13. Noise and Vibration

13.1 Introduction

13.1.1 MVV Environment Limited (the Applicant) has submitted a full planning application for a Carbon Capture Retrofit Ready (CCRR) Energy from Waste Combined Heat and Power (EfW CHP) Facility at Canford Resource Park (CRP), off Magna Road, in the northern part of Poole. Together with associated CHP Connection, Distribution Network Connection (DNC) and Temporary Construction Compounds (TCCs), these works are the Proposed Development.

13.1.2 The primary purpose of the Proposed Development is to treat Local Authority Collected Household (LACH) residual waste and similar residual Commercial and Industrial (C&I) waste from Bournemouth, Christchurch, Poole and surrounding areas, that cannot be recycled, reused or composted and that would otherwise be landfilled or exported to alternative EfW facilities further afield, either in the UK or Europe.

13.1.3 The Proposed Development would recover useful energy in the form of electricity and hot water from up to 260,000 tonnes of non-recyclable (residual), non-hazardous municipal, commercial and industrial waste each year. The Proposed Development has a generating capacity of approximately 31 megawatts (MW), exporting around 28.5 MW of electricity to the grid. Subject to commercial contracts, the Proposed Development will have the capability to export heat (hot water) and electricity to occupiers of the Magna Business Park and lays the foundations for a future CHP network to connect to customers off Magna Road.

13.1.4 The location and the extent of the Proposed Development is identified by the red line shown on **Figure 1.1**. In total, the Proposed Development covers an area of 10.1 hectares (Ha).

13.1.5 A full description of the Proposed Development is provided in **ES Chapter 3: Description of the Proposed Development**. A list of terms and abbreviations can be found in **ES Appendix 1.1**.

13.1.6 This chapter of the ES has been produced by Southdowns Environmental Consultants Ltd to assess the Proposed Development in relation to the potential noise and/or vibration effects it could have upon nearby sensitive Receptors.

13.1.7 The noise and vibration assessment comprises the following elements:

- a noise survey at a selection of the nearest noise sensitive Receptors in order to obtain a measure of the baseline noise conditions;
- an assessment of the potential noise and vibration effects during the construction phase of the Proposed Development, by examining the effects of individual and concurrent construction activities as well as the noise from off-site construction traffic. Noise levels have been calculated using a software computer model (SoundPLAN 8.2);
- an assessment of the potential operational traffic noise effects due to an increase in HGV movements on the immediate surrounding road network, using guidance published by the Highways Agency; and
- an assessment of the predicted potential operational noise effects of the Proposed Development following the principles of the British Standard (BS) 4142:2014+A1:2019[1]

[1] British Standards Institution. BS 4142:2014+A1:2019. *Methods for rating and assessing industrial and commercial sound*.

assessment methodology and using guidance given by the Environment Agency (EA)[2] on the management of noise and vibration.

13.1.8 The potential noise effects identified are presented, along with any potential mitigation measures required to prevent or minimise noise. Any residual effects (of moderate or major significance) that remain with these mitigation measures are then referred to as temporary or permanent significant effects.

13.2 Assessment Criteria & Methodology

Legislative Context, Technical Guidance and Best Practice

Legislative Context

National Planning Policy and Guidance

13.2.1 The Noise Policy Statement for England (NPSE)[3], sets out the long-term vision of Government noise policy.

13.2.2 The vision of the NPSE is to 'Promote good health and a good quality of life through the effective management and control of noise within the context of Government policy on sustainable development'.

13.2.3 The NPSE has adopted the following concepts to help consider whether noise is likely to have 'significant adverse' or 'adverse' effects on health and quality of life:

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

13.2.4 The Government's National Planning Policy Framework (NPPF)[4] sets out the Government's planning policy for England and how it should be applied. The NPPF replaced a number of planning policy guidance documents, including the now archived Planning Policy Guidance 24: Planning and Noise[5].

13.2.5 Planning Practice Guidance (PPG) on noise[6] advises local planning authorities to take into account the acoustic environment, and in doing so consider the following:

- whether or not a significant adverse impact is occurring or likely to occur;
- whether or not an adverse impact is occurring or likely to occur; and

[2] Environment Agency, 2022. *Noise and Vibration Management: Environmental Permits.*
[3] Department for Environment Food and Rural Affairs, 2010. *Noise Policy Statement for England (NPSE).*
[4] Department of Communities and Local Government, 2012 (last updated 2021). *National Planning Policy Framework.*
[5] Department of Communities and Local Government, 1994. *Planning Policy Guidance 24: Planning and Noise.*
[6] Department for Environment Food and Rural Affairs, 2014 (last updated 2019). *Planning Practice Guidance on noise.*

- whether or not a good standard of amenity can be achieved.

13.2.6 Guidance on the significance of noise effects is summarised in a Noise Exposure Hierarchy that is presented in PPG – Noise and is represented in **Table 13-1**.

Table 13-1: Planning Practice Guidance – Noise Exposure Hierarchy

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

13.2.7 Where no other relevant scales exist, then the above scale will be used to identify the significance of any observed effects. Where other relevant scales have been published and are used for the identification of significant effects from specific sources of noise, then these will be used as indicated below. A unified project of significant effects will be developed that takes into account both the magnitude of impact and the sensitivity of Receptor.

Control of Pollution Act

13.2.8 A regulatory framework for controlling statutory noise nuisance from construction sites is provided under the Control of Pollution Act 1974[7]. Section 60, Part III of Chapter 40 of this Act provides Local Authorities with powers to control noise and vibration from construction sites, whilst developers or contractors can seek prior consent for demolition and construction work under Section 61 of the same part of the Act.

Environment Agency – Noise and Vibration Management: Environmental Permits

13.2.9 The Environmental Agency (EA) has published guidance[8] in relation to the management of noise and vibration as part of the conditions for an environmental permit which states:

"The environment agencies will treat noise in the same way as any other polluting emission. If noise is audible at any of the following types of locations, they will regard it as 'possibly causing an impact':

- *residential properties*
- *schools*
- *hospitals*
- *offices*
- *public recreation areas*
- *other noise sensitive receptors (NSR)*
- *noise sensitive habitats*

Where noise is possibly causing an impact, the operator must carry out an assessment to determine:

- *the level of impact*
- *how much work needs to be done to prevent or minimise noise pollution*

Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution. For Landfill Directive installations you should interpret this as meaning all reasonable steps must be taken to prevent noise nuisance. In this guidance, appropriate measures and BAT are equivalent and interchangeable"

13.2.10 The operational noise impact assessment is broken down into 4 steps; desktop risk assessment, off-site monitoring, source assessment, and BAT or appropriate measures justification.

13.2.11 The desktop risk assessment identifies plant or operations that may be audible at any NSR.

13.2.12 Off-site monitoring is required to measure and determine the existing background acoustic environment as per the standard BS 4142.

13.2.13 The source assessment quantifies the emissions from the identified plant or operations at NSR locations. The resulting level of operational noise impact is described as:

- *"Unacceptable level of audible or detectable noise*

[7] UK Government, 1974. *Control of Pollution Act 1974.*
[8] Environment Agency (EA), 2021 (last updated 2022). *Noise and Vibration Management: Environmental Permits*

- *This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures).*
- *You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.*
- *The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context).*

- *Audible or detectable noise*
  - *This level of noise means that noise pollution is being (or is likely to be) caused at a receptor.*
  - *Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.*
  - *The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context)*
- *No noise, or barely audible or detectable noise*
  - *This level of noise means that no action is needed beyond basic appropriate measures or BAT.*
  - *The closest corresponding BS 4142 descriptor is 'low impact or no impact' (following consideration of context).*
  - *Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority. Note that BS 4142 is unlikely to be the appropriate methodology on its own to assess low frequency noise."*

13.2.14 The findings of the source assessment should be assessed, contextualised and justification provided to confirm that BAT will be implemented to prevent or minimise polluting noise.

British Standard 5228

13.2.15 BS 5228-1:2009+A1:2014[9] provides guidance on mitigation options available. These include engineering measures, restricted hours of working and the setting of boundary or community noise limits.

13.2.16 Criteria for the control of building damage and disturbance effects of vibration are provided in BS 5228-2:2009+A1:2014[10].

Vibration Affecting Human Receptors

13.2.17 BS 5228 Part 2 provides guidance on the perception of vibration within occupied buildings. This guidance provides a simple method of determining the potential annoyance alongside evaluating cosmetic damage associated with vibration.

[9] British Standards Institution, 2014. BS 5228-1:2009+A1:2014. *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise.*
[10] British Standards Institution, 2014. BS 5228-2:2009+A1:2014. *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.*

13.2.18 **Table 13-2** details Peak Particle Velocity (PPV) levels and their potential effect on humans and provides a semantic scale for a description of construction vibration effects on human Receptors.

Table 13-2: Guidance on Human Effects of Peak Particle Velocity (PPV) Levels with Magnitude of Effect

Peak Particle Velocity Level [1,2,3]	Description	Magnitude of effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Very Low
0.3 mm/s	Vibration might be just perceptible in residential environments.	Low
1.0 mm/s	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.	Medium
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	High

Note:
1) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
2) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
3) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

13.2.19 Where the vibration experienced at a structure exceeds the values shown in **Table 13-2**, this is considered to have a potential adverse effect. Based on BS 5228, **Table 13-3** presents the criteria for the description of magnitudes of vibration effects.

Table 13-3: Magnitude of Effect for Construction Induced Vibration

Vibration Level (PPV)	Magnitude of Effect
<1.0 mm/s	No change
1.0 mm/s to 3.0 mm/s	Very Low
3.0 mm/s to 5.0 mm/s	Low
5.0 mm/s to 10 mm/s	Medium
>10 mm/s	High

British Standard 4142

13.2.20 BS 4142:2014+A1:2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’ (BSI, 2019) provides a procedure for the measurement and assessment of sound of an industrial and/or commercial nature and the likely effects of such sound on people

who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

British Standard 8233

13.2.21 BS 8233:2014[11] gives recommendations for the control of noise in and around buildings. The Standard suggests appropriate criteria and limits for different situations to guide the design of new or refurbished buildings undergoing a change of use.

Baseline Data Collection

13.2.22 The collation of baseline data is presented in **ES Appendix 13.1**.

Predicted Effects

Construction Activity Noise

13.2.23 The potential effects of construction noise and vibration should not be significant due to the separation distance between the Proposed Development and the nearest Receptors as well as the temporary nature of the activity.

13.2.24 Ultimately, the scale of any adverse noise effects due to construction activity will depend on the principal construction activities deployed, the incorporated mitigation and the effective execution of a comprehensive Construction Noise and Vibration Management Plan or equivalent. Construction noise levels have been assessed using the ABC Method assessment described in in BS 5228-1:2009+A1:2014.

13.2.25 The semantic scale of construction noise impact defined in DMRB (Design Manual for Roads and Bridges) LA 111[12], based on the ABC Method assessment in BS 5228-1, is presented in **Table 13-4,** including the time periods and defines LOAEL and SOAEL for construction noise.

Table 13-4: Construction Noise – LOAEL & SOAEL

Time Period	LOAEL	SOAEL
Daytime Weekday 07:00 to 19:00 Saturday 07:00 to 13:00	Baseline Noise Levels $L_{Aeq,T}$	Threshold Determined as per BS 5228-1 Section E3.2 and Table E.1
Night 23:00 to 07:00	Baseline Noise Levels $L_{Aeq,T}$	Threshold Determined as per BS 5228-1 Section E3.2 and Table E.1
Evening and weekends (Time periods not considered above)	Baseline Noise Levels $L_{Aeq,T}$	Threshold Determined as per BS 5228-1 Section E3.2 and Table E.1

Note: Where specific local circumstances mean that an alternative method of setting LOAEL and SOAEL for noise sensitive Receptors is more appropriate, the alternative method can be submitted as a departure from standards to the Overseeing Organisation (BCP Council) for approval.

[11] British Standards Institution, 2014. BS 8233:2014. *Guidance on sound insulation and noise reduction for buildings.*
[12] Highways England, 2020. *LA 111 Noise and Vibration – (Revision 2).*

13.2.26 The ABC method assessment applies to residential dwellings only. All non-residential dwellings are assessed using the 5 dB (decibel) (A) change method as defined in BS 5228-1.

13.2.27 **Table 13-5** defines the magnitude of impact of construction traffic noise.

Table 13-5: Magnitude of impact – Construction Noise

Magnitude of impact	Construction Noise Level
Major	Above or equal to SOAEL+5dB
Moderate	Above or equal to SOAEL and below SOAEL+5dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Note: Where specific local circumstances mean that an alternative method of setting LOAEL and SOAEL for noise sensitive Receptors is more appropriate, the alternative method can be submitted as a departure from standards to the Overseeing Organisation for approval.

13.2.28 Construction noise shall constitute a significant effect where it is determined that a major or moderate impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or
- A total number of days exceeding 40 in any 6 consecutive months.

Construction Vibration

13.2.29 The semantic scale of construction vibration impact defined in DMRB LA 111 is presented in **Table 13-6**, including the time periods and defines the LOAEL and SOAEL for construction vibration.

Table 13-6: Construction Vibration – LOAEL & SOAEL

Time Period	LOAEL	SOAEL
All Time periods	0.3mm/s PPV	1.0mm/s PPV

Note: Where specific local circumstances mean that an alternative method of setting LOAEL and SOAEL for noise sensitive Receptors is more appropriate, the alternative method can be submitted as a departure from standards to the Overseeing Organisation for approval.

13.2.30 **Table 13-7** defines the magnitude of impact of construction vibration.

Table 13-7: Magnitude of impact - Construction Vibration

Magnitude of impact	Construction Noise Level
Major	Above or equal to 10 mm/s PPV
Moderate	Above or equal to SOAEL and below 10 mm/s PPV
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

13.2.31 Construction vibration shall constitute a significant effect where it is determined that a major or moderate impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or
- A total number of days exceeding 40 in any 6 consecutive months.

Operational: Plant Noise - Residential

13.2.32 BS 4142 provides guidance on the rating and assessment of sound of an industrial and/or commercial nature. This is the method of assessment advised by EA guidance.

13.2.33 The standard states that:

"This standard is applicable to the determination of the following levels at outdoor locations:

- *Rating levels for sources of sound of an industrial and/or commercial nature; and*
- *Ambient, background and residual sound levels*

for the purposes of:

- *Investigating complaints;*
- *Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and*

Assessing sound at proposed new dwellings or premises used for residential purposes."

13.2.34 The determination of sound amounting to nuisance is beyond the scope of BS 4142:2014+A1:2019.

13.2.35 The significance of sound of an industrial and/or commercial nature depends upon the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

13.2.36 Typically, the greater the difference between rating level and background sound levels, the greater the magnitude of the impact. BS 4142:2014+A1:2019 provides the following guidance when assessing the difference in the rating level and background sound assessment level:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context; and
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

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

13.2.38 Certain acoustic features can increase the significance of the impact over that expected from a basic comparison between specific sound level and the background sound level. These features include tonality and impulsivity, as well as additional characteristics and intermittency of the sound.

13.2.39 Where appropriate, a rating penalty for sound based on a subjective assessment of its characteristics should be established. In other circumstances, an objective appraisal of tonal and/or impulsive characteristics may be appropriate.

13.2.40 An individual's response to sound can be subjective, and the significance of a sound level impact can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood. BS 4142 recognises the importance of the context in which a sound occurs and has considered the acoustical terms 'sound' and 'noise' in its development. BS 4142 refers to 'sound' as being measured by a sound level meter or other measuring system. The standard refers to 'noise' as relating to human response and is routinely described as unwanted sound, or a sound considered undesirable or disruptive.

13.2.41 If the difference between the background LA90 noise level and the Rating Level of site noise is greater than 10dB, then effects are considered significant and generic options for additional mitigation will be identified, in addition to the incorporated mitigation that is anticipated for the base case scenario. A 5 dB difference will be considered to be a potential adverse effect subject to the acoustic context of the prevailing environment.

13.2.42 The semantic scale of operational noise is presented in **Table 13-8** including the time periods and defines LOAEL and SOAEL for operational noise.

Table 13-8: Operation Noise – LOAEL & SOAEL – Residential Receptors

Time Period	LOAEL	SOAEL
All Time periods	Background Sound Level, $L_{A90,T}$	Background Sound Level, $L_{A90,T}$ +5 dB

Operational: Plant Noise – Non-Residential Dwellings

13.2.43 Guidance in BS 8233:2014 on sound insulation and noise reduction in buildings gives recommendations for the control of noise in and around buildings. The standard suggests appropriate criteria and limits for different situations to guide the design of new or refurbished buildings undergoing a change of use.

13.2.44 Desirable noise levels inside non-domestic buildings when they are unoccupied are specified in the standard and are reproduced in **Table 13-9**.

Table 13-9: BS 8233 Typical Noise levels in Non-Domestic Buildings

Activity	Location	Design Range dB $L_{Aeq,T}$
Speech or telephone communications	Department store Cafeteria, canteen, kitchen	50 - 55
	Concourse Corridor, circulation space	40 - 55
Study and work requiring concentration	Library, gallery, museum	40 - 50
	Staff/meeting room, training room	35 - 45
	Executive office	35 - 40
Listening	Place of worship, counselling, meditation, relaxation	30 - 35

13.2.45 Guidance for ambient noise levels within schools is presented in Building Bulletin 93[13]. A simplified reproduction of the upper limits for indoor ambient noise levels within schools is presented in **Table 13-10**.

Table 13-10: Upper limits for indoor ambient noise levels with schools

Type of Room	Upper limit for the indoor ambient noise level, $L_{Aeq,30mins}$ dB	
	New Build	Refurbishment
Nursery school rooms ***Primary school*: classroom, class base, general teaching area, small group room** ***Secondary school*: classroom, general teaching area, seminar room, tutorial room, language laboratory**	35	40
Teaching space intended specifically for students with special hearing and communication needs	30	35

13.2.46 **Table 13-11** summarises the time periods and defines LOAEL and SOAEL for other non-residential Receptors.

Table 13-11: Non-Residential Receptors – LOAEL & SOAEL

Building Activity	LOAEL	SOAEL
Speech or telephone communications	40	55
Study and work requiring concentration	35	50
Listening	30	35
School	30 $L_{Aeq,30mins}$ dB	35 $L_{Aeq,30mins}$ dB

Operational: Plant Noise – Ecological

13.2.47 Receptor R22 (see **Figure 13.1** for location) has been included as an ecological Receptor due to the presence of nightjar habitats, nocturnal birds which are a species of conservation concern according to the Woodland trust (Woodland Trust, 2022).

13.2.48 Noise can affect birds when the noise is sudden or at a high level over a prolonged period. Noise levels may also effects birds due to the masking effects on their ability to communicate.

13.2.49 The hearing range of birds is comparable to humans. Although humans can hear over a wider range of frequencies, birds hear sounds at a greater sensitivity. Both birds and humans can hear the softest sounds at around 3kHz. Therefore, the A-weighting curve can be applied to noise levels, although it should be taken as an indicative metric.

[13] Department for Education, 2014. *Acoustic Design of Schools: Performance Standards. Building Bulletin 93 (BB93).*

13.2.50 Relevant guidance of the effects of noise on birds, although not targeted at the nightjar, is provided in the Waterbird Disturbance toolkit[14], which advises that a level of over 55 dBA is like to represent a minimum disturbance threshold for sudden noises and prolonged noise up to 70 dBA may be acceptable to a bird[15].

13.2.51 The call of a nightjar has a peak sound pressure level between the 1-2 kHz frequency bands. In Germany, a standard of 52 dB(A) is applied to define a zone of significant effect on the corncrake within a Special Protection Area (SPA). The corncrake are birds with nocturnal calls, which are variable and have wider frequency ranges than nightjars. However, they do include calls with high sound pressure levels within the 1-2 kHz frequency range. Therefore, it would be precautionary to apply a threshold of 52 dB(A) at Receptor R22.

13.2.52 It should be noted that nightjars reside within the area between April and September.

13.2.53 **Table 13-12**: presents the time periods and defines LOAEL and SOAEL for ecological Receptors.

Table 13-12: Ecological Receptor – LOAEL & SOAEL

Time Period	LOAEL	SOAEL
All Time Periods	52 dB $L_{Aeq,1hr}$	70 dB $L_{Aeq,1hr}$

Operational: Plant Noise – Magnitude of Impact

13.2.54 **Table 13-13** defines the magnitude of impact of operational noise for all Receptors.

Table 13-13: Magnitude of impact – Operational Noise

Magnitude of impact	Operational Noise Level
Major	Above or equal to SOAEL+5dB
Moderate	Above or equal to SOAEL and below SOAEL+5dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Traffic Noise

13.2.55 Procedures for the calculation and evaluation of road traffic noise effects are described in DMRB LA 111.

13.2.56 DMRB LA 111 covers the methodology to be used for the assessment of noise from road traffic to establish the magnitude and significance of any change due to construction, operation, and maintenance projects. Both construction and operational phase traffic noise impacts are calculated based on Basic Noise Level (BNL) change.

[14] TIDE Tidal River Development. *Waterbird Disturbance & Mitigation Toolkit.* https://www.tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/ (Accessed 07 January 2023).
[15] Argus Ecology, 2014. *Proposed Energy Centre Bilsthorpe Business Park, Nottinghamshire. Addendum report: impact assessment on nightjar (Caprimulgus europaeus) in Cutts Wood.*

Construction Traffic

13.2.57 **Table 13-14** defines the magnitude of impact of construction phase traffic noise.

Table 13-14: Magnitude of change – Construction Traffic Noise

Magnitude of impact	Short term noise change (dB $L_{A10,18hr}$ or L_{night})
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	Less than 1.0

13.2.58 Construction Traffic noise shall constitute a significant effect where it is determined that a major or moderate impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; or
- A total number of days exceeding 40 in any 6 consecutive months.

Operational Traffic

13.2.59 **Table 13-15** defines the magnitude of impact of operational phase traffic noise.

Table 13-15: Magnitude of change – Operational Traffic Noise

Magnitude of impact	Long term noise change (dB $L_{A10,18hr}$ or L_{night})
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 4.9
Negligible	Less than 3.0

Geographical Scope

13.2.60 The spatial scope of the Study Area comprises:

- Land within 500m from the boundary of the EfW CHP Facility Site; and
- Additional Receptor locations beyond 500m, as necessary, to ensure that the nearest and most sensitive Receptors are protected in all directions.

13.2.61 Operational vibration from the EfW CHP Facility Site is not expected to be significant given the minimum separation distances of 400-500m between residential Receptors and EfW CHP Facility Site. Vibration caused by HGV movements on the local road network should also be minimal assuming that EfW CHP Facility Site access roads are well maintained. As such, operational vibration is not assessed as part of this chapter.

Temporal Scope

13.2.62 Should consent be granted in 2023, it is anticipated that construction of the Proposed Development will commence in Q1 2024 and take approximately 36-months to complete. Therefore, the construction programme has been assumed to last for 36-months from the commencement of works.

13.2.63 The operational phase is assumed to be permanent for the purposes of this assessment.

Consultation

Statutory Consultation

13.2.64 In relation to noise and vibration, BCP Council[16], in their Scoping Opinion (**ES Appendix 5.1**), noted that effects should be scoped into the ES. Cumulative effects from vehicle movements and activities (construction or operation) should assume open windows.

13.2.65 The effects of noise and vibration during construction and operational phases should consider wildlife and properties currently under construction, west of Bearwood (Farrier Place), as part of the considered sensitive Receptors.

Community Consultation

13.2.66 As part of the Applicant's commitment to engage with the local community, three public exhibitions were held between 12 and 14 January 2023. The exhibitions occurred at the Hamworthy Club, Magna Road and Bearwood Community Centre, King John Avenue. Feedback from these events is reported in the Statement of Community Involvement that accompanies the planning application.

13.2.67 Concerning noise and vibration, feedback included:

- Concerns about the construction activities and the noise impacts to residents;
- Concerns about 24/7 operational noise for the EfW CHP Facility and the noise and vibration impacts to residents; and
- Concerns about vibration from HGV on the A314.

13.2.68 Where appropriate, in undertaking this assessment, the community's feedback has been considered and a summary response provided in the **Statement of Community Involvement** that accompanies the planning application.

Assumption and Limitations

Construction

13.2.69 The following assumptions have been made specifically regarding the noise calculation models used to predict construction activity and road traffic noise levels:

- Construction activity assumptions have been based upon information provided by The Applicant. These are presented in **ES Appendix 13.1**;

[16] BCP Council, 2022. *Environmental Impact Assessment Scoping Opinion request for an Energy from Waste and Combined Heat and Power Facility at Canford Resource Park.*

- The topography of the area has been modelled using Lidar data from Defra (Department for Environmental Foot & Rural Affairs).
- The ground type has been assumed as soft ground, with the exception of roads, the EfW CHP Facility Site and TCC; these are modelled as hard;
- Noise levels have been predicted 1m from the façade of the property of interest with noise levels calculated at ground and upper floors, where appropriate. Ground floor Receptor heights have been set 1.5m above local ground, with upper floors modelled in 2.5m high intervals;
- All point sources and line sources representing traffic movements have been modelled, 1.5m above local ground; and
- Traffic Noise Calculations - Traffic speed has been assumed to be 40mph (64km/h) on public highways and the road surface has been modelled as impervious.

13.2.70 The assumed programme of construction works for the Proposed Development is presented in **Table 13-24**. This programme has been assumed based on information provided by the Applicant and used for the calculation of potential combined noise effects.

Operational

13.2.71 The following assumptions have been made specifically regarding the noise calculation models used to predict operational activity noise levels:

- A +3 dB correction has been applied to the specific sound levels to compensate for potential uncertainty within the source data provided in the sound model;
- Operational plant assumptions have been based upon information provided the Applicant. These are presented in **ES Appendix 13.1**; and
- The ground type has been assumed as soft ground, except for roads and the EfW CHP Facility Site; these are modelled as hard.

13.3 Baseline Conditions

Current Baseline

13.3.1 The sensitivity of Receptors has been assessed using expert judgement and described using a semantic scale. The Receptor sensitivity judgements are guided by the understanding of baseline conditions within the local vicinity.

13.3.2 Although the majority of sensitive Receptors in the area are residential premises, there is also a nearby school and noise sensitive commercial premises.

13.3.3 **Table 13-16** presents the scale used to categorise the sensitivity of each Receptor.

Table 13-16: Receptors and sensitivity

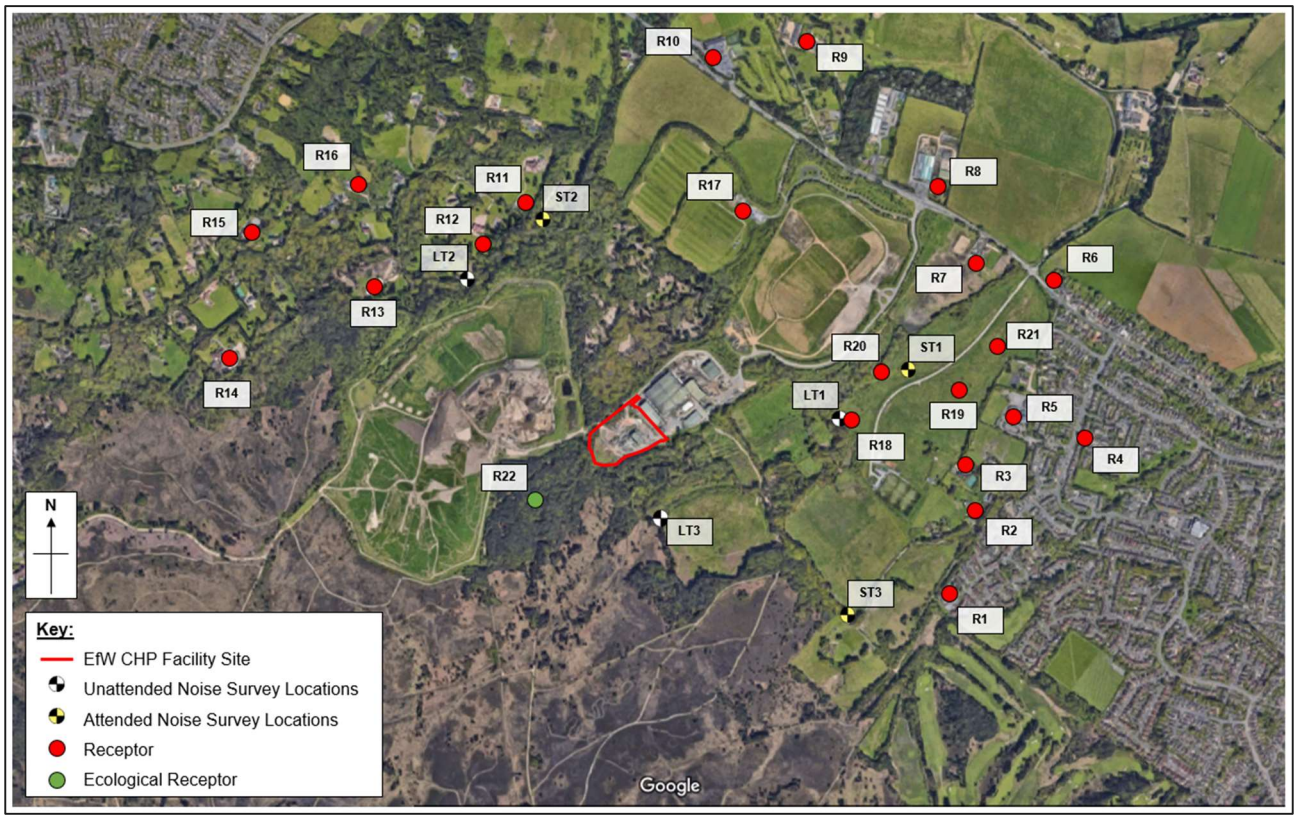
Receptor ID	Receptor Address	Approx Number of Properties	Receptor Type	Sensitivity
R1	188 Viscount Walk, Bournemouth, BH11 9TJ	28	Residential	Medium

Receptor ID	Receptor Address	Approx Number of Properties	Receptor Type	Sensitivity
R2	Pine Lodge, Wheelers Lane, Bournemouth, BH11 9QW	1	Residential	Medium
R3	Wheelers Lane, Bournemouth, BH11 9QJ	4	Residential	Medium
R4	171 King John Ave, Bournemouth, BH11 9SJ	30	Residential	Medium
R5	Bearwood Primary & Nursery School, Barons Rd, Bournemouth, BH11 9UN	1	School	Medium
R6	154 Magna Rd, Bournemouth, BH11 9NB	15	Residential	Medium
R7	Waggy Tails Rescue, 143 Magna Rd, Poole, Bournemouth, Wimborne, BH21 3AW	1	Commercial	Low
R8	White House, Canford Magna Garden Centre, 170 Magna Rd, Bournemouth, Wimborne, BH21 3AP	1	Commercial	Low
R9	Moortown Dr, Bournemouth, Wimborne, BH21 3AR	15	Residential	Medium
R10	The Hamworthy Club, Magna Rd, Canford Magna, Bournemouth, Wimborne, BH21 3AP	1	Commercial	Low
R11	Arrowsmith Rd, Bournemouth, BH21 3BE	3	Residential	Medium
R12	Arrowsmith Rd, Bournemouth, Wimborne, BH21 3BE	4	Residential	Medium
R13	Maranello, Bournemouth, Wimborne, BH21 3BE	1	Residential	Medium
R14	Magna Care Centre, Arrowsmith Rd, Poole, Bournemouth, Wimborne, BH21 3BQ	1	Care Centre	Medium
R15	Tanglewood, Bournemouth, Wimborne, BH21 3BG	8	Residential	Medium
R16	Hyperion, Arrowsmith Rd, Bournemouth, Wimborne, BH21 3BE	4	Residential	Medium
R17	Canford Park Sports Pitches Club House, Magna Rd, Bournemouth, Wimborne, BH21 3AP	1	Commercial	Low
R18	Canford Park (To become Provence Dr, Bournemouth, BH11 9FE)	10	Residential	Medium

Receptor ID	Receptor Address	Approx Number of Properties	Receptor Type	Sensitivity
R19	Canford Park (To become Neville Gardens, Bournemouth, Wimborne, BH11 9QJ)	10	Residential	Medium
R20	Canford Park (To become 67 Provence Dr, Bournemouth, Wimborne, BH11 9FE)	10	Residential	Medium
R21	Canford Park (To become 28 Becket Cres, Bearwood, Poole, Bournemouth, BH11 9FN)	10	Residential	Medium
R22	Ecological Receptor	-	Ecological	Medium

13.3.4 A map of Receptors is presented on **Figure 13-1**.

Figure 13-1: Assessment Receptor Locations



13.3.5 The existing noise environment in the vicinity of the Proposed Development is dominated by the existing CRP and Magna Road/A341 to the north. The main traffic exists on Magna Road/A341 between Oakley and Bear Cross.

13.3.6 Unattended long term (LT) sample measurements were undertaken between 09:15 on Thursday 7 July 2022 and 14:56 hours on Wednesday 13 July 2022 at monitoring locations LT1-LT3.

13.3.7 Attended short term (ST) sample measurements were undertaken between 12:05 and 15:55 hours on Thursday 7 July 2022 at monitoring locations ST1.

13.3.8 Unattended and attended monitoring locations LT1-LT3 and ST1-ST3 are shown in **Table 13-17** and **Figure 13-2**.

Table 13-17: Attended Baseline Noise Monitoring Locations

ID	Monitoring Co-ordinates	Free-field/facade
LT1	50.770079, -1.944457	Free-Field
LT2	50.773322, -1.958477	Free-Field
LT3	50.767946, -1.951157	Free-Field
ST1	50.771770, -1.941406	Free-Field
ST2	50.774747, -1.955776	Free-Field
ST3	50.766534, -1.948263	Free-Field

Figure 13-2: Measurement Locations

Attended Sound Survey Results

13.3.9 The survey results are summarised in **Table 13-18**.

Table 13-18: Baseline noise monitoring Results

Rec. ID	Date of Meas.	Start Time	Dur (mins)	Measured Noise Levels, dB re. 2 X 10^{-5} Pa.				
				$L_{Amax,F}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A50,15min}$	$L_{A90,15min}$
ST1	07/07/2022	12:05	15	77.4	62.5	59.8	50.3	45.4
		13:55	15	79.7	55.6	56.5	45.2	42.2
ST2		11:15	15	64.4	45.4	44.5	42.2	40.3
		13:20	15	54.7	40.1	38.9	37.9	36.6
		15:40	15	70.4	39.4	39.5	37.3	36.2
ST3		12:40	15	63.6	50.5	48.6	48.0	46.1
		14:55	15	66.8	48.9	47.3	46.4	44.7

13.3.10 **Table 13-18** shows that ambient daytime $L_{Aeq,15min}$ noise levels ranged between 38.9 and 59.8 dB across all locations. Background $L_{A90,15min}$ noise levels ranged from 36.2 to 46.1 dB across the three attended measurement locations.

13.3.11 During the attended survey on the 7 July 2022, the main source of sound observed at ST1 was road noise from Magna Road. Other sources of environmental sound observed at ST1 included audible activity from the existing recycling facility and the housing construction site located on Provence Drive.

13.3.12 During the attended survey on the 7 July 2022, the main source of sound observed at ST2 was road noise from Magna Road. Other sources of environmental sound observed at ST2 included local wildlife and low-level activity noise from the existing recycling facility.

13.3.13 During the attended survey on the 7 July 2022, the main source of sound observed at ST3 was activities from the existing recycling facility. Other sources of environmental sound observed at ST3 included local wildlife and the housing construction site located on Provence Drive.

Unattended Sound Survey Results

13.3.14 Daytime $L_{Aeq,12hr}$, evening $L_{Aeq,4hr}$ and night-time $L_{Aeq,8hr}$ ambient sound levels presented in **Table 13-19, Table 13-20** and **Table 13-21** have been calculated using logarithmic averaging, whilst mean $L_{Amax,F}$ and $L_{A90,T}$ sound levels have been calculated using arithmetic averaging. The range of 15-minute values over which each logarithmic or mean value has been calculated is shown in parenthesis.

13.3.15 A summary of the unattended monitoring results at LT1 is presented in **Table 13-19**.

Table 13-19: Summary of unattended sound monitoring results at LT1

Day of Measurement	Date	Measured Sound Pressure Levels, dB re. 2 x 10^{-5} Pa.											
		Daytime (07:00 – 19:00)				Evening (19:00 – 23:00)				Night-time (23:00 – 07:00)			
		$L_{Amax,F}$	$L_{A10,12\ hr}$	$L_{Aeq,12\ hr}$	$L_{A90,12\ hr}$	$L_{Amax,F}$	$L_{A10,4\ hr}$	$L_{Aeq,4\ hr}$	$L_{A90,4\ hr}$	$L_{Amax,F}$	$L_{A10,8\ hr}$	$L_{Aeq,8\ hr}$	$L_{A90,8\ hr}$
Thu	07-Jul-22	61 (50-86)[2]	45 (41-51)[2]	46 (41-52)[2]	40 (38-42)[2]	52 (41-75)	40 (35-49)	44 (34-54)	35 (33-37)	49 (36-75)	40 (34-52)	44 (33-56)	35 (32-39)
Fri	08-Jul-22	60 (52-80)	47 (44-57)	49 (41-59)	43 (37-46)	53 (44-79)	42 (37-46)	46 (36-56)	37 (35-41)	49 (37-68)	39 (33-49)	39 (32-46)	34 (31-36)
Sat	09-Jul-22	60 (47-80)	46 (44-52)	48 (41-56)	42 (34-46)	56 (47-65)	39 (35-43)	40 (35-45)	34 (32-39)	48 (36-77)	36 (30-48)	42 (29-55)	30 (27-34)
Sun	10-Jul-22	58 (47-79)	46 (39-52)	48 (37-57)	42 (30-48)	53 (44-76)	39 (36-45)	45 (34-55)	34 (32-38)	52 (39-77)	39 (31-50)	45 (30-56)	34 (28-42)
Mon	11-Jul-22	60 (45-76)	47 (42-52)	47 (40-55)	43 (37-48)	52 (40-75)	41 (37-46)	44 (36-52)	35 (32-38)	50 (42-70)	43 (37-50)	41 (36-47)	39 (35-41)
Tue	12-Jul-22	61 (49-77)	48 (44-62)	50 (43-59)	44 (40-47)	50 (44-72)	42 (41-44)	44 (39-54)	39 (38-41)	51 (44-76)	44 (40-50)	46 (39-56)	40 (38-42)
Wed	13-Jul-22	65 (53-82)[2]	50 (47-59)[2]	52 (46-58)[2]	46 (44-50)[2]								
Mean Average		61 (58-65)	47 (45-50)	49 (46-52)	43 (40-46)	53 (50-56)	41 (39-42)	44 (40-46)	36 (34-39)	50 (48-52)	40 (36-44)	43 (39-46)	35 (30-40)

Notes:
[1] the range of 15-minute levels measured during the monitoring periods are shown in parenthesis;
[2] incomplete daytime periods due to equipment set-up/retrieval;

13.3.16 The results of the unattended sound monitoring show that during daytime periods, ambient sound levels ranged between 46 and 52 dB $L_{Aeq,12hr}$, with a mean level of 49 dB $L_{Aeq,12hr}$.

13.3.17 Mean background sound levels measured during the daytime periods ranged between 40 and 46 dB $L_{A90,12hr}$. The overall mean 12-hour daytime background sound level measured over the 7-day monitoring period was 43 dB $L_{A90,12hr}$.

13.3.18 The results of unattended sound monitoring show that during evening periods, ambient sound levels ranged between 40 and 46 dB $L_{Aeq,4hr}$, with a mean level of 44 dB $L_{Aeq,4hr}$.

13.3.19 Mean background sound levels measured during the evening periods ranged between 34 and 39 dB $L_{A90,4hr}$. The overall mean 4-hour daytime background sound level measured over the 7-day monitoring period was 36 dB $L_{A90,4hr}$.

13.3.20 During night-time periods ambient sound levels ranged between ranged between 39 and 46 dB $L_{Aeq,8hr}$, with a mean level of 43 dB $L_{Aeq,8hr}$.

13.3.21 Mean background sound levels measured during the night-time periods ranged between 30 and 40 dB $L_{A90,8hr}$ with an overall mean value of 35 dB $L_{A90,8hr}$.

13.3.22 A summary of the unattended monitoring results at LT2 is presented in **Table 13-20**.

Table 13-20: Summary of unattended sound monitoring results at LT2

Day of Measurement	Date	Measured Sound Pressure Levels, dB re. 2 x 10^{-5} Pa.											
		Daytime (07:00 – 19:00)				Evening (19:00 – 23:00)				Night-time (23:00 – 07:00)			
		$L_{Amax,F}$	$L_{A10,12\ hr}$	$L_{Aeq,12\ hr}$	$L_{A90,12\ hr}$	$L_{Amax,F}$	$L_{A10,4\ hr}$	$L_{Aeq,4\ hr}$	$L_{A90,4\ hr}$	$L_{Amax,F}$	$L_{A10,8\ hr}$	$L_{Aeq,8\ hr}$	$L_{A90,8\ hr}$
Thu	07-Jul-22	62 (46-89) [2]	41 (37-45) [2]	50 (35-59) [2]	33 (33-34) [2]	53 (43-75)	38 (35-50)	44 (34-55)	32 (31-35)	46 (35-73)	35 (28-47)	41 (26-54)	28 (22-39)
Fri	08-Jul-22	60 (48-79)	43 (38-56)	48 (37-58)	35 (33-38)	54 (44-76)	40 (37-45)	45 (36-55)	35 (33-38)	49 (37-64)	35 (29-47)	36 (27-42)	29 (23-34)
Sat	09-Jul-22	59 (44-79)	43 (37-48)	47 (35-56)	35 (31-39)	53 (38-75)	37 (33-42)	38 (32-44)	32 (30-34)	46 (34-76)	33 (27-42)	40 (25-54)	27 (22-31)
Sun	10-Jul-22	56 (44-83)	40 (33-50)	46 (33-57)	32 (29-34)	54 (42-76)	35 (29-44)	45 (28-56)	29 (26-34)	47 (32-78)	32 (25-44)	44 (24-57)	27 (22-35)
Mon	11-Jul-22	56 (47-79)	41 (36-51)	44 (34-56)	33 (31-35)	49 (35-71)	33 (27-40)	41 (27-52)	28 (26-32)	45 (32-73)	32 (26-43)	38 (25-49)	27 (23-35)
Tue	12-Jul-22	61 (45-77)	42 (36-61)	48 (34-58)	33 (30-36)	49 (37-74)	36 (32-41)	44 (30-55)	30 (29-33)	48 (33-77)	34 (26-53)	44 (23-55)	27 (21-39)
Wed	13-Jul-22	65 (46-79) [2]	43 (37-58) [2]	50 (36-57) [2]	34 (33-40) [2]								
Mean Average		60 (56-65)	42 (40-43)	48 (44-50)	34 (32-35)	52 (49-54)	37 (33-40)	43 (38-45)	31 (28-35)	47 (45-49)	34 (32-35)	41 (36-44)	28 (27-29)

Notes:
[1] the range of 15-minute levels measured during the monitoring periods are shown in parenthesis;
[2] incomplete daytime periods due to equipment set-up/retrieval;

13.3.23 The results of unattended sound monitoring show that during daytime periods, ambient sound levels ranged between 44 and 50 dB $L_{Aeq,12hr}$, with a mean level of 48 dB $L_{Aeq,12hr}$.

13.3.24 Mean background sound levels measured during the daytime periods ranged between 32 and 35 dB $L_{A90,12hr}$. The overall mean 12-hour daytime background sound level measured over the 7-day monitoring period was 34 dB $L_{A90,12hr}$.

13.3.25 The results of unattended sound monitoring show that during evening periods, ambient sound levels ranged between 38 and 45 dB $L_{Aeq,4hr}$, with a mean level of 43 dB $L_{Aeq,4hr}$.

13.3.26 Mean background sound levels measured during the evening periods ranged between 28 and 35 dB $L_{A90,4hr}$. The overall mean 4-hour daytime background sound level measured over the 7-day monitoring period was 31 dB $L_{A90,4hr}$.

13.3.27 During night-time periods ambient sound levels ranged between ranged between 36 and 44 dB $L_{Aeq,8hr}$, with a mean level of 41 dB $L_{Aeq,8hr}$.

13.3.28 Mean background sound levels measured during the night-time periods ranged between 27 and 29 dB $L_{A90,8hr}$ with an overall mean value of 28 dB $L_{A90,8hr}$.

13.3.29 A summary of the unattended monitoring results at LT3 is presented in **Table 13-21**.

Table 13-21: Summary of unattended sound monitoring results at LT3

Day of Measurement	Date	Measured Sound Pressure Levels, dB re. 2 x 10^{-5} Pa.											
		Daytime (07:00 – 19:00)				Evening (19:00 – 23:00)				Night-time (23:00 – 07:00)			
		$L_{Amax,F}$	$L_{A10,12\ hr}$	$L_{Aeq,12\ hr}$	$L_{A90,12\ hr}$	$L_{Amax,F}$	$L_{A10,4\ hr}$	$L_{Aeq,4\ hr}$	$L_{A90,4\ hr}$	$L_{Amax,F}$	$L_{A10,8\ hr}$	$L_{Aeq,8\ hr}$	$L_{A90,8\ hr}$
Thu	07-Jul-22	61 (50-87) [2]	47 (44-49) [2]	48 (43-52) [2]	45 (42-46) [2]	50 (41-72)	39 (35-47)	42 (34-52)	36 (33-41)	48 (39-74)	41 (37-52)	44 (36-56)	38 (35-44)
Fri	08-Jul-22	63 (54-79)	50 (46-58)	50 (45-59)	47 (43-49)	54 (43-78)	43 (40-46)	46 (39-56)	40 (38-43)	50 (43-59)	43 (40-50)	42 (39-46)	39 (38-43)
Sat	09-Jul-22	60 (48-79)	49 (45-54)	50 (44-54)	46 (43-49)	55 (43-68)	42 (40-45)	43 (39-48)	40 (37-43)	49 (41-74)	42 (39-51)	42 (37-52)	37 (35-40)
Sun	10-Jul-22	58 (47-78)	48 (44-52)	49 (42-56)	46 (41-49)	51 (39-73)	39 (34-45)	45 (33-53)	36 (31-42)	48 (38-73)	41 (36-51)	45 (35-56)	37 (33-48)
Mon	11-Jul-22	59 (48-75)	48 (44-55)	49 (43-55)	46 (42-49)	53 (47-67)	43 (40-46)	43 (39-50)	40 (37-43)	52 (42-75)	43 (39-53)	45 (38-55)	39 (37-44)
Tue	12-Jul-22	66 (49-116)[3]	51 (42-70) [3]	76 (41-93) [3]	44 (40-51) [3]	50 (42-73)	42 (38-53)	44 (37-54)	37 (35-39)	50 (39-74)	43 (36-56)	46 (35-55)	38 (34-44)
Wed	13-Jul-22	65 (56-80)[2]	49 (47-59) [2]	51 (46-57) [2]	45 (44-46) [2]								
Mean Average		61 (58-65)	49 (47-50)	50 (48-51)	46 (45-47)	52 (50-55)	41 (39-43)	44 (42-46)	38 (36-40)	50 (48-52)	42 (41-43)	44 (42-46)	38 (37-39)

Notes:
[1] the range of 15-minute levels measured during the monitoring periods are shown in parenthesis;
[2] incomplete daytime periods due to equipment set-up/retrieval; and
[3] period discounted from average due to unknown event.

13.3.30 The results of unattended sound monitoring show that during daytime periods, ambient sound levels ranged between 48 and 51 dB $L_{Aeq,12hr}$, with a mean level of 50 dB $L_{Aeq,12hr}$.

13.3.31 Mean background sound levels measured during the daytime periods ranged between 45 and 47 dB $L_{A90,12hr}$. The overall mean 12-hour daytime background sound level measured over the 7-day monitoring period was 46 dB $L_{A90,12hr}$.

13.3.32 The results of unattended sound monitoring show that during evening periods, ambient sound levels ranged between 42 and 46 dB $L_{Aeq,4hr}$, with a mean level of 44 dB $L_{Aeq,4hr}$.

13.3.33 Mean background sound levels measured during the evening periods ranged between 36 and 40 dB $L_{A90,4hr}$. The overall mean 4-hour daytime background sound level measured over the 7-day monitoring period was 38 dB $L_{A90,4hr}$.

13.3.34 During night-time periods ambient sound levels ranged between ranged between 42 and 46 dB $L_{Aeq,8hr}$, with a mean level of 44 dB $L_{Aeq,8hr}$.

13.3.35 Mean background sound levels measured during the night-time periods ranged between 37 and 39 dB $L_{A90,8hr}$ with an overall mean value of 38 dB $L_{A90,8hr}$.

Derivation of Ambient and Background Sound Levels

13.3.36 The results of the unattended sound monitoring provide an indication of the diurnal variation in sound levels in the vicinity of the Proposed Development, whilst short-term attended measurements provide an indication of the variation in sound levels between the unattended locations and attended locations ST1, ST2 and ST3.

13.3.37 The results of the attended sound measurements have been compared with the corresponding levels measured at LT1, LT2 and LT3, with the difference used to derive a correction factor to extrapolate mean 12-hour (daytime), 4-hour (evening) and 8-hour (night-time) $L_{Aeq,T}$ and $L_{A90,T}$ sound levels at the attended monitoring locations. The extrapolated free-field ambient sound levels at all measurement locations are presented in **Table 13-22**.

Table 13-22: Derived free-field ambient sound levels

Measurement Location	Derived Free-field Ambient sound levels, dB re. 2x 10^{-5} Pa		
	Daytime $L_{Aeq,12hr}$	**Evening** $L_{Aeq,4hr}$	**Night** $L_{Aeq,8hr}$
LT1	49	44	43
LT2	48	43	41
LT3	50	44	44
ST1	49	44	43
ST2	49	44	41
ST3	50	44	44

13.3.38 The extrapolated free-field background sound levels at all measurement locations are presented in **Table 13-23**.

Table 13-23: Derived free-field background sound levels

Measurement Location	Derived Free-field Background Sound Levels, dB re. 2x 10^{-5} Pa	
	$L_{A90,16hr}$	$L_{A90,8hr}$
LT1	42	34
LT2	34	24
LT3	46	38
ST1	42	34
ST2	36	24
ST3	45	38

13.4 Inherent Design Mitigation

13.4.1 The design of the Proposed Development has incorporated a number of measures from the outset to prevent or reduce potential adverse effects which might otherwise have arisen. The relevant designed-in measures to this noise and vibration chapter are discussed below.

All Phases

13.4.2 The Applicant, and its EPC Contractor will be required to develop good relationships with people living and working in the surrounding area. To keep the local community informed of project developments during construction and operation, the Applicant will establish and operate a Community Liaison Group. Any complaints will be investigated.

Construction

13.4.3 The best practicable means, as defined in s72 of the Control of Pollution Act 1974, will be utilised to control noise levels throughout the construction phase of the Proposed Development. This includes:

- Proposed working hours would be 07:00 to 19:00 Monday to Friday, 08:00 to 16:00 on Saturdays, and no work outside these hours or on Sundays or Public holidays without prior approval from the LPA (subject to the exceptions noted in **ES Chapter 3: Description of the Proposed Development**);
- During the hour before and hour after the core working hours, some mobilisation activities would occur and include:
  - arrival and departure of the workforce and movement to and from areas across the project;
  - site inspections and safety checks; site meetings (briefings and quiet inspections/walkovers);
  - site clean-up (site housekeeping that does not require the use of plant); and
  - low-key maintenance including site maintenance, safety checking of plant and machinery (provided this does not require or cause hammering or banging).

- mobilisation activities would not include HGV movements into and out of the construction compound.
- all plant and machinery will be well maintained and operated in accordance with the manufacturer's instructions;
- every care will be taken to avoid unnecessary noise when carrying out manual operations and when operating plant and equipment;
- special attention will be given to the use and maintenance of sound reduction equipment fitted to power tools and machines; and,
- all plant will be switched off or reduced to idle when not in use.

Operational

13.4.4 The location of the EfW CHP Facility within the existing CRP, reduces the risk of adverse effect from operation of the Proposed Development.

13.4.5 The orientation of the EfW CHP Facility has been arranged so that the dominant noise sources face towards Magna Road, rather than the towards the Canford Heath area to the south.

13.4.6 The air-cooled condenser (ID10) (see **Figure 3.1** in **ES Chapter 3: Description of the Proposed Development**) will be surrounded by cladding which achieves R_w of 24 dB on 4 sides.

13.4.7 The Exhaust Steam pipe between the turbine hall (ID09) and the air-cooled condenser (ID10) will be treated acoustically to achieve at least 10 dB(A) in mitigation.

13.4.8 Wherever possible, the processing of materials is contained within the building envelope and openings are kept to a minimum.

13.5 Potential Environmental Impact and Effects

Construction phase

Construction Activity Noise

13.5.1 On-site construction noise levels have been predicted by modelling the Proposed Development and surrounding area using SoundPLAN. SoundPLAN is a proprietary software package which allows the calculation of sound levels using the implementation of the methodology presented in BS 5228-1:2009+A1:2014.

13.5.2 For the Proposed Development, two TCC locations have been identified, but only one will be implemented. The decision to use either TCC1 or TCC2 will be taken post-consent. Therefore, this assessment considers both options.

13.5.3 Based on the assumptions in **ES Appendix 13.1**, construction noise levels have been calculated for works associated with the Proposed Development. The noise levels from individual construction activities have been calculated at the sensitive Receptors. Cumulative noise levels from combined construction activities have been derived using the high-level assumed programme, as presented in **Table 13-24**.

Table 13-24: Assumed Construction Programme

Construction activity	Start Month	End Month
TCC1/TCC2 - Mobilisation	1	2
TCC1/TCC2 & EfW CHP Facility - Site mobilisation	2	3
TCC1/TCC2 activity, daytime (First 5 months only)	1	5
TCC1/TCC2 activity, daytime (All months after: telescopic handler only)	6	36
TCC1/TCC2, night-time (First 5 months)	1	5
EfW CHP Facility Site - earthworks	3	30
EfW CHP Facility Site - foundations	3	20
EfW CHP Facility Site roads and hardstandings	3	30
EfW CHP Facility Site - structures (Civil)	3	24
EfW CHP Facility Site - M&E	12	30
EfW CHP Facility Site - M&E (out-of-core-hours construction activity)	12	30
EfW CHP Facility Site - plant installation	9	30
CHP and Grid Connection - cable/pipe install	35	36
BM34 Substation	36	36

13.5.4 The average and highest monthly predicted noise levels are presented in **Table 2-2** of **ES Appendix 13.1**.

13.5.5 **Table 13-25** and **Table 13-26** present the assessment for each time period based on the ABC method and the highest monthly predicted noise levels for options TCC1 and TCC2, respectively.

Table 13-25: Assessment of Construction Noise Levels – Option TCC1

Rec. No.	Sensitivity	Daytime (Mon-Fri 07:00-19:00, Sat 07:00-13:00)				Evening (Mon-Fri 19:00-23:00, Sat 13:00-23:00)[4]				Night-time (23:00-07:00)[5]			
		Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact	Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact	Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact
R1[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R2[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R3[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R4[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R5[2]	Medium	49	-	65	Minor			N/A[3]				N/A[3]	
R6[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R7[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R8[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R9[1]	Medium	49	A	65	Minor	44	A	55	Negligible	41	A	45	Negligible
R10[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R11[1]	Medium	49	A	65	Minor	44	A	55	Negligible	41	A	45	Minor
R12[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R13[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R14[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R15[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R16[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R17[2]	Low	49	-	65	Minor	44	-	55	Minor			N/A[3]	
R18[1]	Medium	49	A	65	Minor	44	A	55	Minor	43	B	50	Minor
R19[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R20[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R21[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R22	*Ecological Receptor*												

Note: [1] ABC Method assessment;
[2] 5dB Change Method;
[3] not applicable during period;
[4] Evening works limited to 16:00 on Saturdays only; and
[5] Night-time works are limited to the operation of generators prior to mains power connection.

Table 13-26: Assessment of Construction Noise Levels – Option TCC2

Rec. No.	Sensitivity	Daytime (Mon-Fri 07:00-19:00, Sat 07:00-13:00)				Evening (Mon-Fri 19:00-23:00, Sat 13:00-23:00)[4]				Night-time (23:00-07:00)[5]			
		Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact	Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact	Baseline, $L_{Aeq,T}$	ABC Category	Threshold, dB	Magnitude of Impact
R1[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R2[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R3[1]	Medium	50	A	65	Minor	44	A	55	Negligible	44	B	50	Negligible
R4[1]	Medium	49	A	65	Negligible	44	A	55	Negligible	43	B	50	Negligible
R5[2]	Medium	49	-	65	Minor			N/A[3]				N/A[3]	
R6[1]	Medium	49	A	65	Negligible	44	A	55	Negligible	43	B	50	Negligible
R7[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R8[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R9[1]	Medium	49	A	65	Negligible	44	A	55	Negligible	41	A	45	Negligible
R10[2]	Low	49	-	65	Minor	44	-	55	Negligible			N/A[3]	
R11[1]	Medium	49	A	65	Minor	44	A	55	Negligible	41	A	45	Minor
R12[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R13[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R14[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R15[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R16[1]	Medium	48	A	65	Negligible	43	A	55	Negligible	41	A	45	Negligible
R17[2]	Low	49	-	65	Minor	44	-	55	Minor			N/A[3]	
R18[1]	Medium	49	A	65	Minor	44	A	55	Minor	43	B	50	Minor
R19[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R20[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R21[1]	Medium	49	A	65	Minor	44	A	55	Negligible	43	B	50	Negligible
R22	*Ecological Receptor*												

Note: [1] ABC Method assessment;
[2] 5dB Change Method;
[3] not applicable during period; and
[4] Evening works limited to 16:00 on Saturdays only; and
[5] Night-time works are limited to the operation of generators prior to mains power connection.

13.5.6 The results presented in **Table 13-25** and **Table 13-26** indicate that predicted construction noise levels fall below SOAEL criteria at residential or non-residential Receptors.

13.5.7 Receptors of medium sensitivity with a **Minor** impact will result in **Slight** significance of effect. Low sensitivity Receptors experiencing a **Minor** impact will result in a **Neutral or Slight** significance of effect.

Ecological Receptor – R22

13.5.8 Daytime, evening and night-time noise contours indicating the spatial distribution of noise levels from the construction of the Proposed Development are presented in **Figure 13-3, Figure 13-4** and **Figure 13-5**. The presented contours represent the worst-case combination of activities from the programme presented in **Table 13-24**.

13.5.9 Only the TCC2 scenario is presented for ecological assessment reasons, as this represents the worst-case for the ecological Receptor.

Figure 13-3: Construction Noise Contour (TCC2) – Daytime

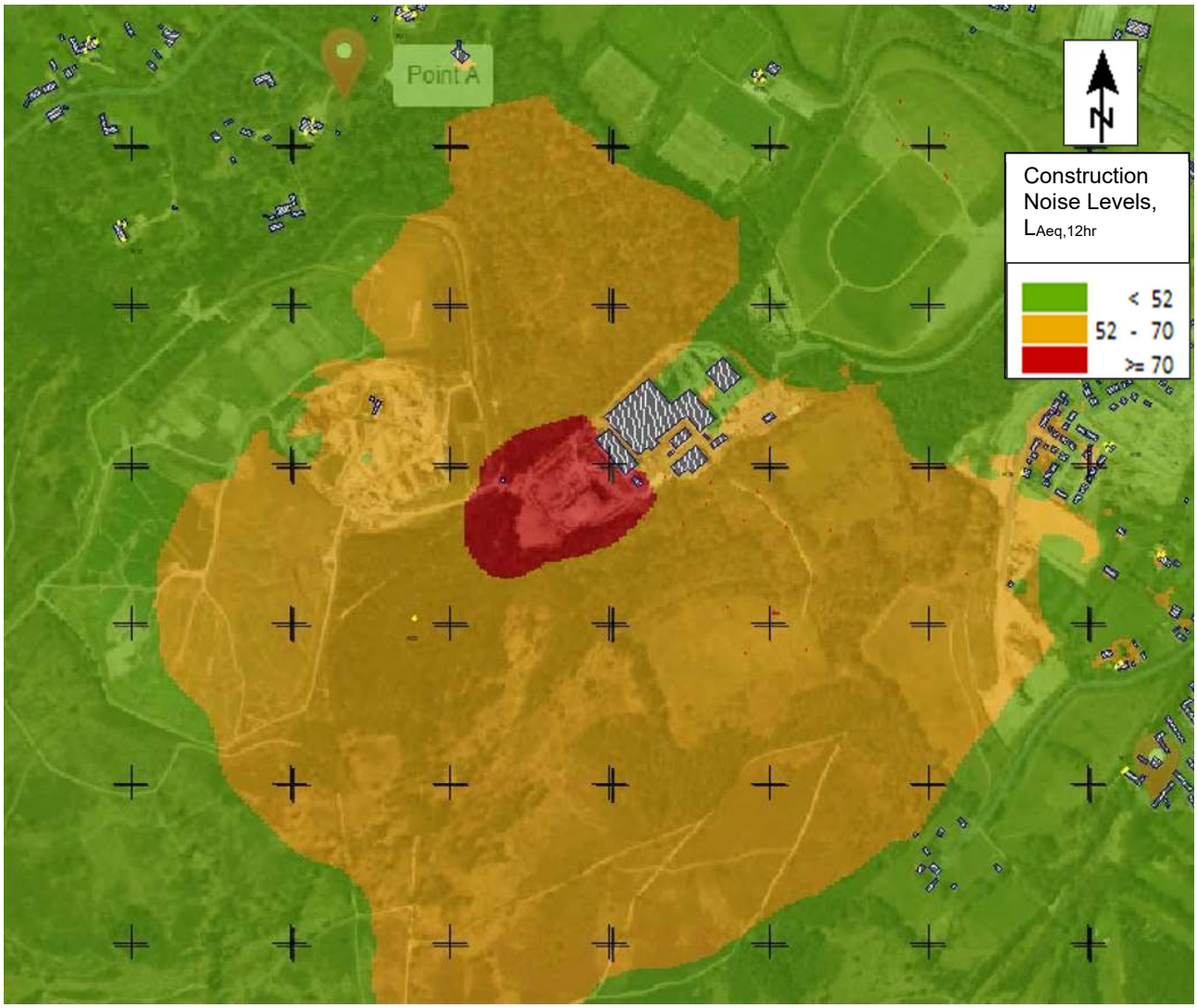
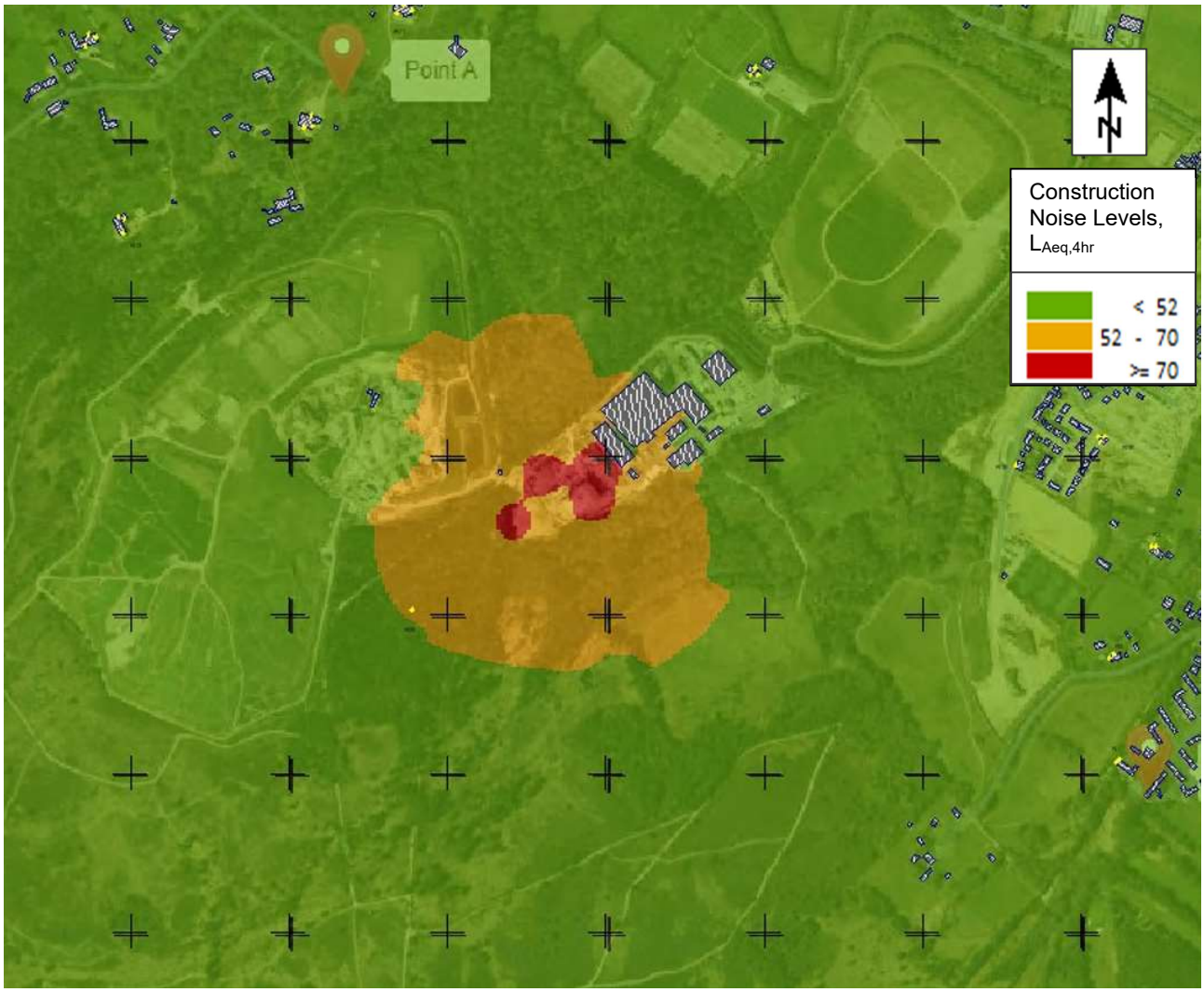
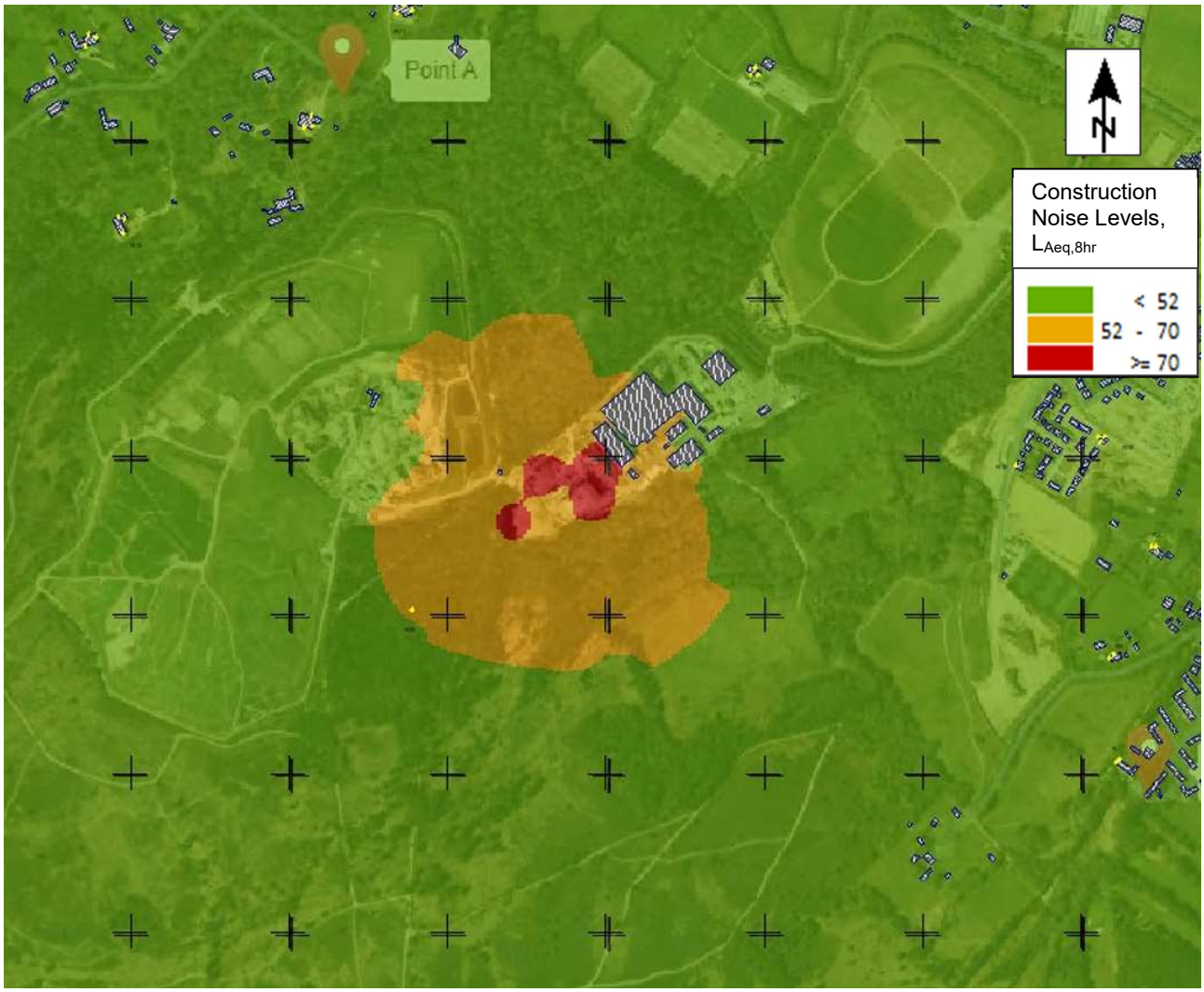


Figure 13-4: Construction Noise Contour (TCC2) - Evening



Note: Evening works limited to 16:00 on Saturdays only.

Figure 13-5: Construction Noise Contour (TCC2) – Night-time



Note: Night-time works are limited to the operation of generators prior to the connection to mains power.

13.5.10 Areas shaded in green indicate areas which are predicted to fall below the LOAEL value and will result in a **Negligible** effect. Areas shaded in orange, are predicted to fall between the LOAEL and SOAEL values and will result in a **Minor** adverse effect. Areas shaded in Red which are predicted to exceed the SOAEL value and will result in a **Moderate or Major** adverse effect.

13.5.11 During the daytime period, the majority of the heathland is predicted to experience **Minor adverse** impact which will result in a **Slight** significance of effect, this is not significant in EIA terms.

13.5.12 During the evening and night-time period, the majority of the heathland is predicted to experience **Negligible** impact which will result in a **Neutral or Slight adverse** significance of effect, this is not significant in EIA terms.

13.5.13 In addition to the ecological Receptor noise predictions presented above, a review of the proposed items of construction plant has been undertaken. No impulsive plant items are proposed during the TCC site mobilisation phase. Therefore, it is considered that the risk posed to the ecological Receptor as a result of impulsive noise is low.

CHP Connection and DNC

13.5.14 The noise effects associated with the construction of the CHP Connection and DNC are considered to be no worse than those associated with TCC2.Therefore, they have not been separately assessed.

Construction Activity Vibration

13.5.15 Based on the construction assumptions presented in **ES Appendix 13.1**, the element of plant which is assumed to be the greatest source of vibration is the vibratory roller.

13.5.16 Peak Particle Velocity (PPC) vibration levels have been predicted using the method defined in **ES Appendix 13.1**.

13.5.17 The assessment of the vibratory roller at each Receptor is presented in **Table 13-27**.

Table 13-27: Assessment of Construction Vibration Levels – PPV

Receptor No.	Sensitivity	Dist. (m)[1]	PPV mms^{-1}		Magnitude of Impact
			Steady State	Start-up/Run down	
R1	Medium	790	0.01	0.01	Negligible
R2	Medium	680	0.01	0.01	Negligible
R3	Medium	630	0.02	0.02	Negligible
R4	Medium	920	0.01	0.01	Negligible
R5	Medium	700	0.01	0.01	Negligible
R6	Medium	880	0.01	0.01	Negligible
R7	Low	700	0.01	0.01	Negligible
R8	Low	760	0.01	0.01	Negligible
R9	Medium	920	0.01	0.01	Negligible
R10	Low	820	0.01	0.01	Negligible
R11	Medium	650	0.02	0.02	Negligible
R12	Medium	640	0.02	0.02	Negligible
R13	Medium	710	0.01	0.01	Negligible
R14	Medium	1010	0.01	0.01	Negligible
R15	Medium	1080	0.01	0.01	Negligible
R16	Medium	950	0.01	0.01	Negligible
R17	Low	410	0.03	0.03	Negligible
R18	Medium	360	0.04	0.04	Negligible

Receptor No.	Sensitivity	Dist. (m)[1]	PPV mms^{-1}		Magnitude of Impact
			Steady State	Start-up/Run down	
R19	Medium	480	0.03	0.03	Negligible
R20	Medium	440	0.03	0.03	Negligible
R21	Medium	750	0.01	0.01	Negligible
R22	Medium	200	0.09	0.09	Negligible

Note: [1] distances used in calculations are greater than the maximum permitted value of x, as indicated by the calculation method. However, measurements of vibratory rollers operating at set distances have shown this method of prediction to present a worse case when compared to measurements.

13.5.18 The predicted PPV levels at all Receptors fall below the LOAEL, resulting in a **Negligible** magnitude of impact, therefore, likely to result in **Neutral or Slight** significance of effects.

Construction Traffic Noise

13.5.19 The traffic effect due to the Proposed Development's construction phase was calculated using BNL as defined in DMRB LA 111 and described in **ES Appendix 13.1**.

13.5.20 Estimated Receptor noise levels have been calculated on a monthly basis, with the resulting number of months in each impact category presented in **Table 13-28**.

Table 13-28: Assessment of Traffic Flow Noise Levels – Construction Phase

Receptor ID	Sensitivity	Baseline 2022	Baseline 2022 + Construction			
		BNL, $L_{A10,18hrs}$	No. of Months for Magnitude of Impact			
			Negligible	Minor	Moderate	Major
R1	Medium	40.8	36	0	0	0
R2	Medium	41.6	36	0	0	0
R3	Medium	42.9	36	0	0	0
R4	Medium	45.2	36	0	0	0
R5	Medium	45.7	36	0	0	0
R6	Medium	46.3	36	0	0	0
R7	Low	53.8	36	0	0	0
R8	Low	54.5	36	0	0	0
R9	Medium	46.8	36	0	0	0
R10	Low	53.7	36	0	0	0
R11	Medium	43.3	36	0	0	0

Receptor ID	Sensitivity	Baseline 2022	Baseline 2022 + Construction			
		BNL, $L_{A10,18hrs}$	No. of Months for Magnitude of Impact			
			Negligible	Minor	Moderate	Major
R12	Medium	41.5	36	0	0	0
R13	Medium	42.4	36	0	0	0
R14	Medium	42.7	36	0	0	0
R15	Medium	46.0	36	0	0	0
R16	Medium	44.6	36	0	0	0
R17	Low	46.3	36	0	0	0
R18	Medium	42.7	36	0	0	0
R19	Medium	43.5	36	0	0	0
R20	Medium	44.1	36	0	0	0
R21	Medium	48.1	36	0	0	0
R22	Medium	39.2	36	0	0	0

13.5.21 During the construction phase, HGV movements are predicted to have a **Negligible** impact on all Receptors; this is likely to result in **Neutral or Slight adverse** effects and is not significant in EIA terms.

Operational phase

Residential Dwellings

13.5.22 A sound model has been constructed to calculate the propagation of sound away from the Proposed Development and sound levels at the residential Receptors, as described in **ES Appendix 13.1**.

13.5.23 Two modes of operation have been assessed: 'Normal Mode' and 'Turbine Bypass Mode'. The only differential between these modes is the sound level from the exhaust steam pipe between the turbine hall (ID09) and the air-cooled condenser (ID10) which is higher in bypass mode.

13.5.24 A summary of the operational sound assessment for Normal Mode is presented in **Table 13-29**.

Table 13-29: Assessment of Operational Noise Levels – Normal Mode

Receptor	Sensitivity	Rating Level		Background Sound Level		Excess of rating over background sound level	
		Daytime dB ($L_{Ar,1hr}$)	Night-time dB ($L_{Ar,15min}$)	Daytime dB ($L_{A90,1hr}$)	Night-time dB ($L_{A90,15min}$)	Daytime dB	Night-time dB
R1	Medium	25	22	45	38	-20	-16
R2	Medium	27	24	45	38	-18	-14
R3	Medium	28	24	45	38	-17	-14
R4	Medium	24	20	42	34	-18	-14
R5	*Non-residential* [3]						
R6	Medium	28	20	42	34	-14	-14
R7	*Non-residential* [3]						
R8	*Non-residential* [3]						
R9	Medium	26	24	36	24	-10	0
R10	*Non-residential* [3]						
R11	Medium	32	33	36	24	-4	+9
R12	Medium	25	25	34	24	-9	+1
R13	Medium	25	26	34	24	-9	+2
R14	Medium	20	21	34	24	-14	-3
R15	Medium	20	20	34	24	-14	-4
R16	Medium	23	22	34	24	-11	-2
R17	*Non-residential* [3]						
R18	Medium	35	27	42	34	-7	-7
R19	Medium	30	23	42	34	-12	-11
R20	Medium	37	26	42	34	-5	-8
R21	Medium	27	23	42	34	-15	-11
R22	*Non-residential* [3]						

Note: [1] Specific and Rating Levels calculated at a free-field location, 1.5 m above local ground;
[2] where multiple facades may be exposed to the specific sound, the façade with the highest calculated Specific Sound Level is presented; and
[3] Non-residential Receptors are beyond the scope of BS 4142.

13.5.25 A summary of the operational noise assessment for bypass mode is presented in **Table 13-30**.

Table 13-30: Assessment of Operational Noise Levels – Turbine Bypass Mode

Receptor	Sensitivity	Noise Rating Level		Background Sound Level		Excess of rating over background sound level	
		Daytime dB ($L_{Ar,1hr}$)	Night-time dB ($L_{Ar,15min}$)	Daytime dB ($L_{A90,1hr}$)	Night-time dB ($L_{A90,15min}$)	Daytime dB	Night-time dB
R1	Medium	25	22	45	38	-20	-16
R2	Medium	27	24	45	38	-18	-14
R3	Medium	28	24	45	38	-17	-14
R4	Medium	24	20	42	34	-18	-14
R5	*Non-residential* [3]						
R6	Medium	28	21	42	34	-14	-13
R7	*Non-residential* [3]						
R8	*Non-residential* [3]						
R9	Medium	26	24	36	24	-10	0
R10	*Non-residential* [3]						
R11	Medium	33	33	36	24	-3	+9
R12	Medium	26	26	34	24	-8	+2
R13	Medium	26	27	34	24	-8	+3
R14	Medium	21	21	34	24	-13	-3
R15	Medium	20	21	34	24	-14	-3
R16	Medium	23	23	34	24	-11	-1
R17	*Non-residential* [3]						
R18	Medium	35	27	42	34	-7	-7
R19	Medium	30	24	42	34	-12	-10
R20	Medium	37	27	42	34	-5	-7
R21	Medium	28	24	42	34	-14	-10
R22	*Non-residential* [3]						

Note: [1] Specific and Rating Levels calculated at a free-field location, 1.5 m above local ground;

[2] where multiple facades may be exposed to the specific sound, the façade with the highest calculated Specific Sound Level is presented; and
[3] Non-residential Receptors are beyond the scope of BS 4142.

13.5.26 The predicted rating levels at R11, which represents 3 properties, result in a potential **Moderate adverse** impact, depending on the context (see below).

13.5.27 The predicted rating levels at, R12 and R13 which represent 25 properties, result in a **Minor adverse** impact depending on the context.

13.5.28 At all other Receptors, there is a **Negligible** impact resulting in a **Neutral or Slight** significance of effect.

Context

13.5.29 When considering the significance of an effect, BS 4142 advises that the context of the impact should be considered. The context of the effect should consider factors such as: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; the sensitivity of the Receptor; and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

13.5.30 The Proposed Development will operate 24-hours a day 365-days a year. Residual waste will only be accepted between 07:00 and 20:00 hours.

13.5.31 At the Receptors predicted to have an adverse effect, the background assessment level is based on measured levels at LT2.

13.5.32 The daytime (07:00 – 23:00 hrs) baseline ambient $L_{Aeq,15min}$ sound levels measured at LT2 ranged from 38 to 50 dB $L_{Aeq,15min}$. The specific daytime sound levels at R11, R12, and R13 fall below this range of sample $L_{Aeq,15min}$ sound levels, by at least 8 dB.

13.5.33 The night-time (23:00 – 07:00 hrs) baseline ambient $L_{Aeq,15min}$ sound levels measured at LT2 ranged from 36 to 44 dB $L_{Aeq,15min}$. The specific night-time sound levels at R11, R12 and R13 fall below this range of sample $L_{Aeq,15min}$ sound levels, by at least 6 dB.

13.5.34 The existing CRP has industrial premises, including a Mechanical and Biological Treatment (MBT) facility and Materials Recycling Facility (MRF), which processes waste during daytime hours. The character of noise produced by the existing activities are similar to the Proposed Development.

13.5.35 Calculations indicate that the continuous operation of the EfW CHP Facility will not produce tonal, impulsive and/or intermittent sounds and therefore may be described, using terminology referred to in the EA's guidance, as a bland/characterless sound, which is likely to reduce the sensitivity of the situation.

13.5.36 Based on the comparison of predicted rating levels against baseline sound levels, a potential moderate impact is predicted at R11 during the night-time period. The night-time background sound level at this location is 24 dB $L_{A90,15min}$.

13.5.37 The main noise-sensitive activity undertaken during the night-time period is resting/sleeping within bedrooms. ProPG: Planning & Noise [17] indicates that a partially open window can offer an attenuation of between 10 and 15 dB(A) from external noise sources. Subtracting this attenuation from the specific operational sound pressure level of 30 dB(A) results in an internal noise level of between 15-20 dB(A).

[17] Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health, 2017. *ProPG: Planning & Noise – New Residential Development.*

13.5.38 In line with guidance presented in the EA's noise guidelines, barely audible or detectable noise should be categorised as 'low impact or no impact'. Although the performance of human hearing ranges from person to person, a continual noise source of between 15-20 dB(A) is considered to be barely audible or not detectable.

13.5.39 When considering these factors, the magnitude of impact at R11 during night-time hours can be reduced from **Moderate** to **Minor**. The **Minor** impact indicates a **Slight adverse** effect at R11, this is not significant in EIA terms.

Non-Residential Dwellings

13.5.40 **Table 13-31** presents the assessment of operational noise levels calculated at non-residential Receptors. The operational noise level is logarithmically summed with the existing ambient level to calculate the combined external noise level. However, as the operational free-field noise level is 10 dB or more below the existing ambient sound level, this results in no calculated increase.

13.5.41 The different modes of the operation do not affect the operational noise levels at the Receptors presented in **Table 13-31**.

Table 13-31: Operational Noise Assessment – Non-Residential dwellings

Rep ID	Sensitivity	Operational Free-Field Noise Level, dB $L_{Aeq,1hr}$	Existing Free-Field Ambient Sound Level, dB $L_{Aeq,12hr}$	Combined External Free-field Noise Level[1], dB $L_{Aeq,1hr}$	Internal Noise Level[2], dB $L_{Aeq,1hr}$	Magnitude of Impact
R5	Medium	22	49	49	34	Negligible
R7	Low	25	59	59	44	Negligible
R8	Low	29	49	49	34	Negligible
R10	Low	23	49	49	34	Negligible
R17	Low	28	49	49	34	Negligible

Note [1] logarithmic sum of operational noise level and existing sound level; and
[2] Internal noise level calculated assuming a 15 dB reduction in free-field levels for a partially open window.

13.5.42 As there is no calculated increase in the external noise level when combined with the operational noise level, there is **Negligible** impact at all non-residential Receptors, resulting in a **Neutral or Slight adverse** significance of effect; this is not significant in EIA terms.

Ecological Receptor – R22

13.5.43 Daytime and night-time noise contours indicating the spatial distribution of noise levels from operation to the south-west of the Proposed Development are presented in **Figure 13-6** and **Figure 13.7** for Normal Mode and **Figure 13.8** and **Figure 13.9** for Bypass Mode. Colour shading on these figures indicates:

- Green – areas predicted to fall below the LOAEL value resulting in a Negligible effect;
- Orange – areas predicted to fall between the LOAEL and SOAEL values resulting in a Minor effect; and
- Red – areas predicted to exceed the SOAEL value resulting in a Moderate or Major effect.

Figure 13-6 Daytime Operational Noise Contour to South-West – Normal Operation

Figure 13.7: Night-Time Operational Noise Contour to South-West – Normal Operation

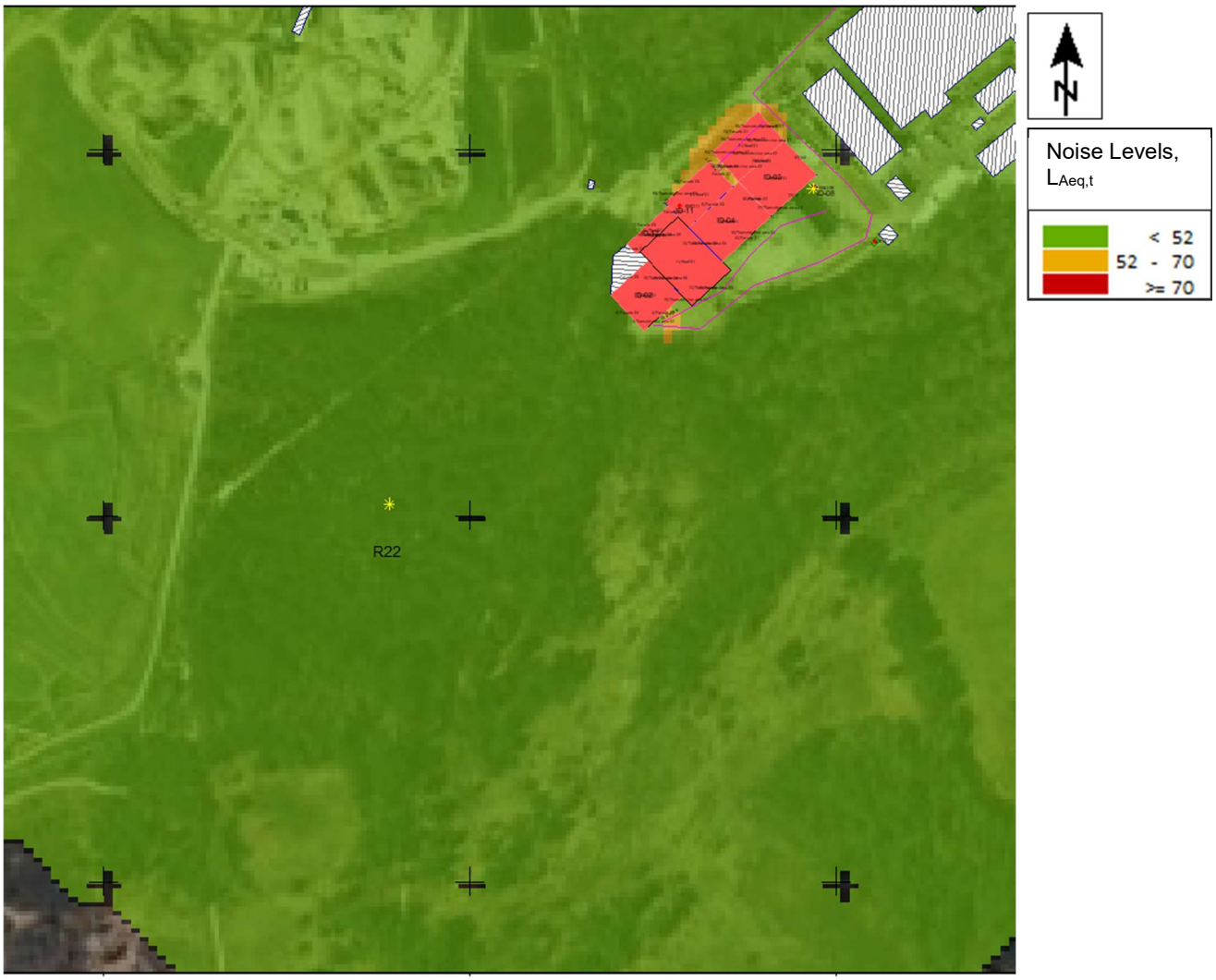


Figure 13.8: Daytime Operational Noise Contour to South-West – Turbine Bypass Operation

Figure 13.9: Night-Time Operational Noise Contour to South-West – Turbine Bypass Operation

13.5.44 During the daytime and night-time period, for both operational modes, the majority of the heathland is predicted to experience **negligible** impact resulting in a **Neutral or Slight adverse** significance of effect; this is not significant in EIA terms.

Operational Traffic Noise

13.5.45 The effect of traffic on Magna Road/A341 due to the operational phase of the Proposed Development has been calculated using BNL as defined in DMRB LA 111 and described in **ES Appendix 13.1**.

13.5.46 Estimated Receptor noise levels from daily operational HGV flows on Magna Road/A341 are presented in **Table 13-32**.

Table 13-32: Assessment of Daily Traffic Flow Noise Levels – Operational Phase

Receptor ID	Sensitivity	Baseline 2022	Baseline 2027 + Operational		
		BNL, $L_{A10,18hrs}$	BNL, $L_{A10,18hrs}$	Difference	Magnitude of Impact
R1	Medium	53.2	53.3	+0.1	Negligible
R2	Medium	53.9	54.1	+0.2	Negligible
R3	Medium	55.2	55.3	+0.1	Negligible
R4	Medium	57.5	57.6	+0.1	Negligible
R5	Medium	58.0	58.1	+0.1	Negligible
R6	Medium	69.9	70	+0.1	Negligible
R7	Low	68.1	68.2	+0.1	Negligible
R8	Low	68.0	68	0.0	Negligible
R9	Medium	59.1	59.2	+0.1	Negligible
R10	Low	66.0	66.1	+0.1	Negligible
R11	Medium	55.6	55.7	+0.1	Negligible
R12	Medium	53.9	53.9	0.0	Negligible
R13	Medium	54.7	54.8	+0.1	Negligible
R14	Medium	55.0	55.1	+0.1	Negligible
R15	Medium	58.3	58.4	+0.1	Negligible
R16	Medium	56.9	57	+0.1	Negligible
R17	Low	58.7	58.7	0.0	Negligible
R18	Medium	55.0	55.2	+0.2	Negligible
R19	Medium	55.8	55.9	+0.1	Negligible
R20	Medium	56.5	56.6	+0.1	Negligible
R21	Medium	60.4	60.5	+0.1	Negligible
R22	Medium	51.5	51.6	+0.1	Negligible

13.5.47 For the operational phase, HGV movements are predicted to have a **Negligible** impact on all Receptors for the duration of the operational phase, resulting in **Neutral or Slight adverse** effects at all Receptors; this is not significant in EIA terms.

13.6 Decommissioning Phase

13.6.1 For the purpose of the assessment, a working assumption has been made that the Proposed Development has an operational lifespan of approximately 40-years. However, it should be noted that it is common for such developments to be operational for longer periods. It is anticipated that the process of decommissioning would involve the termination of operational activity, following which there would be electrical and process isolation and demolition activities. The EfW CHP Facility Site (including the CHP Connection) and the DNC would be left in a clear and secure condition in accordance with a Decommissioning Plan. The decommissioning process is anticipated to last for one year.

13.6.2 For the purposes of this assessment, the environmental effects associated with the decommissioning phase would be of a similar level to those reported for the construction phase works, albeit with a lesser duration of one year.

13.7 Additional Mitigation

13.7.1 Adverse effects are undesirable and result from negative impacts. Effects of moderate significance or above are considered to be significant in EIA terms and should be prevented, or where that is not practicable, minimised via the use of further mitigation.

Construction phase

Construction Activity Noise

13.7.2 All predicted adverse effects due to construction activity noise fall **below Moderate** significance. Therefore, further mitigation is not required. However, an Outline Construction Environmental Management Plan (CEMP) accompanies the ES, see **ES Appendix 3.2**. The Outline CEMP sets out the management and control measures for the construction process to ensure that no adverse noise and vibration effects arise.

Construction Traffic Noise

13.7.3 All predicted adverse effects due to construction traffic noise fall **below Moderate** significance. Therefore, further mitigation is not required.

Construction Vibration

13.7.4 All predicted adverse effects due to construction vibration fall **below Moderate** significance. Therefore, further mitigation is not required.

Operational Mitigation

Operational Activity Noise

13.7.5 With the embedded mitigation, as described in **Section 13.4**, all predicted adverse effects due to operational activity noise fall **below Moderate** significance. Therefore, further mitigation is not required.

Operational Traffic Noise

13.7.6 All predicted adverse effects due to operational traffic noise fall **below Moderate** significance. Therefore, further mitigation is not required.

13.8 Residual Effects

Construction phase

13.8.1 During the construction phase, all effects are temporary adverse effects that are no greater than **Slight**, therefore, **not significant**.

Operational phase

13.8.2 When considering the implementation of proposed mitigation, the permanent adverse effects are no greater than **Slight**, therefore**, not significant**.

13.9 Implications of Climate Change

13.9.1 The implications of climate change and adaptation to climate change have been considered in relation to the noise and vibration assessment. It is considered that there are no implications relevant to this chapter.

13.10 Cumulative Effects

13.10.1 Planning application APP/21/01186/F for the development of class B1c, B2 and B8 industrial units was granted planning consent by BCP Council. A variation to this planning consent, currently under consideration by BCP Council (APP/22/01642/F), seeks to change the scheme's proposals to achieve a BREEAM (Buildings Research Establishment Environmental Assessment Method) rating. No information on noise and vibration accompanies this planning application. Noise and vibration relating to this development's construction and operational phases might impact the Receptors to the east of the Proposed Development. At these Receptors, predicted noise and vibration effects for the construction phase are **Slight** and **Neutral or Slight** during the operational phase. Therefore, a cumulative **Moderate** or higher significance of effect is unlikely to occur due to cumulative impacts.

13.10.2 Planning application APP/21/00620/F for 45 dwellings has been considered in this chapter, with sensitive Receptors R18, R19, R20 and R21 included as part of the assessment.

13.10.3 APP/21/00400/F (and the variation APP/22/00284/F) for the creation of a photovoltaic solar farm, including a battery system. No information on noise and vibration accompanies this planning application. Therefore, whilst it is not possible to consider quantitative data, the cumulative effects of such a development's noise and vibration impact are considered low.

13.10.4 The Receptors considered in this noise and vibration chapter are located within a 1.5km of the Proposed Development. Beyond this separation distance, noise and vibration from the EfW CHP Facility would be negligible. From the schedule of committed schemes presented with **ES Chapter 5: Approach to Assessment** and on **Figure 5.1**, the following planning applications are over 1.5km from the nearest Receptor considered in this chapter:

- APP/20/00252/F - Light Industrial & Office/Warehouse
- APP/20/00418/F - Office/Light Industry/Storage

- APP/21/00309/F - 10 Industrial/Warehouse Units
- 3/21/1566/RM - 174 Houses
- 3/21/0840/FUL - 63 Houses & 12 Flats
- 3/21/1556/FUL - 66 Sheltered Flats/32 Bungalows/9 Houses
- APP/21/00748/F - 81 Houses & 29 Sheltered Flats
- APP/21/00497/F - Industrial/Warehouse/Office
- 3/21/0674/OUT - 26 Industrial Units
- 3/20/1945/FUL - Energy Facility
- 3/21/0740/FUL - 2 Starter Industrial Units
- 3/20/0880/FUL - Warehouse & Office
- 8/21/0207/FUL - Energy Recovery Facility

13.11 Summary

13.11.1 During the Proposed Development's construction phase, there are no Moderate or higher effects of significance predicted at residential/non-residential sensitive Receptors. Construction noise is predicted to cause a minor adverse impact to birds upon the heathland. However, the combined ambient and predicted construction noise level remains below the upper bounds of acceptability for nightjars.

13.11.2 During the Proposed Development's construction phase there are no Moderate or higher effects of significance predicted due to construction vibration at all sensitive Receptors.

13.11.3 The comparison of background/rating levels indicates a potential moderate impact at a single residential Receptor (R11) during night-time operation. However, upon consideration of the context, this impact is reduced to minor. This results in a slight adverse effect.

13.11.4 Traffic noise on Magna Road/A341 during the construction or operational phases are predicted to result in Minor or lower effects of significance at all Receptors.

13.11.5 A summary of the assessment is set out in **Table 13-33** overleaf.

Table 13-33: Summary of effects

Receptor	Sensitivity of Receptor(s)	Nature of Potential Impact	Proposed Mitigation	Residual Effects	Significant/not significant
Construction Phase					
R1	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R2	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R3	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R4	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R5	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R6	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R7	Low	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant

Receptor	Sensitivity of Receptor(s)	Nature of Potential Impact	Proposed Mitigation	Residual Effects	Significant/not significant
R8	Low	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R9	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R10	Low	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R11	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R12	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R13	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R14	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R15	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant

Receptor	Sensitivity of Receptor(s)	Nature of Potential Impact	Proposed Mitigation	Residual Effects	Significant/not significant
R16	Medium	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R17	Low	Noise - Neutral or Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R18	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R19	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R20	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R21	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R22	Medium	Noise - Slight Vibration - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
Operational Phase					
R1	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant

Receptor	Sensitivity of Receptor(s)	Nature of Potential Impact	Proposed Mitigation	Residual Effects	Significant/not significant
R2	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R3	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R4	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R5	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R6	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R7	Low	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R8	Low	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R9	Medium	Noise - Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R10	Low	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R11	Medium	Noise - Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R12	Medium	Noise - Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R13	Medium	Noise - Slight Traffic - Neutral or Slight	None considered	-	Not Significant

Receptor	Sensitivity of Receptor(s)	Nature of Potential Impact	Proposed Mitigation	Residual Effects	Significant/not significant
R14	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R15	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R16	Medium	Noise - Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R17	Low	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R18	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R19	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R20	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R21	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant
R22	Medium	Noise - Neutral or Slight Traffic - Neutral or Slight	None considered	-	Not Significant

13.12 Mitigation Commitments Summary

Table 13-34: Summary for Securing Mitigation

Identified Receptor	Type and purpose of additional mitigation measure (prevent, reduce, offset, enhance)	Means by which mitigation may be secured (e.g., planning condition/legal agreement)	To be delivered by	Auditable by
Not Required				

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