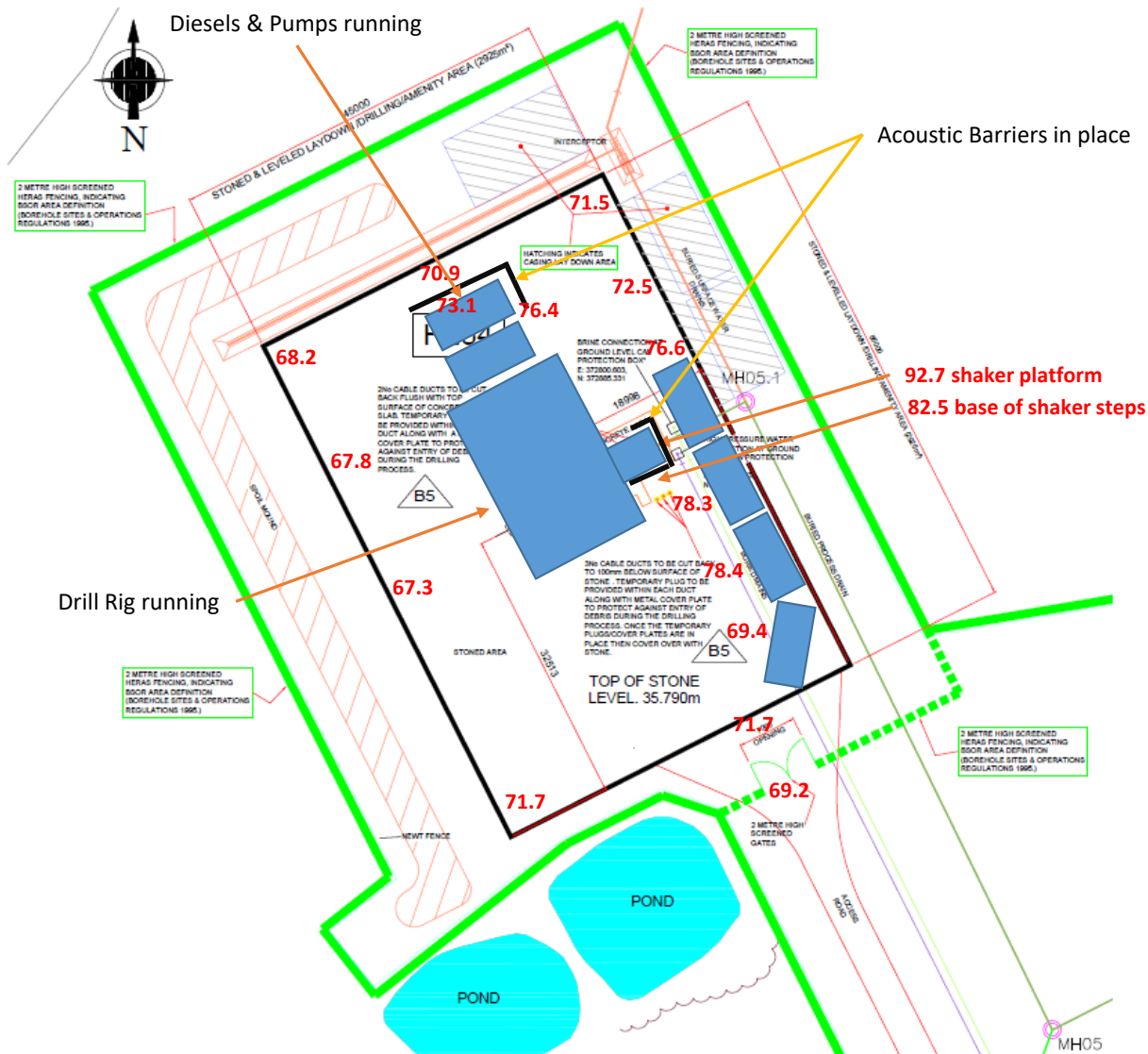
Note

Rig inventory is subject to amendment by substitute items of equivalent size or capacity where equipment is dependent on availability and also if changes are agreed with the Company



H254 Spot noise levels taken 10/06/19. Drill Rig running throughout, with the diesels, pumps & screen shaker running continuously. Intermittent vehicle movements throughout the survey, shuttling supplies to/from & around pad.





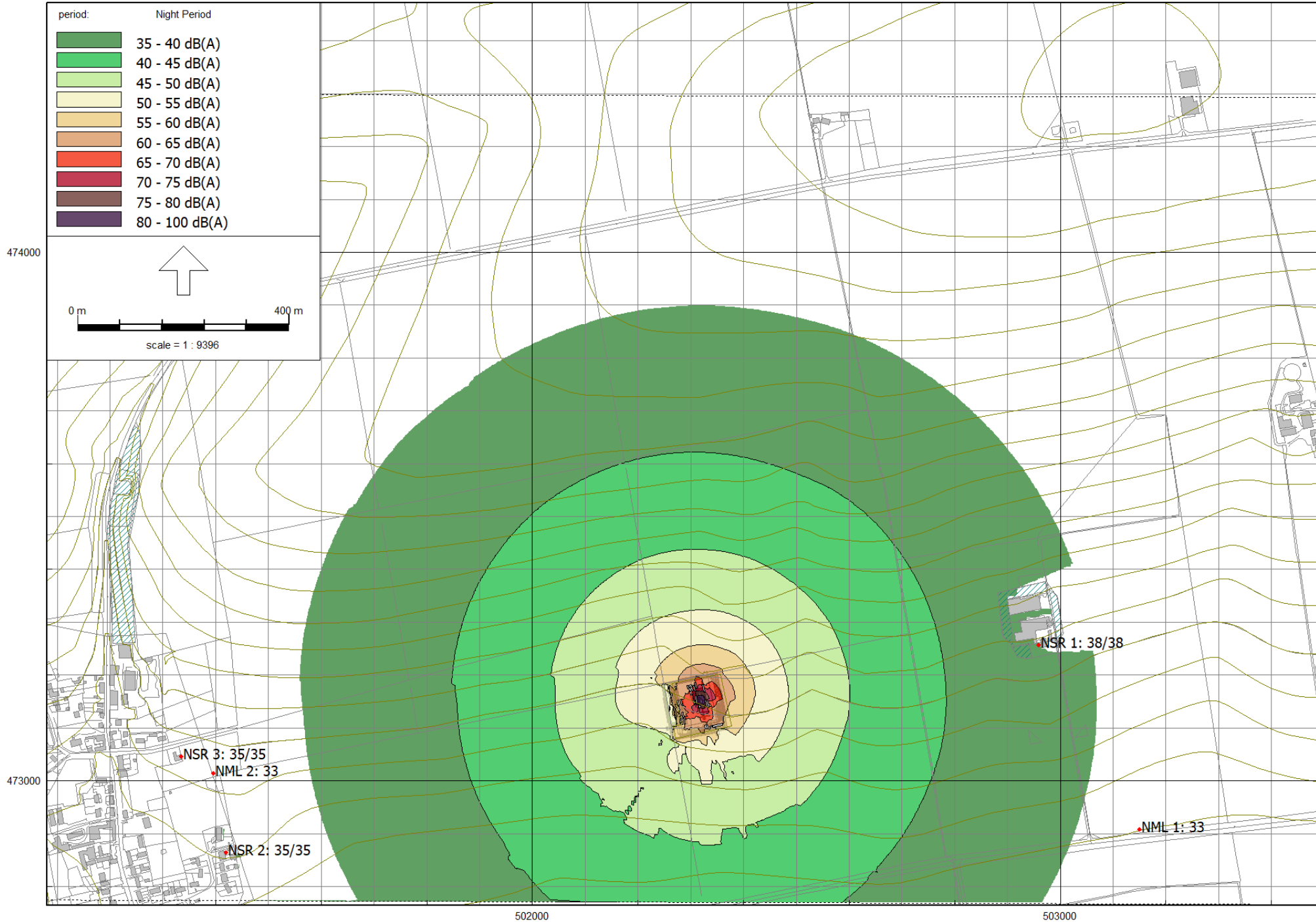
H254 Spot noise levels taken 29/07/19. Acoustic cladding fitted around the screen shaker and the diesel pumps. Drill Rig running throughout, with the diesels, pumps & screen shaker running continuously. Intermittent vehicle movements throughout the survey, shuttling supplies to/from & around pad.





A P P E N D I X F

Predicted noise levels – Drilling (Phase 2)

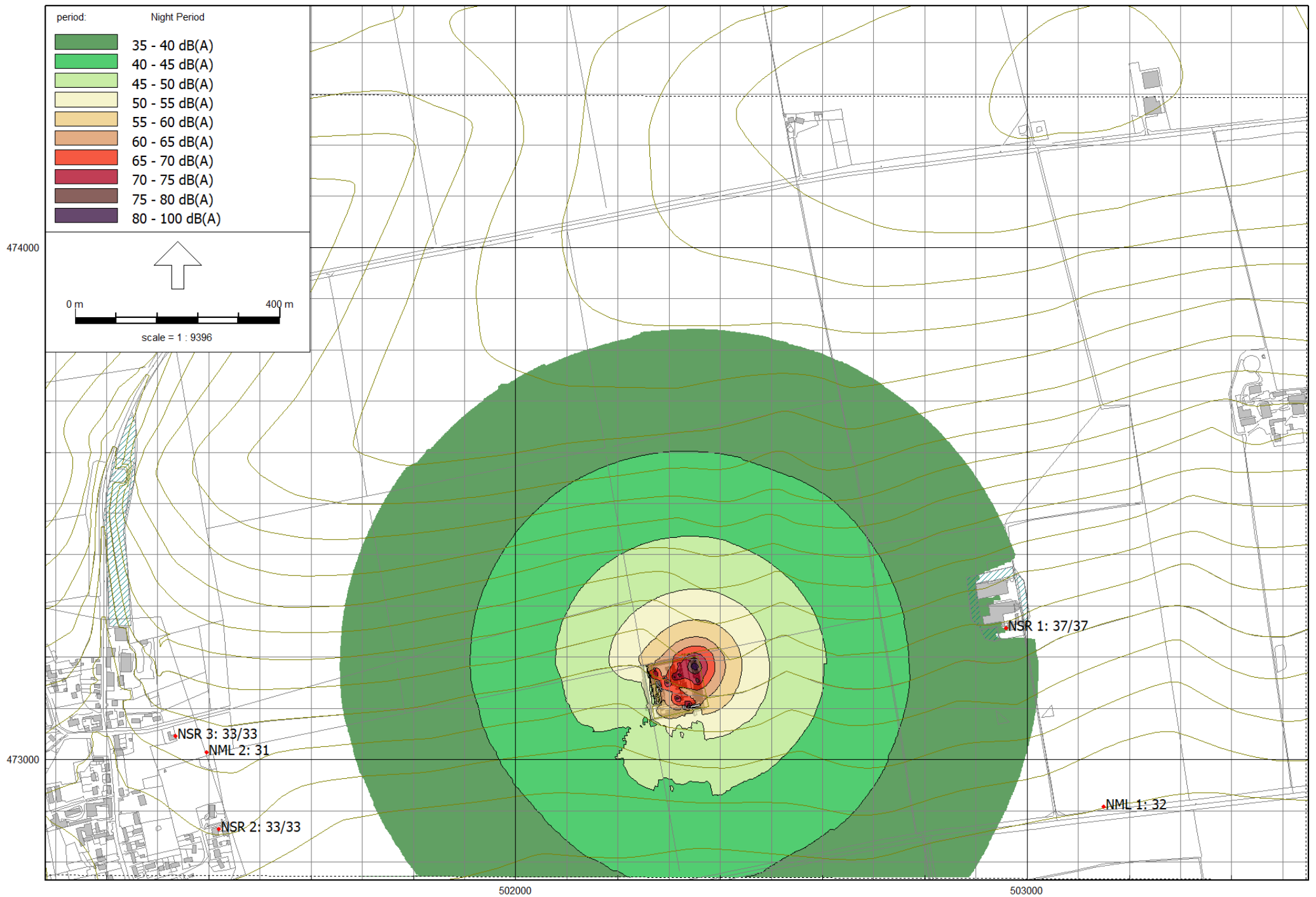




APPENDIX G

Predicted noise levels –Flow testing (Phase 3)

- Workover
- 24hr/day flow testing



Testing phase- nighttime

Report: Table of Results
 Model: Initial testing overnight P3b
 LAeq: total results for receivers
 Group: (main group)
 Group Reduction: No

Name				
Receiver	Description		Height	Night
NML 1 A	NML 1 - attended measurements		1.50	32.4
NML 2 A	NML 2 - attended and unattended monitoring		1.50	31.1
NSR 1 A	NSR 1 - Westfield House		1.50	36.7
NSR 1 B	NSR 1 - Westfield House		4.50	36.8
NSR 2_A	NSR 2 - 7 Eastfield		1.50	33.4
NSR 2 B	NSR 2 - 7 Eastfield		4.50	33.4
NSR 3 A	NSR 3 - Applegarth, Smythy Lane		1.50	32.8
NSR 3_B	NSR 3 - Applegarth, Smythy Lane		4.50	33.0

Testing phase- nighttime

Report: Table of Results
 Model: Initial testing overnight P3b
 LAeq: by Source/Group for receiver NSR 1_B - NSR 1 - Westfield House
 Group: (main group)
 Group Reduction: No

Name				
Source/Group	Description		Height	Night
NSR 1_B	NSR 1 - Westfield House		4.50	36.8
	Shrouded ground flare		4.00	35.2
3	Lighting tower		0.75	23.3
3	Lighting tower		0.75	23.2
3	Lighting tower		0.75	23.0
3	Lighting tower		0.75	22.7
3	Lighting tower		0.75	22.4
2	Generator		1.50	21.8
1	Compressor		1.00	21.6
2	Generator		1.50	21.5
4	Process flow at separator		2.75	13.7
4	Process flow at separator		2.75	13.6
Group	MR ANDREW CORKILL-305638-VML10K-FOXHOLES-A...		0.00	--



A P P E N D I X H

Flare Noise

PW Flare

As a 'design' noise mitigating feature, the PW flare is fitted with a shroud of 2m diameter and 8.5m height, bringing the total height of the flare stack assembly to 12m. Figure 2 provides detail of the full flare assembly.

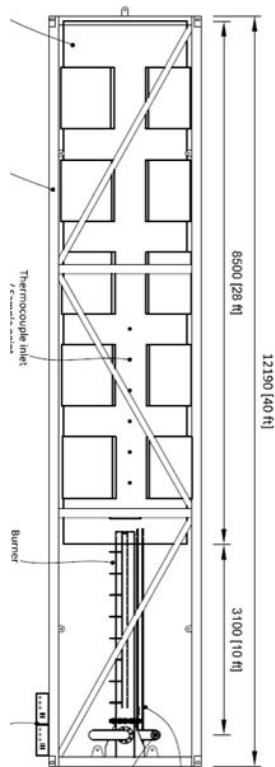


Figure 2: PW Flare Stack assembly

The sound power level of the PW flare has been calculated from sound pressure level (L_p) measurements recorded on similar equipment whilst operating at another wellsite. Specific detail of the site cannot be provided for confidentiality reasons.

It may be noted that a flare noise source exhibits directivity in the sound propagation pattern, with the noise level at 0° along the centreline of the stack being highest and with the noise level then reducing with increasing angle, from the vertical.

In this case the sound power level of the stack noise emission has been calculated for 90° (horizontally) to the stack lip, so including for a directivity adjustment between the measurement position (at 45°) and the horizontal (90°). The sound power level (L_w) may therefore be taken as an 'effective' sound power, applicable to sound propagation to 90°, or horizontal into the environment in the direction of the houses.

The calculation of the PW flare sound power level emission (L_w) for the intended flow rate of 1.0mmscfd, is included in Table 1. As only the overall dB(A) was provided from the actual flare measurements, the octave band levels reflect a typical flare noise spectrum shape.

Detail	L_{wA}	Octave Band Sound Power Levels (dB)								
		31	63	125	250	500	1k	2k	4k	8k
Measured L_p at 10m distance	74									
L_w calculated for 1.0mmcfd	103		101	100	101	100	99	94	88	80
L_w calculated for 2.5mmcfd	106		104	103	104	103	102	97	91	83

Table 1 Sound power level (L_w) calculation, relating to PW Flare.



A P P E N D I X J

Phase 3 – Equipment noise contributions during 24hr/day flow testing

Testing phase- nighttime

Report: Table of Results
 Model: Initial testing overnight P3b
 LAeq: total results for receivers
 Group: (main group)
 Group Reduction: No

Name				
Receiver	Description		Height	Night
NML 1 A	NML 1 - attended measurements		1.50	32.4
NML 2 A	NML 2 - attended and unattended monitoring		1.50	31.1
NSR 1 A	NSR 1 - Westfield House		1.50	36.7
NSR 1 B	NSR 1 - Westfield House		4.50	36.8
NSR 2_A	NSR 2 - 7 Eastfield		1.50	33.4
NSR 2 B	NSR 2 - 7 Eastfield		4.50	33.4
NSR 3 A	NSR 3 - Applegarth, Smythy Lane		1.50	32.8
NSR 3_B	NSR 3 - Applegarth, Smythy Lane		4.50	33.0

Testing phase- nighttime

Report: Table of Results
 Model: Initial testing overnight P3b
 LAeq: by Source/Group for receiver NSR 1_B - NSR 1 - Westfield House
 Group: (main group)
 Group Reduction: No

Name				
Source/Group	Description		Height	Night
NSR 1_B	NSR 1 - Westfield House		4.50	36.8
	Shrouded ground flare		4.00	35.2
3	Lighting tower		0.75	23.3
3	Lighting tower		0.75	23.2
3	Lighting tower		0.75	23.0
3	Lighting tower		0.75	22.7
3	Lighting tower		0.75	22.4
2	Generator		1.50	21.8
1	Compressor		1.00	21.6
2	Generator		1.50	21.5
4	Process flow at separator		2.75	13.7
4	Process flow at separator		2.75	13.6
Group	MR ANDREW CORKILL-305638-VML10K-FOXHOLES-A...		0.00	--



APPENDIX K

Draft Noise Management Plan

Weaverthorpe-1 Exploration Wellsite, Butt Lane, Foxholes, Drifffield, YO25 3HY

Noise Management Plan (Draft)

Report ref.

ARC7307/25034/V4

Issued to

Egdon Resources U.K. Ltd

Prepared by

Andrew Corkill MSc MIOA
Principal Consultant

Version	Authorised by	Remarks	Date
V1	ARC	For client comment	21/5/2025
V2	ARC	Incorporating client comments	6/6/2025
V3	ARC	Minor changes	17/6/2025
V4	ARC	Final Draft	8/07/2025



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1. INTRODUCTION

This draft Noise Management Plan (NMP) seeks to put in place measures, including noise monitoring where required, that will provide the appropriate level of protection for sensitive noise receptors in the event that activity commences on the proposed exploration wellsite on land north of Butt Lane, Foxholes, Drifffield, YO25 3HY.

For this project, it is proposed to submit a full NMP, which is generally considered to be current best practice and is more comprehensive than a Noise Complaint Procedure. This covers general management of noise issues, as well as detailing the noise monitoring requirements and the procedure for dealing with noise complaints.

There are four main phases to this project, with phase 4 dividing into two cases. These are described in table 1.

	Needs to be included in NVIA submitted for Planning or for Permitting ?	
	North Yorkshire Council (NYC)	Environment Agency (EA)
Phase 1: Construction of a temporary drilling pad.	Yes	No
Phase 2: Drill single exploration well	Yes	No
Phase 3: Flow testing (24hr/day for 2 weeks)	Yes	Yes
Phase 4: Suspend or restore site		
Case A: Proven gas	No	No
Case B: Insufficient or no gas	Yes	No

Table 1: Phases of the proposed development

If gas is proven (Case A) then the works to suspend the well are similar or less than those involved in constructing the well site, and will be limited to daytime, and so no additional assessment will be required as the conclusion of the Phase 1 assessment will apply.

If there is found to be insufficient or no gas (Case B), then some minor insignificant daytime construction activities will be carried out however noise will predominantly be from activity from a workover rig. This will be assessed as a separate subphase, and is a temporary activity.

It may be noted that whilst the mineral planning authority, North Yorkshire Council (NYC) is responsible for reviewing the assessment of noise arising during all activity in Phases 1, 2, 3 and 4, as regards noise, the EA is focussed primarily on Phase 3 (testing for 2 weeks (24hr/day)). However, in relation to the normal approach of the EA adopt on noise, they need to approve a NMP only if it is likely that a significant noise impact might arise, which would be a breach of the SOAEL¹ threshold. Within the NIA², this threshold is advised to be LAeq,T 45 dB at night whilst the predicted level is 10 dB lower at LAeq,T 35 dB. It is considered then that the EA will not seek to formally review the Noise Management Plan.

¹ Significant Observed Adverse Effects Level

² Weaverthorpe-1 Exploration Wellsite, Butt Lane, Foxholes, Drifffield, YO25 3HY. Noise and Vibration Impact Assessment to support Planning and Environmental Permit Applications, ARC7300/25034/V1



This Noise Management Plan sets out how noise emissions to the community will be minimised and controlled. This is a draft only and would be subject to further discussions in the event that planning consent is granted, so that further requirements of NYC may be included in the final version.

2. PLANNING CONDITIONS PROPOSED BY THE APPLICANT

The following noise conditions are those proposed by the applicant in the NVIA.

1. All recommendations outlined in the Noise and Vibration Impact Assessment ARC7300/25034/V# shall be implemented before each phase and shall be thereafter maintained until end of operations, unless otherwise agreed in writing by the MPA.

REASON: In the interests of residential amenity and in accordance with the local plan.

2. Within one month of the date of the permission being granted, a Noise Management Plan (NMP) shall be submitted to the Mineral Planning Authority (MPA) for review and approval. The Noise Management Plan NMP shall detail the procedures to be adopted to minimise noise and also the process to be followed in the event of a noise complaint being received or a request being made by the MPA for suitable noise monitoring and actions to be undertaken within 48 hours of notification. The NMP shall be complied with at all times.

REASON: In the interests of residential amenity and in accordance with the local plan.

3. Noise limits
The equivalent continuous sound level (L_{Aeq}) at the nearest noise sensitive properties to the site and attributable to the operations subject of this permission, shall not exceed the following values during daytime (07:00-19:00), evening period (19:00-22:00) and nighttime (22:00-07:00) weekdays, Saturdays and where applicable Sundays including Bank Holidays.
 - Phase 1 and 4 – Construction and site suspension/restoration: daytime $L_{Aeq,1hr}$ 50 dB, evening $L_{Aeq,1hr}$ 40dB and nighttime $L_{Aeq,15min}$ 40dB. Saturday work finish time of 13:00hrs. No work Sundays or bank holidays. No work between 19:00hrs and 07:00hrs on any other day.
 - Phase 2 - Drilling: daytime $L_{Aeq,1hr}$ 50dB, evening $L_{Aeq,1hr}$ 40dB and nighttime $L_{Aeq,15min}$ 40dB. These values apply on any day of the week during this specific phase only.
 - Phase 3 - Testing: daytime $L_{Aeq,1hr}$ 50 dB, evening $L_{Aeq,1hr}$ 40dB and nighttime $L_{Aeq,15min}$ 40dB. These values apply on any day of the week during this specific phase only.

REASON: In the interests of residential amenity and in accordance with the local plan.



4. Within one month of commencement of each phase, a verification report detailing with the actual noise produced at the commencement of each phase shall be submitted to the MPA. The verification report shall include results of onsite/attended monitoring for a representative monitoring period for each phase covering each of the noise limits detailed in Condition 3 above.

REASON: In the interests of residential amenity and in accordance with the local plan.

5. Vibration from construction work on site and during operation shall not exceed 0.3mm/s (PPV) at any residential property at any time.

REASON: In the interests of residential amenity and in accordance with the local plan.

3. NOISE MANAGEMENT PLAN

3.1 PHASE 1: SITE CONSTRUCTION

Potentially noise-making equipment used for the site construction and related works, includes the following:

- Electrical generator for (general and welfare).
- Compactor roller
- Excavator
- Aggregate vehicles HGVs
- Bulldozer
- Wheeled crane
- Concrete pouring
- Site compressor
- Lighting towers

Roadgoing HGVs are excluded from the noise management plan except when they are active on the site or site access track within the red line boundary. HGVs on the public road network do not fall within the scope of this plan.

All machinery will conform to the relevant EC Directives on the maximum permissible sound power levels emitted by construction equipment. Diesel exhaust silencers to the manufacturer's original specification shall be fitted and all deficiencies rectified before the machine is allowed to continue operating on site.

Engine covers and other noise control panels shall be kept properly closed whenever the machine is operating, and engines shall not be left running unnecessarily. At no time shall a machine operator leave the vicinity of his machine without first having switched off the engine. Any deficiencies in the manufacturer's original noise control equipment, including (but not limited to) broken, missing or



deformed panels, missing insulation materials or faults in panel fasteners shall be rectified before the machine is permitted to continue operating on site.

The levels of noise predicted within the NIA² during construction, are low and do not breach the LOAEL adverse effect threshold value.

3.2 PHASE 2: DRILLING

Potentially noise-making machinery on site during drilling is listed below.

- Rig engine, drawworks and top drive
- Pumps
- Electrical generators
- Screw compressor
- Hydraulic power unit
- Solids control equipment including agitators and circulation pumps

Large pumps and generators, the screw compressor and the hydraulic power unit will be installed in purpose-built acoustically lined housings, fitted with attenuators to allow the passage of cooling air through the housing. Diesel engines will be fitted with high-performance exhaust silencers.

Doors to acoustic enclosures and all other noise control panels shall be kept properly closed whenever machinery within is operating and shall only be opened to allow personnel to enter or leave the enclosure. Any deficiencies in the noise control equipment will be identified by inspection at the earliest opportunity. Deficiencies including (but not limited to) broken, missing or deformed panels and doors, missing insulation materials, faults in panel or door fasteners and damage to attenuators or exhaust systems shall be rectified before affected machinery is permitted to continue operating on site.

The levels of noise predicted within the NIA² during drilling are low and do not breach the LOAEL adverse effect threshold value.

3.3 PHASE 3: TESTING

Potentially noise-making machinery which may be required for the 24hr/day testing phase of the development is listed below. These are the items that will run potentially during this phase.

- Electrical generator
- Air compressor
- Separator system
- Shrouded ground flare

3.4 PHASE 4: SITE SUSPENSION OR RESTORATION

In the event of gas being proven (Case A), the suspension of the well will involve construction equipment similar but fewer items, to that listed within Phase 1. In the event of insufficient or no gas being found (Case B), other construction equipment, but again typically less than during Phase 1, will be used as part of the restoration works and initially this would include circulation pumps and a cement



pump and other less significant construction equipment. However, the most significant noise source during this phase will be a workover rig .

All machinery will conform to the relevant UK legislation on the maximum permissible sound power levels emitted by construction equipment. Diesel exhaust silencers to the manufacturer's original specification shall be fitted and all deficiencies rectified before the machine is allowed to continue operating on site.

3.5 ALL PHASES

Training

The site induction programme and site rules during all phases will include instructions on good working practices for site staff, managers, visitors and contractors in order to minimise noise whilst working on the site. These practices will include, but not be limited to:

- The avoidance of unnecessary revving of engines;
- Plant used intermittently to be shut down when not actually in use
- Reversing to be avoided wherever possible without comprising any site safety considerations;
- Compliance with the site speed limit at all times;
- Reporting of any defective equipment or plant as soon as possible, so that corrective maintenance can be undertaken;
- Handling materials and tools in a manner that minimises noise.

Maintenance

Maintenance of plant will be carried out routinely and in accordance with the manufacturers' guidance. Scheduled inspections of all plant and equipment recognised as potential noise sources will be undertaken to ensure that:

- All plant is in a good state of repair and fully functional;
- Any plant found to be requiring interim maintenance is identified and taken out of use wherever practicable;
- Any acoustic enclosure fitted to plant is in a good state of repair;
- Any doors and covers remain closed during operation;
- Repairs are undertaken only by fully qualified maintenance staff.

4. NOISE MONITORING

4.1 TIMETABLE FOR MONITORING

It is most important for suitable noise monitoring to be triggered either if noise complaints are received or if specifically requested by the minerals planning authority (MPA). Measurements will be obtained within 48 hours of a complaint being received or a request being made by the MPA, subject to weather conditions being suitable for measurements.



It may be appropriate also to consider carrying out attended noise measurements at the commencement of key phases, particularly those that continue through the night (eg Phase 2 drilling and Phase 3 testing). The details of such additional tests can be discussed with NYC at the detailed design stage and would be subject to their agreement before planned attended measurements took place. With set back distances being so large at this site, temperature gradients and wind direction effects can attenuate received noise by up to 15 dBA, such monitoring would therefore have to also include readings undertaken close to the site and extrapolations made to establish highest expected levels likely at sensitive receptors.

4.2 LOCATIONS

The nearest noise-sensitive locations are shown in the table below. Some of these locations can only be accessed over private land, so a proxy noise measurement location may be appropriate. Unless access to private land has previously been agreed for that purpose, all measurement locations must be publicly accessible.

Noise Sensitive Receptor (NSR)	NSR Name	OS grid reference	Distance (m) and Direction in relation to wellsite centre
NSR 1	Westfield House	502963E, 473259N	635m E
NSR 2	7 Eastfield	501407E, 472866N	940m WSW
NSR 3	Applegarth, Smythy Lane	501331E, 473047N	975m W

Table 2: Nearest noise sensitive receptors to the site

In the event of planned noise monitoring at the commencement of key phases, measurements close to the site might be necessary followed by extrapolation to the NSR, for a meaningful worst case or highest level of noise at an NSR, to be established.

4.3 REPORTING

On completion of a noise survey, a report shall be made available in a format suitable for submission to the Mineral Planning Authority. The report shall be submitted within five working days of completion of the measurements.

The report shall contain, as a minimum:

- The measured sound levels LAeq,T during site activity;
- The positions of measurements selected and justification of their selection
- Details of the instrumentation used to include calibration dates;
- Weather observations for the date of the survey;
- Calculation method used in the event of extrapolating NSR levels from measurements close to the site
- Comments on the audibility of the site and regarding tonality and impulsive noise; and
- Details of any extraneous noise sources that may have influenced the noise climate.

The report shall compare the measured or extrapolated sound levels against the planning condition noise limits.



4.4 NOISE LIMITS

The noise limits against which noise monitoring results will be compared are those set out in planning conditions issued by NYC. Proposed noise limits are included within draft planning conditions in section 2 of this document.

4.5 NOISE MITIGATION

In the event of a breach of any noise limit the noise source(s) causing the excessive noise will be identified in consultation between the Noise Specialist and the site manager. If the breach is likely to continue then suitable mitigation measures shall be implemented, such as replacing faulty noise control equipment, substituting quieter replacement machinery, or the installation of additional noise reduction measures.

For drilling operations, a further period of night-time noise monitoring shall be undertaken after the noise mitigation measures have been implemented, in order to demonstrate the success of the action(s).

After any excesses have been rectified during other activities on site, further measurements or monitoring will be undertaken and reported to demonstrate the necessary noise reductions have been achieved.

5. COMPLAINTS PROCEDURE

In the event of a complaint from a resident or local business to the Minerals Planning Authority about noise during any operational phase, or a complaint made directly to the site manager or designated person, the following procedure shall be followed. Egdon Resources U.K. Limited shall record the issue as per the HSE Management System procedures, and specifically the Incident Management Procedure.

In the event that the source of the noise has already been monitored according to the procedures in the NMP and no excess found, this shall be taken as evidence that there is no breach of any noise planning condition. The complaint shall, however, be recorded.

In the event that either no noise monitoring has yet been conducted, such monitoring shall take place at the earliest opportunity and in any event within 48 hours of receipt of the complaint (subject to appropriate weather). The complainant shall be informed by North Yorkshire Council that investigations are under way. If the investigations demonstrate that a breach of the conditioned limits was likely to have occurred, remedial works shall be implemented to prevent a further breach. NYC shall be kept informed of progress.

If noise monitoring for the appropriate phase of operations has already been completed, and noise control actions are under way in consequence, the complainant shall be informed to that effect by NYC. In any event, all parties will be further informed of the results of noise mitigation measures, once these have been demonstrated by further noise survey(s) to have been effective in meeting the conditioned noise limits.

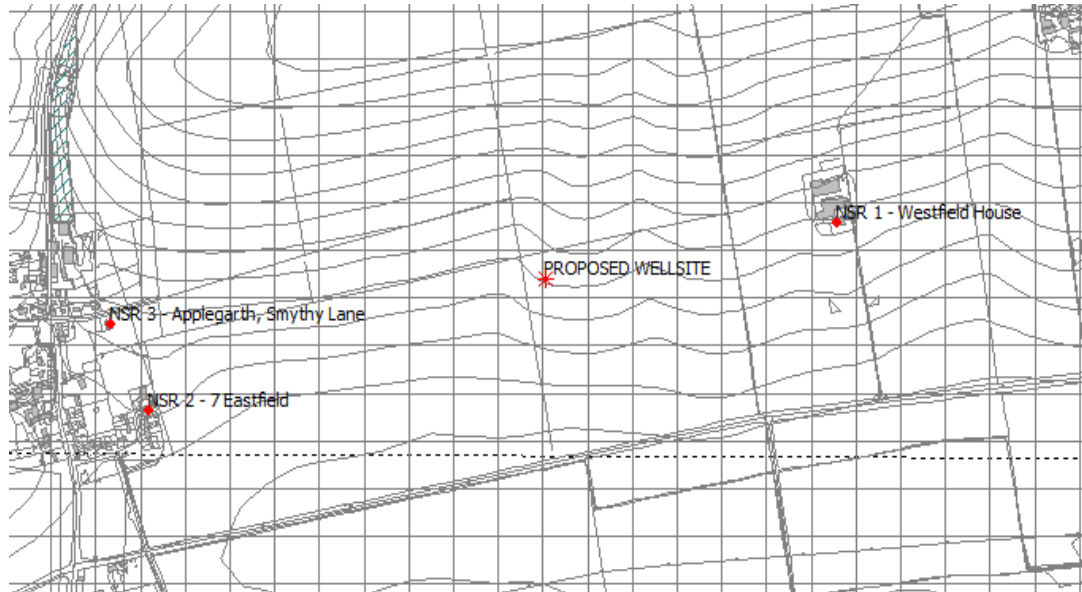


Figure 1: Nearest noise sensitive receptors to the well site.

In any instance of a breach of noise thresholds, across any development phases, Egdon Resources U.K. Limited Production and HSE Manager must be informed immediately by the site manager.

Details of any action taken to reduce noise emissions shall be recorded, and the results of noise monitoring submitted to the Environmental Health team at NYC within 5 working days of completion of the site visit.

Head Office

Spectrum Acoustic Consultants Ltd
27-29 High Street
Biggleswade
Bedfordshire
SG18 0JE
UNITED KINGDOM

 +44 (0)1767 318871

 enquiries@spectrumacoustic.com

 www.spectrumacoustic.com

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SG18 0JE
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