



ENVIRONMENTAL STATEMENT: 6.1 CHAPTER 6: NOISE AND VIBRATION

DECARBONISATION

Cory Decarbonisation Project

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6. NOISE AND VIBRATION

6.1. INTRODUCTION

- 6.1.1. This chapter reports the assessment of the likely significant effects of the Proposed Scheme noise and vibration on receptors during construction and operation and describes:
- relevant policy, legislation and guidance;
 - consultation undertaken to date;
 - the methodology for assessment;
 - potential effects of the construction phase; and
 - potential effects of the operation phase.
- 6.1.2. This chapter focusses on the likely significant effects of the Proposed Scheme noise and vibration on human receptors only, with effects on marine biodiversity receptors presented in **Chapter 8: Marine Biodiversity (Volume 1)** and terrestrial biodiversity receptors presented in **Chapter 7: Terrestrial Biodiversity (Volume 1)**. A noise and vibration assessment has not been undertaken on heritage receptors as the nearest Listed Building is over 750m away from the Site boundary, effects on heritage receptors is assessed in **Chapter 9: Historic Environment (Volume 1)**.
- 6.1.3. To support the reader of this noise and vibration chapter, all noise and vibration terminology is described in **Appendix 6-1: Noise and Vibration Terminology (Volume 3)**. The appendices associated with this chapter include:
- **Appendix 6-1: Noise and vibration terminology (Volume 3);**
 - **Appendix 6-2: Noise Monitoring (Volume 3);**
 - **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance Information (Volume 3);**
 - **Appendix 6-4: Underwater Noise Assessment (Volume 3);**
 - **Appendix 6-5: Operational Noise Modelling Assumptions (Volume 3);**
 - **Appendix 6-6: Construction Noise (Volume 3);** and
 - **Appendix 6-7: Uncertainty Matrix (Volume 3).**

6.2. POLICY, LEGISLATION, AND GUIDANCE

- 6.2.1. The policy, legislation, and guidance relevant to the assessment of noise and vibration for the Proposed Scheme is detailed in **Table 6-1**, with further detailed information provided in **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance (Volume 3)**.

Table 6-1: Noise and Vibration Summary of Key Policy, Legislation, and Guidance

Policy, Legislation or Guidance	Description
Policy	
Overarching National Policy Statement (NPS) for Energy EN-1 2024¹	<p>This Overarching National Policy Statement for Energy (EN-1) is part of a suite of NPS designated by the Secretary of State of DESNZ in January 2024.</p> <p>Section 5.12 (Noise and Vibration) includes reference to the NPSE⁶, and also provides guidance on what information should be included in a noise assessment for a proposed development. There is also mention of noise in relation to the marine environment, which states in paragraph 5.12.11: <i>“In the marine environment, applicants should consider noise impacts on protected species, both at the individual project level and in-combination with other marine activities”</i>.</p>
National Planning Policy Framework (NPPF) 2023²	<p>The NPPF sets out the Government’s planning policies for England and how these should be applied, with the following paragraphs relating to noise:</p> <p><i>“180. Planning policies and decisions should contribute to and enhance the natural and local environments by: [a number of points including]...</i></p> <p><i>e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans”;</i></p> <p><i>and</i></p> <p><i>“191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:</i></p> <ul style="list-style-type: none"> <i>• mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁵; and</i>

Policy, Legislation or Guidance	Description
	<ul style="list-style-type: none"> ● <i>identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...</i> <p>and</p> <ul style="list-style-type: none"> ● “193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”
<p>The London Plan 2021³</p>	<p>The Spatial Development Strategy for Greater London setting out a framework for how London will develop over the next 20-25 years and the Mayor’s vision for Good Growth.</p> <p>Policy D14 of the London Plan is the key policy specific to noise within Greater London, which states that:</p> <p><i>“In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:</i></p> <ul style="list-style-type: none"> ● <i>avoiding significant adverse noise impacts on health and quality of life</i> ● <i>reflecting the Agent of Change principle as set out in Policy D13 Agent of Change</i> ● <i>mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses</i> ● <i>improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)</i> ● <i>separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation</i>

Policy, Legislation or Guidance	Description
	<ul style="list-style-type: none"> • <i>where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles</i> • <i>promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver”.</i>
The Bexley Local Plan 2023⁴	<p>The Local Plan, adopted on 26 April 2023, positively plans for sustainable development across the Borough. It is essential to the delivery of the Council’s other key plans and strategies, including the Bexley Plan.</p>
London Environment Strategy 2018⁵	<p>The London Environment Strategy seeks to ensure that London will become a “<i>zero carbon city by 2050</i>” by setting out policies and proposals in seven policy areas to address environmental challenges, including the transition to a low carbon circular economy. The Mayor wants to ensure “<i>London’s businesses and workers are supported to be able to compete effectively in, and benefit from, this growing global market</i>”.</p> <p>The London Environment Strategy seeks to ensure that “<i>Londoners’ quality of life will be improved by reducing the number of people adversely affected by noise and promoting more quiet and tranquil spaces</i>”.</p>
Noise Policy Statement for England (NPSE) 2010⁶	<p>Seeks to ensure that noise matters are considered at the right time during the development of policy and decision making, and not in isolation. It highlights the underlying principles on noise management already found in existing legislation and guidance. Specifically, the NPSE aims, in paragraph 1.7, “<i>through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development: avoid significant adverse impacts on health and quality of life; mitigate and minimise adverse impacts on health and quality of life; and where possible, contribute to the improvement of health and quality of life</i>”.</p>
South East Inshore Marine Plan 2021⁷	<p>The South East Inshore Marine Plan area stretches from Felixstowe in Suffolk to west of Dover in Kent and incorporates the River Thames. It will help to enhance and protect the marine environment and achieve sustainable</p>

Policy, Legislation or Guidance	Description
	<p>economic growth while respecting local communities both within and adjacent to the marine plan area.</p> <p>Policy SE-UWN-1 states that “<i>Proposals that result in the generation of impulsive sound must contribute data to the UK Marine Noise Registry as per any currently agreed requirements. Public authorities must take account of any currently agreed targets under the Marine Strategy Part One Descriptor 11</i>”. In addition, Policy SE-UWN-2 advises that “<i>proposals that result in the generation of impulsive or non-impulsive noise must demonstrate that they will, in order of preference:</i></p> <ul style="list-style-type: none"> ● avoid ● minimise ● mitigate <ul style="list-style-type: none"> – adverse impacts on highly mobile species so they are no longer significant <p><i>If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding”.</i></p>
Legislation	
Environment Act 2021⁸	The Environment Act 2021 makes provision about targets, plans and policies for improving the natural environment. In relation to noise and vibration and the Proposed Scheme, there is nothing specific in this Act that would influence the assessment methodology.
Control of Pollution Act 1974⁹	The Act contains provisions relating to a wide range of environmental pollution matters, including construction noise, and the obtaining consents in relation to construction noise effects.
Environmental Protection Act 1990¹⁰	The Environmental Protection Act makes provision for the improved control of pollution arising from certain industrial and other processes and, amongst many other things, requires local authorities to issue a noise abatement notice where it is satisfied that a noise nuisance exists.
Guidance	
National Planning Practice Guidance (2021)¹¹	Guidance relating to the processes and tools that can be used through the planning system in England. It includes guidance relating to how planning can manage potential noise effects in new development.

Policy, Legislation or Guidance	Description
British Standard (BS) 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites (Part 1: Noise and Part 2: Vibration)¹²	BS 5228:2009+A1:2014 sets out a method for measuring and predicting noise from construction works, as well as recommendations for basic methods of vibration control relating to construction sites.
BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound¹³	BS 4142: 2014+A1:2019 provides an assessment method for noise arising from commercial noise sources, including external plant and onsite vehicle movements and unloading at residential receptors.
BS 7445:2003 - Description and Measurement of Environmental Noise¹⁴	BS 7445:2003 provides a description of the quantities and methods used when measuring outdoor environmental noise.
Calculation of Road Traffic Noise (CRTN) 1988¹⁵	This technical memorandum describes the procedures for measuring and calculating noise from road traffic. It is used to calculate the change in noise level from construction and development generated road traffic.
Design Manual for Roads and Bridges (DMRB), Sustainability & Environment Appraisal: LA 111 Noise and Vibration 2020¹⁶	LA 111 sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation. It is commonly used to assess the magnitude of impact of any change in noise level from construction generated road traffic.
ISO 9613: Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2:	The document describes a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

Policy, Legislation or Guidance	Description
General Method of Calculation 1996 ¹⁷	
BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings ¹⁸	The guidance provided in BS 8233:2014 includes appropriate internal and external noise level criteria, which are applicable to dwellings exposed to steady external noise sources.

6.3. CONSULTATION AND ENGAGEMENT

- 6.3.1. **Table 6-2** below provides a summary of comments provided as part of the statutory consultation process since the PEIR and the Applicant’s response.
- 6.3.2. No further engagement or consultation has been undertaken to inform the noise and vibration assessment to date.
- 6.3.3. **Appendix 4-2: Scoping Opinion Responses (Volume 3)** provides a summary of the Planning Inspectorate and consultee comments on the EIA Scoping Opinion¹⁹ and the Applicant’s responses.

Table 6-2: Summary of the Statutory Consultation Comments in relation to Noise and Vibration

Statutory Consultee	Response
London Borough of Bexley	
<p><i>“It is noted that in Paragraph 2.4.10 of the PEIR the applicant has accepted the previous EH scoping comments that construction working hours for noisy activities will typically be limited to 08:00 - 18:00 Mondays to Fridays, 08:00 -13:00 on Saturdays with no noisy works on Sundays or Public Holidays. There is however, still a discrepancy in the PEIR as references to noisy construction times in Paragraph 6.7.3 do not fully reflect the assurances made Chapter 2.</i></p> <p><i>It is accepted that there will be a need for some activities to be undertaken outside of permitted hours (e.g. jetty works involving tidal considerations). Appropriate dispensation arrangements and prior consent agreements under the provisions of the Control of Pollution Act 1974 will need to be established on due course as development proposals are finalised.”</i></p>	<p>During construction, standard working hours for the landside activities are Monday to Friday 07:00 to 19:00. On Saturdays, standard working hours are 07:00 to 13:00, with no working on Sundays or Bank Holidays. The working hours do not apply to construction works where these are (a) are carried out within existing buildings or buildings constructed as part of Proposed Scheme; (b) are carried out with the prior approval of the relevant planning authority; or (c) are associated with an emergency.</p> <p>These construction hours replicate those used for Riverside 2²⁰.</p> <p>Marine construction activities are expected to be 24 hours and 7 days a week.</p> <p>The remaining comments are acknowledged.</p>
<p><i>“The proposed concept of an Outline Code of Construction Practice (OCOCP) is considered acceptable. This will be submitted as part of the DCO application and can include a more detailed consideration of mitigation measures required to minimise potential noise, vibration and disturbance to local residents and businesses. It is</i></p>	<p>Noted. Any full CoCP(s) will be developed to be in substantial accordance with the Outline CoCP (Document Reference 7.4) which includes consideration of piling activities. This is secured by a requirement of the Draft DCO (Document Reference 3.1).</p>

Statutory Consultee	Response
<p><i>recommended that particular attention will need to be paid to impacts associated with piling activities.”</i></p>	
<p><i>The methodologies and preliminary conclusions outlined in the remainder of chapter 6 for both construction and operational phases are considered satisfactory. It is accepted that further work will need to be carried out with regard to selection and siting of ASHP Fans.”</i></p>	<p>No response required.</p>
<p>CBRE on behalf of the Peabody Trust</p>	
<p><i>“In respect of the planning of the construction process, Peabody is concerned to limit the noise impacts and lorry movement impacts, on local people. We would like to be consulted on the proposed content of the Code of Construction Practice for the Project.”</i></p>	<p>No significant effects are anticipated as a result of operational noise or lorry movements, as presented in this chapter.</p> <p>Mitigation measures to minimise noise impacts throughout the construction phase will be managed through the CoCP and CTMP. Outline CoCP (Document Reference 7.4) and Framework CTMP (Document Reference 7.7) are submitted with this application for development consent, and are available for comment. Any full CoCP(s) or CTMP(s) will be developed in substantial accordance with the submitted outline document. This is secured by a requirement of the Draft DCO (Document Reference 3.1).</p>

6.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

6.4.1. The noise assessment of the Proposed Scheme has been undertaken in line with the legislation, policy and guidance described in **Section 6.2** and **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance (Volume 3)** of this chapter.

POTENTIAL SIGNIFICANT EFFECTS

6.4.2. As identified in the EIA Scoping Report²¹ and Paragraph 6.4.2 in the PEIR²², the following effects are considered to be potentially significant and have been considered further in this assessment:

- Construction Phase:
 - Noise effects arising during the construction phase of the Proposed Scheme (construction noise – landside).
 - Underwater noise and vibration effects arising during the demolition of the Belvedere Power Station Jetty (disused) and construction phase of the Proposed Scheme on marine receptors (i.e. marine mammals, hearing specialist fish species) (construction noise – marine receptors) are presented in **Chapter 8: Marine Biodiversity (Volume 1)**.
 - Noise impacts arising from construction vehicles on the surrounding road network (construction road traffic noise).
- Operation Phase:
 - Noise effects arising from the operation of the Proposed Scheme (landside only).
 - Underwater noise and vibration effects arising from maintenance dredging on marine receptors (i.e. marine mammals, hearing specialist fish species) are presented in **Chapter 8: Marine Biodiversity (Volume 1)**.

MATTERS SCOPED OUT

6.4.3. The following effects are considered unlikely to be significant and therefore have not been considered further in this assessment:

- Construction Phase:
 - Vibration effects arising during the construction phase of the Proposed Scheme on landside receptors (further information is provided in **Appendix 4-2: Scoping Opinion Responses (Volume 3)**).
 - Vibration effects arising from construction vehicles on the surrounding road network.
- Operation Phase:
 - Vibration effects arising from the operation of the Proposed Scheme.

- Noise impacts arising from additional traffic as a result of the operation of the Proposed Scheme as the number of operational traffic movements are minimal, as described in **Chapter 18: Landside Transport (Volume 1)**.
- Vibration effects arising from additional traffic as a result of the operation of the Proposed Scheme.
- Noise impacts on landside receptors arising from additional vessel movements or idling vessels. It is expected that up to five vessels will call at the Proposed Jetty each week to collect and transport CO₂ from the Proposed Scheme. Based on the information presented in **Chapter 19: Marine Navigation (Volume 1)**, there are already numerous vessel movements within this stretch of water. Consequently, the proposed additional movements from the Proposed Scheme are not anticipated to result in any significant adverse effects. Furthermore, there are already vessels that idle at the Middleton Jetty, and given the distance to the nearest sensitive receptors, no significant adverse effects are anticipated.
- Underwater noise and vibration effects arising from additional vessel movements on marine receptors (i.e., marine mammals, hearing specialist fish species). It is expected that up to five vessels will call at the Proposed Jetty each week to collect and transport LCO₂ from the Proposed Scheme. Based on the information presented in **Chapter 19: Marine Navigation (Volume 1)**, there are already numerous vessel movements within this stretch of the River Thames. Consequently, the proposed additional movements from the Proposed Scheme are not anticipated to result in any significant adverse effects on marine receptors.

BASELINE DATA COLLECTION

- 6.4.4. To quantify the existing baseline noise levels at the nearest noise sensitive receptors, as identified in **Section 6.6** a baseline noise survey was carried out at three measurement positions between 16th March to the 21st March 2023. Continuous noise measurements were taken at three locations considered representative of the nearest noise sensitive receptors. **Table 1-1** within **Appendix 6-2: Noise Monitoring (Volume 3)** presents the location of each measurement position (MP), with a summary presented below:
- MP1 – representative of the prevailing noise levels at the Travelodge London Belvedere and residential dwellings on Clydesdale Way, North Road, Norman Road, Poppy Close and Little Brights Road;
 - MP2 - representative of the noise levels close to the A2016 Eastern Way; and
 - MP3 - representative of the noise levels along the western boundary of the Site, and on Crossness LNR.
- 6.4.5. Measurements were taken in accordance with BS 7445:2003¹⁴ and BS 4142: 2014+A1:2019¹³. Meteorological conditions were conducive to obtaining accurate and reliable noise data.

- 6.4.6. All measurements were made using Class 1 sound monitoring equipment. All sound level meters had been calibrated to traceable standards within the previous 24 months, and the calibrator within the previous 12 months. All the sound level meters were calibrated onsite at the beginning and end of the monitoring periods. Any drifts in calibration level were within accepted tolerances.
- 6.4.7. A summary of the results obtained from these measurements is presented in **Table 6-7**. Detailed day-by-day data per measurement position is presented in **Appendix 6-2: Noise Monitoring (Volume 3)**.

ASSESSMENT METHODOLOGY

- 6.4.8. As set out in **Section 2.4 of Chapter 2: Site and Proposed Scheme Description (Volume 1)**, two options for the construction programme of the Proposed Scheme are being considered: Option 1 and Option 2. The estimated construction period is approximately 60 months (five years) for Option 1 and approximately 42 months (three and a half years) for Option 2. In order to provide a proportionate and robust noise and vibration assessment, only Option 2 has been considered as this presents the worst case scenario for this assessment. This is because there would be greater construction noise due to the consolidated construction programme.
- 6.4.9. As set out in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, two options for the design of the Carbon Capture Facility are being considered. One option is for individual lines to be connected to the exhaust stacks for Riverside 1 and Riverside 2, with two individual Stack(s) for the Carbon Capture Facility. A second option is for the two lines from Riverside 1 and Riverside 2 to be combined into a single Stack at the Carbon Capture Facility. For the purposes of this assessment, two individual lines with two individual Stack(s) is representative of the worst case scenario.
- 6.4.10. As set out in **Section 2.5 of Chapter 2: Site and Proposed Scheme Description (Volume 1)**, the choice between demolition or retention of the Belvedere Power Station Jetty (disused) is being considered. For the purposes of this assessment, the demolition of the Belvedere Power Station Jetty (disused) has been assessed as this is considered to present the worst case scenario for this assessment. This is because increased construction traffic and noise generating activities would be required should the Belvedere Power Station Jetty (disused) be demolished. If the Belvedere Power Station Jetty (disused) is to be retained (with modifications) there would be a slight improvement in the assessment of impacts and effects reported within this chapter, given the quantity of construction activities and associated vehicle movements would reduce.
- 6.4.11. The assessment presented within this chapter considers potential impacts from the construction and operation of the Proposed Scheme alongside Riverside 1 and Riverside 2.

Construction Phase

Construction Noise - Landside

- 6.4.12. An assessment of temporary construction noise impacts has been undertaken in line with the guidance contained in BS 5228:2009+A1:2014, and in consideration of the Lowest Observed Adverse Effect Levels (LOAEL) and Significant Observed Adverse Effect Levels (SOAEL). These terms are taken from national noise policy, most notably the NPSE⁶:
- LOAEL – the level above which adverse effects on health and quality of life can be detected; and
 - SOAEL – the level above which significant adverse effects on health and quality of life occur.
- 6.4.13. The scope and level of detail of the assessment undertaken is considered to be proportionate to the risk of a potential likely significant adverse effect occurring.
- 6.4.14. The baseline noise environment for the construction assessment has been quantified using data from the noise survey described in **Section 6.6**.
- 6.4.15. Construction noise levels at the façade of the nearest sensitive receptors to each area of works have been predicted based on the likely plant items (type, quantity and location), construction activities and proposed construction programme. A degree of professional judgement has been required to pragmatically group sensitive receptors and activities where appropriate.
- 6.4.16. The magnitude and significance of effects for construction noise have been determined by comparing predicted construction noise levels with the defined LOAEL and SOAEL values. The methodology for defining values for LOAEL and SOAEL is explained in the next paragraph, and the methodology for determining the magnitude and significance of effect is subsequently presented.
- 6.4.17. The LOAEL for each time period (day, evening/weekends and night) has been set as the baseline noise level for each receptor or group of receptors. The SOAEL has been set as the threshold level determined using section E.3.2 and Table E.1 of BS 5228:2009+A1:2014-1 (the ABC method)¹², which is replicated in **Table 6-3**. Further information and detail on BS 5228 and the ABC method is presented in **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance (Volume 3)**.

Table 6-3: Threshold of Potential Significant Adverse Construction Noise Effects Used to Determine the SOAEL

Assessment Category and Threshold Value Period	Threshold Value, in decibels (dB, $L_{Aeq, T}$)		
	Cat. A ^{A)}	Cat. B ^{B)}	Cat. C ^{C)}
Night time (23:00 –07:00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07:00 –19:00) and Saturdays (07:00–13:00)	65	70	75

Notes:

1 - A potential significant adverse effect is indicated if the $L_{Aeq, T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

2 - If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant adverse effect is indicated if the total $L_{Aeq, T}$ noise level for the period increases by more than 3 dB due to site noise.

3 - Applied to residential receptors only.

A. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.

C. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.

D. 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.

- 6.4.18. Note 1 to the table states “a potential significant effect is indicated if the $L_{Aeq, T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level”. On this basis, and continuing the theme of 5 dB step widths, **Table 6-4** has been prepared for the initial determination of the potential for significant effects in relation to construction noise. Both daytime and night time periods have been considered.
- 6.4.19. Any evening (post 19:00) or weekend working (Saturday afternoon or Sundays) would only be required for marine construction activities (Proposed Jetty), unless otherwise agreed by LBB. The night time assessment represents a worst case scenario to determine the potential impacts at the nearest human receptors (approximately 950m to the south of the Proposed Jetty), and therefore the evening and weekend periods have not been assessed. Further information on construction working hours is provided in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

Table 6-4: Significance Scale for the Assessment of Noise during Construction Works

Significance	Magnitude of Impact	BS 5228:2009+A1:2014-1 Threshold Level (dB $L_{Aeq,T}$), according to Category and Period					
		Day (08:00-18:00)			Night (23:00-07:00)		
		Cat A	Cat B	Cat C	Cat A	Cat B	Cat C
Significant	Major	>70	>75	>80	>50	>55	>60
	Moderate	65 – 70	70 – 75	75 – 80	45 – 50	50 – 55	55 – 60
Not Significant	Minor	60 – 65	65 – 70	70 – 75	40 – 45	45 – 50	50 – 55
	Negligible	<60	<65	<70	<40	<45	<50

6.4.20. Construction noise may be considered a significant adverse effect where it is determined that a major or moderate magnitude of impact will occur to a noise sensitive receptor 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 six consecutive months.

6.4.21. Any negligible or minor impacts are deemed not significant irrespective of duration.

CONSTRUCTION NOISE – MARINE RECEPTORS

6.4.22. An underwater noise and vibration assessment has been undertaken to determine whether the resultant noise and vibration levels are predicted to exceed the tolerant thresholds for marine species during the demolition of the Belvedere Power Station Jetty (disused) (if this option is taken forwards) and construction works.

6.4.23. The detailed assessment is presented in **Appendix 6-4: Underwater Noise Assessment (Volume 3)**, with the resultant impacts on marine species presented in **Chapter 8: Marine Biodiversity (Volume 1)**.

CONSTRUCTION ROAD TRAFFIC NOISE

6.4.24. An assessment of noise impacts arising from construction vehicles on the surrounding road network has been undertaken based on the principles of LA 111¹⁶. All road traffic noise predictions have been undertaken based on the principles of the calculation methodology presented in the CRTN¹⁵ and LA 111¹⁶.

6.4.25. An assessment of the potential magnitude of impacts and associated significance of effects has been undertaken of the predicted noise level changes, using guidance set out in LA 111¹⁶. The short term magnitude of impact scales as defined in LA 111¹⁶ are presented in **Table 6-5**.

Table 6-5: Magnitude of Impact Scales from LA 111

Magnitude of Impact	Significance	Short term noise change (dB L _{A10,18hr})
Negligible	Not Significant	Less than 1.0
Minor		1.0 to 2.9
Moderate	Likely to be Significant	3.0 to 4.9
Major		Greater than or equal to 5.0

- 6.4.26. LA 111¹⁶ states that the initial assessment of any potential likely significant adverse effects should be based on the short term magnitude of impact scale, and that an impact of ‘moderate’ or ‘major’ corresponds to a potential likely Significant adverse effect; however, an impact of ‘negligible’ or ‘minor’ corresponds to a likely Not Significant adverse effect.
- 6.4.27. Following this initial assessment of potential significance, LA 111¹⁶ states that a construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of 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.
- 6.4.28. Given the likely duration of the construction works is over a maximum period of 60 months, it is considered that the above time-based criteria would be exceeded. Consequently, any moderate or major impacts would be Significant, but any negligible or minor impacts would be Not Significant. The construction assessment presented in this chapter is appropriate for both construction programme options, as set out in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

Operation Phase Assessment Methodology

Operational Noise – Landside Receptors

- 6.4.29. Noise resulting from the operation phase of the Proposed Scheme has been assessed in accordance with BS 4142: 2014+A1:2019¹³. The detailed methodology for assessing industrial sources in line with BS 4142: 2014+A1:2019 has been set out in **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance (Volume 3)**.
- 6.4.30. Using the results of the baseline survey, noise emission targets for the Proposed Scheme have been derived in accordance with BS 4142: 2014+A1:2019¹³, which states that, *“a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context, and the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”*.

6.4.31. Consequently, operational noise effects may be considered significant depending on both the margin by which the rating level of the specific sound source exceeds the background sound level and also the context in which the sound occurs. Magnitude of impacts described as moderate or major in **Table 6-6** may be considered significant, depending on the context. Factors taken into consideration for the context may include:

- the absolute sound level at the individual receptor;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings already incorporate noise mitigation measures.

Table 6-6: Operation Noise Criteria

Magnitude of Impact	Significance	BS 4142: 2014+A1:2019 Descriptor	Excess of Rating Level Over Background Sound Level
Major	May be considered significant, depending on the context	Indication of a significant adverse impact, depending on the context.	Greater than 10 dB
Moderate		Indication of an adverse impact, depending on the context.	5.1 to 10 dB
Minor	Not Significant	Not defined in BS 4142: 2014+A1:2019.	0.1 to 5 dB
Negligible		Indication of a low impact, depending on the context.	Less than or equal to 0 dB

Noise Modelling

6.4.32. A detailed acoustic model of the Proposed Scheme and surrounding area has been produced to calculate the specific noise level at the nearest residential properties and compared against the noise emission targets based on design information available to date.

6.4.33. The model has been produced using CadnaA® noise mapping software²³ and the modelled site layout is based upon the parameters set out in **Chapter 2: Site and Project Description (Volume 1)** and the **Works Plans (Document Reference 2.3)**.

6.4.34. The base mapping has been established using Ordnance Survey open data and the topography across the area surrounding the Site has been based on 1m Digital Terrain Model (DTM) data.

- 6.4.35. The following assumptions have been adopted in the acoustic model:
- Ground absorption has been set at 1 for the majority of the model extent to approximate the predominantly acoustically absorbent ground cover between the noise sources and the facades of the proposed residential properties. Areas with significant levels of hard ground have been modelled with a ground absorption of 0. The order of reflections is set within the model at 2.
 - The heights of existing buildings located near to the Proposed Scheme have been approximated individually using online mapping software.
 - Heights of the residential properties have been determined using online mapping software.
 - Noise levels have been predicted at the facades of the residential properties on Clydesdale Way at a height of 7m above ground level for the first-floor apartments and increasing by 3m for each subsequent floor.

- 6.4.36. The assessment assumptions and sources of information for each item of plant have been identified in **Appendix 6-5: Operational Noise Modelling Assumptions (Volume 3)**.

OPERATIONAL NOISE – MARINE RECEPTORS

- 6.4.37. An underwater noise and vibration assessment has been undertaken to determine whether the resultant noise and vibration levels during operational maintenance dredging are predicted to exceed the tolerant thresholds for marine species.
- 6.4.38. The detailed assessment is presented in **Appendix 6-4: Underwater Noise Assessment (Volume 3)**, with the resultant impacts on marine species presented in **Chapter 8: Marine Biodiversity (Volume 1)**.

Significance Criteria

- 6.4.39. The matrix for determining significant effects for both the construction and operation phases is in **Section 4.11 of Chapter 4: EIA Methodology (Volume 1)** and sets out the defined descriptors for magnitude of impact (degree of change) and sensitivity of the receptor.
- 6.4.40. For this chapter, all sensitive receptors are considered to have a high sensitivity.

6.5. STUDY AREA

- 6.5.1. The Study Areas are as follows:

- Construction Phase:
 - Construction Noise (landside and marine receptors) – 300m radius from the Site Boundary, in line with the guidance in LA 111¹⁶; and
 - Construction Road Traffic – 600m radius from the Site Boundary, based on professional experience.

- Operation Phase:
 - Operation Noise (landside and marine receptors) – 600m radius from the Site Boundary, in line with the guidance in LA 111¹⁶.

6.5.2. The selected receptors for the construction and operation phase noise assessments are also representative of neighbouring properties in the vicinity. By choosing a selection of the closest, identified, potentially sensitive receptors the reported impacts are, consequently, typical of the worst affected receptors and all potentially significant effects are identified. At receptors further away from the works the impact would be reduced.

SENSITIVE RECEPTORS

6.5.3. The following sensitive receptors have been identified and have been considered within the noise and vibration impact assessment:

- Residential properties including those on:
 - Clydesdale Way (approximately 50m southeast of the Site Boundary^a);
 - North Road (approximately 170m southeast of the Site Boundary);
 - Little Brights Road (approximately 170m southeast of the Site Boundary);
 - Norman Road (approximately 170m south of the Site Boundary);
 - Poppy Close (approximately 275m southeast of the Site Boundary); and
 - Gypsy and traveller site, located off Jenningtree Way (approximately 600m east of the Site Boundary).
- Hospitality facilities including:
 - Travelodge London Belvedere (approximately 30m south of the Site Boundary).

6.5.4. The Iron Mountain Records Storage Facility, the Asda Belvedere Distribution Centre and the Asda ASC Recycling Centre, and Riverside 1 and Riverside 2 (and the staff within them), are not considered to be noise or vibration sensitive given all will have machinery working within the buildings and/or within the associated loading areas.

6.5.5. It is also noted that places of work, including Riverside 1, are not considered to be noise or vibration sensitive receptors. This is supported by the guidance within LA 111¹⁶, which states that examples of noise and vibration sensitive receptors include dwellings, hospitals, healthcare facilities, education facilities, community facilities, international and national or statutorily designated sites, public rights of way, cultural heritage assets and buildings containing vibration sensitive equipment.

^a All distances have been measured from the nearest point of the Site Boundary to the necessary noise and vibration sensitive receptor.

- 6.5.6. Whilst PRow and users of open land such as the Accessible Open Land are identified as an example of a sensitive receptor in LA111¹⁶, any users of these spaces would be transient such that any potential impacts would be temporary. For a significant construction noise effect to occur, the duration criteria as set out in **Paragraph 6.4.27** would need to be exceeded. Temporary users of the PRow would not exceed these criteria, and therefore could not experience a significant adverse effect. In terms of operation noise, BS 4142: 2014+A1:2019¹³ is used to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes. BS 4142: 2014+A1:2019¹³ is the de facto guidance for assessing sound from industrial and commercial premises, and its focus on humans in a dwelling or premises for residential purposes demonstrates that transient users of a PRow should not be included as a sensitive receptor within this assessment. Effects of the Proposed Scheme on the users of PRow are further assessed in **Chapter: 14 Population, Human Health and Land Use (Volume 1)**.
- 6.5.7. The assessment of noise and vibration impacts on ecological receptors is presented in **Appendix 6-4: Underwater Noise Assessment (Volume 3)**, with the resultant impacts on marine species presented in **Chapter 8: Marine Biodiversity (Volume 1)** and disturbance to terrestrial species covered in **Chapter 7: Terrestrial Biodiversity (Volume 1)**.

6.6. BASELINE CONDITIONS AND FUTURE BASELINE BASELINE

- 6.6.1. A summary of the results obtained from the continuous noise measurements is presented in **Table 6-7** below. The locations of these measurement positions have been provided in **Figure 6-1: Noise Survey Monitoring Locations (Volume 2)**.

Table 6-7: Summary of Noise Monitoring Data

Measurement Position	Daytime Noise Level (07:00 – 23:00) L _{Aeq} , 16hr (dB)	Daytime Noise Level (07:00 – 19:00) L _{Aeq} , 12hr (dB)	Night time Noise Level (23:00 – 07:00) L _{Aeq} , 8hr (dB)	Typical Daytime Background Sound Level (07:00 – 23:00), L _{A90} , 15 mins (dB)	Typical Night time Background Sound Level (23:00 – 07:00), L _{A90} , 15 mins (dB)
MP1	60	61	55	54	49
MP2	62	63	56	58	46
MP3	57	59	51	50	49

- 6.6.2. The ambient noise levels have been derived for the typical 16 hour day (07:00 – 23:00), 12 hour construction weekday (07:00 – 19:00) and 8 hour night (23:00 – 07:00). The latter two periods have been used to inform the construction noise assessment, and the former to provide context for the operation noise assessment.
- 6.6.3. Histograms showing the frequency of occurrence of background sound levels at each measurement position are presented in **Figures 1-1 to 1-6** in **Appendix 6-2: Noise Monitoring (Volume 3)**. These have been used to determine the typical background sound level, based on the most commonly occurring measured $L_{A90, 15 \text{ mins}}$ value. **Table 6-7** presents the typical background sound level obtained from studying both the daytime and night time periods across the entire measurement duration. These background sound levels were then used to inform the operation phase noise assessment.

FUTURE BASELINE

- 6.6.4. The future baseline noise climate at the nearest sensitive receptors may be influenced by changes in road traffic noise or due to the industrial and commercial uses in the area. Whilst the potential for future development in the area could give rise to higher ambient noise levels, there is unlikely to be a significant change to the background sound levels. Furthermore, any future developments would only give rise to an increase in noise levels, and therefore the use of existing noise levels is considered to be a conservative approach.
- 6.6.5. The future baseline noise climate may also be influenced by the operation of Riverside 2 (at the time of writing, construction works for Riverside 2 are being undertaken but will be concluded and Riverside 2 will be operational once construction for the Proposed Scheme commences). The ES for Riverside 2²⁰ concluded that there would be no significant noise effects at the nearest receptors, either from development-generated traffic or from operation of Riverside 2. The operational impact of Riverside 2 was 5 dB below the background sound level, and therefore would not alter the ambient noise level at the nearest sensitive receptors to the Proposed Scheme. Consequently, no significant changes to the baseline noise climate at the nearby sensitive receptors are anticipated in the future as a result of Riverside 2. Furthermore, it is anticipated that the Proposed Scheme will act as a barrier to noise from Riverside 2 on the noise sensitive receptors. On this basis, adopting the existing ambient noise environment as the baseline is considered to represent a reasonable worst case scenario.

6.7. EMBEDDED DESIGN, MITIGATION AND ENHANCEMENT MEASURES

6.7.1. This section sets out the embedded design, mitigation and enhancement measures relevant to the noise and vibration assessment. The **Design Principles and Design Code (Document Reference 5.7)** are commitments which will govern the design of the Proposed Scheme during the detailed design stage. The **Design Principles and Design Code (Document Reference 5.7)** are considered to be embedded mitigation for the purposes of the assessment presented in this ES.

CONSTRUCTION PHASE

6.7.2. The adoption of Best Practicable Means (BPM), as defined in the Control of Pollution Act 1974⁹, is a fundamental embedded mitigation measure. The manifestation of BPM are a series of noise and vibration control measures that are incorporated within the **Outline CoCP (Document Reference 7.4)**; the implementation of which, will result in noise and vibration impacts during construction being avoided or reduced.

6.7.3. The most relevant measures demonstrating BPM with respect to noise and vibration are set out below:

- during construction, standard working hours for the landside activities are Monday to Friday 07:00 to 19:00. On Saturdays, standard working hours are 07:00 to 13:00, with no working on Sundays or Bank Holidays. The working hours do not apply to construction works where these are (a) are carried out within existing buildings or buildings constructed as part of Proposed Scheme; (b) are carried out with the prior approval of the relevant planning authority; or (c) are associated with an emergency;
- however, marine construction activities are expected to be 24 hours and 7 days a week;
- display the name and contact details for a nominated site contact for the public on the Site to deal with complaints and engaging with local residents;
- the selection of quiet and low noise/vibration equipment and methodologies, where practicable;
- no percussive piling will be undertaken in Works No.1E (Supporting Plant) as shown on the **Works Plans (Document Reference 2.3)**. Any piling in Works No. 1E (Supporting Plant) will be undertaken using CFA, unless otherwise approved by LBB;
- optimal location of acoustic screening to minimise adverse noise effects;
- optimal location of equipment onsite to minimise noise/vibration disturbance; and
- the provision of acoustic enclosures around static plant, where necessary.

OPERATION PHASE

6.7.4. No embedded design, mitigation or enhancement measures are proposed for noise and vibration at this stage.

6.8. ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

6.8.1. This section details the assessment of impacts and effects for the Proposed Scheme during both the construction phase and operation phase, taking into account the embedded design, mitigation and enhancement measures detailed in **Section 6.7** (where relevant).

CONSTRUCTION PHASE

Construction Noise (Landside Receptors)

- 6.8.2. Typical construction phase noise levels have been predicted for each key stage of work at the nearest sensitive receptors, which are as follows:
- C1 – Residential properties on Clydesdale Way;
 - C2 – Residential properties on North Road;
 - C3 – Residential properties on Little Brights Road;
 - C4 - Travellers' site located off Jenningtree Way; and
 - C5 – Travelodge London Belvedere, Clydesdale Way.
- 6.8.3. Any sensitive receptors located further away than those identified above, including those on Norman Road^b and Poppy Close, should experience lower noise levels (and by association impacts and effects) based on professional judgement.
- 6.8.4. The receptors identified for the construction noise assessment are shown on **Figure 6-2: Construction Noise – Sensitive Receptors (Volume 2)**.
- 6.8.5. For the purposes of assessment, the principal construction activities have been considered and divided into the following key activities:
- Proposed Jetty:
 - Belvedere Power Station Jetty (disused) demolition and Proposed Jetty construction.
 - Proposed Scheme:
 - site establishment; and
 - substructure and superstructure works.
 - Ancillary Infrastructure:
 - excavation; and
 - pavement works.
- 6.8.6. The key activities align with the construction programmes presented in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

^b Located approximately 200m south of the Site Boundary.

- 6.8.7. A schedule of construction plant has been collated by professional experience and experience of similar schemes. **Appendix 6-6: Construction Noise (Volume 3)** sets out the plant and machinery assumed for the construction noise assessment. This includes the items, quantities and assumed utilisation rates used in the prediction of noise levels during each of the key activities.
- 6.8.8. For all phases, the predicted façade noise levels are based on the following assumptions:
- noise propagation is hemispherical;
 - the intervening ground between the construction noise source and the relevant noise sensitive property is reflective in the acoustic sense;
 - there is no attenuation from atmospheric absorption;
 - the predicted noise levels are those under neutral weather conditions;
 - the majority of data sourced from BS 5228:2009+A1:2014-1¹² as a single figure value, with a few exceptions; and
 - all plant has been set with a source height of 1.5m.
- 6.8.9. It is necessary to determine which BS 5228:2009+A1:2014-1¹² ABC category is relevant to each sample receptor. The baseline noise measurements from MP1 have been used to provide the ambient noise levels at each receptor location as this is the closest measurement position to the receptors assessed, and therefore the most representative of the noise climate at these locations.
- 6.8.10. The appropriate ABC method assessment category (and therefore the SOAEL) for each location has been determined from the measured free-field ambient noise level, corrected to the façade via the addition of 3 dB. **Table 6-8** identifies the process used to determine the ABC category at each receptor location. Further information and detail on BS 5228 and the ABC method is presented in **Appendix 6-3: Supplementary Acoustics Legislation, Policy and Guidance (Volume 3)**.

Table 6-8: Determination of ABC Category at Each Receptor

Receptor	Ambient Noise Level $L_{Aeq,T}$ (dB) Façade		Rounded to the Nearest 5 dB		ABC Category	
	Day	Night	Day	Night	Day	Night
C1 - Clydesdale Way	64	58	65	60	B	C
C2 - North Road	64	58	65	60	B	C
C3 – Little Brights Road	64	58	65	60	B	C
C4 - Travellers' Site located off Jenningtree Way	64	58	65	60	B	C

Receptor	Ambient Noise Level $L_{Aeq,T}$ (dB) Façade		Rounded to the Nearest 5 dB		ABC Category	
	Day	Night	Day	Night	Day	Night
C5 - Travelodge London Belvedere Hotel	64	58	65	60	B	C

6.8.11. The calculated worst case noise levels associated with the demolition and construction works are presented in **Table 6-9**, together with the magnitude of impact based on the significance scale presented in **Table 6-4**, as per the relevant ABC category.

Table 6-9: Predicted Construction Noise Levels and Magnitude of Impact

Receptor	Construction Activity	Daytime		Night time	
		Predicted $L_{Aeq,12h}$ dB Façade	Magnitude of impact	Predicted $L_{Aeq,8h}$ dB Façade	Magnitude of impact
C1 - Clydesdale Way	Demolition of Belvedere Power Station Jetty (disused)	51	Negligible	51	Negligible
	Earthworks and Proposed Jetty construction	54	Negligible	54	Minor
	Site establishment	66	Minor	n/a	n/a
	Substructure and superstructure	73	Moderate	n/a	n/a
	Excavation	65	Minor	n/a	n/a
	Pavement works	68	Minor	n/a	n/a
C2 - North Road	Demolition of Belvedere Power Station Jetty (disused)	49	Negligible	49	Negligible
	Earthworks and Proposed Jetty construction	52	Negligible	52	Minor
	Site establishment	58	Negligible	n/a	n/a
	Substructure and superstructure	65	Minor	n/a	n/a

Receptor	Construction Activity	Daytime		Night time	
		Predicted L _{Aeq,12h} dB Façade	Magnitude of impact	Predicted L _{Aeq,8h} dB Façade	Magnitude of impact
	Excavation	53	Negligible	n/a	n/a
	Pavement works	57	Negligible	n/a	n/a
C3 – Little Brights Road	Demolition of Belvedere Power Station Jetty (disused)	50	Negligible	50	Minor
	Earthworks and Proposed Jetty construction	53	Negligible	53	Minor
	Site establishment	60	Negligible	n/a	n/a
	Substructure and superstructure	66	Minor	n/a	n/a
	Excavation	54	Negligible	n/a	n/a
	Pavement works	58	Negligible	n/a	n/a
C4 - Travellers' site located off Jennings Way	Demolition of Belvedere Power Station Jetty (disused)	51	Negligible	51	Minor
	Earthworks and Proposed Jetty construction	54	Negligible	54	Minor
	Site establishment	53	Negligible	n/a	n/a
	Substructure and superstructure	59	Negligible	n/a	n/a
	Excavation	47	Negligible	n/a	n/a
	Pavement works	51	Negligible	n/a	n/a
C5- Travelodge London Belvedere hotel	Demolition of Belvedere Power Station Jetty (disused)	51	Negligible	51	Minor
	Earthworks and Proposed Jetty construction	54	Negligible	54	Minor
	Site establishment	68	Minor	n/a	n/a

Receptor	Construction Activity	Daytime		Night time	
		Predicted L _{Aeq,12h} dB Façade	Magnitude of impact	Predicted L _{Aeq,8h} dB Façade	Magnitude of impact
	Substructure and superstructure	74	Moderate	n/a	n/a
	Excavation	65	Negligible	n/a	n/a
	Pavement works	68	Minor	n/a	n/a

Note: Night time works only for the Belvedere Power Station Jetty (disused) demolition and Proposed Jetty construction.

- 6.8.12. The assessment generally anticipates impacts of negligible to minor magnitude, including for any night time working. This is to be expected given the separation distance between the Proposed Scheme and the nearest noise sensitive receptors is sizeable (over 150m) in most cases.
- 6.8.13. An impact of moderate magnitude is anticipated at the closest receptors on Clydesdale Way and the Travelodge London Belvedere during the day during the substructure and superstructure works. The predictions are a reasonable worst case as it is assumed that the construction plant are operating at the closest boundary of the Site to the receptor. However, in reality it is likely that the plant would be more spread out and located further from the receptor, resulting in lower predicted noise levels.
- 6.8.14. The construction noise is likely to have a direct, temporary, short term **Moderate Adverse (Significant)** effect on receptors on Clydesdale Way and the Travelodge London Belvedere, and **Negligible to Minor Adverse (Not Significant)** effects on all other landside receptors.

Construction Road Traffic Noise

- 6.8.15. In addition to construction plant operating on the Site, there will be movement of materials to and from the Site by road. The construction phase of the Proposed Scheme has projected that at the construction peak there will be 25 HGV deliveries (50 two-way movements) per day (for further details see **Chapter 18: Landside Transport (Volume 1)**).
- 6.8.16. **Table 6-10** presents 18 hour Annual Average Weekday Traffic (AAWT) flow data for the key road links in the vicinity of the Site, with and without the peak construction traffic, together with the predicted change in noise level. The change in noise level has been compared with the magnitude of impact scale, as set out in **Table 6-5**, and the resulting magnitude of impact reported.

Table 6-10: Predicted Change in Noise Level from Construction Traffic

Road Link	AAWT – Baseline	% HGV	AAWT – Peak Construction Year	%HGV	Predicted Noise Level Change dB	Magnitude of Impact
A2016 Eastern Way	22,499	5.4	22,605	5.6	0.1	Negligible
Yarnton Way	10,783	3.1	10,831	3.1	0.0	Negligible
A2016 Picardy Manorway	31,316	7.3	32,470	7.6	0.2	Negligible
Little Brights Road	11,919	0.7	12,275	0.7	0.1	Negligible
A2016 Bronze Age Way	25,229	10.4	25,825	10.7	0.2	Negligible
A206 Northend Road	32,534	10.2	33,131	10.5	0.1	Negligible
A206 Thames Road	30,204	9.9	30,801	10.1	0.1	Negligible
A206 Bob Dunn Way	27,858	12.1	28,454	12.4	0.1	Negligible

6.8.17. The assessment results indicate that with construction vehicles on the surrounding road network, the increase in noise levels are likely to have a direct, temporary, short term **Negligible (Not Significant)** effect.

OPERATION PHASE

Operational Noise – Landside Receptors

- 6.8.18. The assessment to determine the potential likely significant effects for noise associated with the operation phase are set out below.
- 6.8.19. The background sound level has been determined at Travelodge London Belvedere and the residential receptors at Clydesdale Way from the data captured at MP1 as identified previously in **Table 6-7**.
- 6.8.20. The specific sound level has been determined using the CadnaA²² noise model identified above. It has been assumed that all plant would be running constantly for the entire assessment period during both the daytime and night time as a worst case.
- 6.8.21. An acoustic feature correction of +3 dB has been applied based on the assumption the cooling fans at the water heating plant will have a tonal component. This is considered to be a precautionary approach as full, one-third octave band data for the plant is not available at this time.
- 6.8.22. **Table 6-11** presents the BS 4142 assessment that has been carried out for operational noise from the Proposed Scheme at the receptors at Clydesdale Way.

Table 6-11: Operational Noise Impact Assessment – Clydesdale Way

Time Period	Background sound level $L_{A90, T}$ dB	Specific sound level at nearest noise sensitive receptor $L_{Aeq T}$ dB	Acoustic feature correction	Rating sound level	Excess of rating sound level over background sound level
Daytime	54	50	+3	53	-1
Night time	49	50	+3	53	+4

- 6.8.23. As per the magnitude of impact matrix in **Table 6-6**, the initial estimate of impact would indicate a negligible magnitude of change during the daytime and a minor magnitude of change during the night time. However, this is prior to considering the context of the noise generated by the Proposed Scheme within the surrounding existing noise climate as explained in **Paragraph 6.4.31**. In summary, operational noise is likely to have a direct, permanent, long term **Minor Adverse (Not Significant)** effect during the daytime and a direct, permanent, long term **Minor Adverse (Not Significant)** effect during the night time on residential receptors on Clydesdale Way.

6.8.24. **Table 6-12** identifies the BS 4142 assessment that has been carried out for operational noise from the Proposed Scheme at the receptor at Travelodge London Belvedere.

Table 6-12: Operational Noise Impact Assessment – Travelodge London Belvedere

Time Period	Background Sound Level L _{A90, T} dB	Specific Sound Level at Nearest Noise Sensitive Receptor L _{Aeq T} dB	Acoustic Feature Correction dB	Rating Sound Level dB	Excess of Rating Sound Level over Background Sound Level dB
Daytime	54	51	+3	54	0
Night time	49	51	+3	54	+5

6.8.25. As per the magnitude of impact matrix in **Table 6-6**, the initial estimate of impact would indicate a negligible magnitude of change during the daytime and a moderate magnitude of change during the night time. However, this is prior to considering the context of the noise generated by the Proposed Scheme within the surrounding existing noise climate. In summary, the operational noise is likely to have a direct, permanent, long term **Negligible (Not Significant)** effect during the daytime and a **Moderate Adverse (Significant)** effect during the night time on Travelodge London Belvedere.

6.8.26. A noise impact assessment should consider all pertinent contextual factors, in line with the guidance in BS 4142, before modifying the initial impact estimation accordingly. In this case the key contextual considerations are considered to be:

- **Frequency of exposure:** The air source heat pump (ASHP) fans associated with the water heating facility of the Proposed Scheme are the greatest source of noise at both sensitive receptors. The ASHP will be in use when thermal capacity cannot be provided by Riverside 1 or Riverside 2. The ASHP will be active for approximately 1,500 hours per year, which is approximately 17% of the time. This would support a downward modification to any estimated impact magnitude.
- **The established use of the Site:** The Proposed Scheme is located within an existing large commercial/industrial area and therefore will not be out of character with the existing noise climate. This would support a downward modification to any estimated impact magnitude.

- **The sensitivity of the receptor:** The exposed facades of the residential development on Clydesdale Way and the Travelodge London Belvedere are orientated towards a busy A-road (A2016 Picardy Manorway) and consequently are designed with acoustic façade mitigation to minimise any potential noise impact. Furthermore, the Travelodge London Belvedere includes air conditioning minimising the need to open windows during periods of hot weather. This would support a downward modification of the initial impact estimation.
- **The character of the residual sound compared to the character of the specific sound:** The characteristics of the sound, being industrial in nature, are similar to that of the prevailing noise environment which is dominated by existing industrial/commercial noise and road traffic noise. This would support a downward modification of the initial impact estimation.
- **The level of the residual sound compared to the level of the specific sound:** The level of the ambient sound (60 dB $L_{Aeq,16h}$ during the day and 55 dB $L_{Aeq,8h}$ during the night), is higher than the predicted specific sound level (51 dB $L_{Aeq,T}$) generated by the operation of the Proposed Scheme at the receptors on Clydesdale Way and the Travelodge London Belvedere. This would support a downward modification to any estimated impact magnitude.

6.8.27. Considering the above contextual factors, it is considered that the impact during the night time can be reduced to a direct, permanent, long term **Minor Adverse (Not Significant)** effect.

Noise from Emergency Pressure Release Valves

6.8.28. There are emergency pressure relief valves associated with the LCO₂ Buffer Storage. These valves will release LCO₂ should pressure within the LCO₂ Buffer Storage become too great to avoid damage to the Proposed Scheme. As the valves will only be used in emergency situations, and are not considered part of typical activities, they have not been included within the main assessment.

6.8.29. An assessment of noise from the pressure relief valve impacting closest to the sensitive receptors has been undertaken, and the specific noise level has been predicted to be 45 dB $L_{Aeq,T}$. Assuming a partially open window reduces the external noise level by 15 dB (as set out in BS 8233¹⁸), the internal noise level would not exceed the L_{Aeq} or L_{max} night time noise criteria identified within BS 8233¹⁸. Therefore, the noise from the emergency use of the pressure relief valves is considered to have a direct, permanent, long term **Negligible (Not Significant)** effect.

Uncertainty

6.8.30. Uncertainties in all aspects of this noise assessment have been minimised as far as possible and their consideration is set out in more detail in **Appendix 6-7: Uncertainty Matrix (Volume 3)**.

6.9. ADDITIONAL DESIGN, MITIGATION AND ENHANCEMENT MEASURES

6.9.1. This section sets out the additional mitigation and compensation measures that are relevant for noise and vibration.

CONSTRUCTION PHASE

Construction Noise

6.9.2. As stated in **Paragraph 6.4.20**, construction noise may be considered a significant adverse effect where it is determined that a major or moderate magnitude of impact will occur to a noise sensitive receptor 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 six consecutive months.

6.9.3. Moderate Adverse impacts are predicted at Clydesdale Way and the Travelodge London Belvedere Hotel during the substructure and superstructure landside Carbon Capture Facility construction works, when plant are operating at the southern boundary of the Site, nearest to the receptors.

6.9.4. The duration of any construction works within 180m of the receptors are limited to less than 10 or more days or nights in any 15 consecutive days or nights or a total number of days not exceeding 40 in any six consecutive months, such that significant adverse effects do not arise. This mitigation is set out in the **Outline CoCP (Document Reference 7.4)**. Any full CoCP(s) will be developed in substantial accordance with that **Outline CoCP (Document Reference 7.4)** as is secured by a requirement of the **Draft DCO (Document Reference 3.1)**.

Operation Phase

6.9.5. A Noise Mitigation Plan will be prepared and an Operational EMP, and secured through the prior to operation of the Proposed Scheme to detail the final mitigation measures to demonstrate that only negligible to minor impacts would arise (Not Significant). This is secured by a requirement of the **Draft DCO (Document Reference 3.1)**.

6.9.6. The requirement in the **Draft DCO (Document Reference 3.1)** will secure the operational rating sound levels from the Proposed Scheme such that they will not exceed the typical background sound levels as predicted at 1m from the façade of the nearest sensitive receptors (as a free-field noise level), with the exception of plant operating in an emergency. The operational noise limits, defined as a rating level, at the nearest sensitive receptors Clydesdale Way and the Travelodge London Belvedere Hotel are as set out in **Table 6-13** below.

Table 6-13: Operational Noise Limits

Receptor	Operational Noise Limit $L_{Ar, Tr}$ dB	
	Daytime	Night time
Clydesdale Way	54	49
Travelodge London Belvedere Hotel	54	49

- 6.9.7. Given that the ASHP fans of the Proposed Scheme are the greatest source of noise at Clydesdale Way and the Travelodge London Belvedere, consideration has been given to additional mitigation measures to minimise the impact. This is in line with the requirements as set out in the EN-1¹ to consider “*all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life*”.
- 6.9.8. The following mitigation measures have been reviewed and are incorporated in the **Mitigation Schedule (Document Reference 7.8)** for one of these measures to form part of an Operational EMP - this is secured by a requirement of the **Draft DCO (Document Reference 3.1)**. Any one measure would provide the attenuation required to result in a reduction in noise levels such that effects are **Negligible to Minor (Not Significant)**:
- locating the ASHP fans further away and behind the water heating facility, such that the building acts as a barrier to the noise from the fans; or
 - selecting quieter ASHP fans to achieve a cumulative rating level of not more than 5 dB above the background sound level at 1m from any nearby sensitive receptor; or
 - erecting an acoustic barrier around the ASHP fans to achieve a cumulative rating level of not more than 5 dB above the background sound level at 1m from any nearby sensitive receptor.

6.10. MONITORING

- 6.10.1. No monitoring of noise and vibration effects is considered to be proportionate or to be required during the construction phase.
- 6.10.2. The mitigation measures in the Noise Mitigation Plan, which will be secured through a requirement of the **Draft DCO (Document Reference 3.1)** such that there are no significant noise effects during the operation phase.

6.11. RESIDUAL EFFECTS

- 6.11.1. **Table 6-14** summarises the residual effects associated with the Proposed Scheme.

Table 6-14: Noise and Vibration Summary of Residual Effects

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual Effect
Construction Phase				
Construction Noise (landside receptors)	C1 - Clydesdale Way	Moderate (Significant)	The duration of any construction works within 180m of the receptors is limited to less than 10 or more days or nights in any 15 consecutive days or nights or a total number of days not exceeding 40 in any six consecutive months which is included in the Outline CoCP (Document Reference 7.4) and secured by a requirement of the Draft DCO (Document Reference 3.1) .	Moderate (Not Significant) The impact of construction noise is moderate given the predicted noise levels at the receptor; however, given the duration will be limited the effect is not significant in line with the criteria set out in Paragraph 6.4.20 .
	C2 – North Road	Minor (Not Significant)	N/A	Minor (Not Significant)
	C3 – Little Brights Road	Minor (Not Significant)	N/A	Minor (Not Significant)

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual Effect
	C4 – Travellers’ site located off Jenningtree Way	Minor (Not Significant)	N/A	Minor (Not Significant)
	C5 – Travelodge London Belvedere hotel	Moderate (Significant)	The CoCP will limit the duration of any construction works within 180m of the receptors to less than 10 or more days or nights in any 15 consecutive days or nights and a total number of days exceeding 40 in any six consecutive months	Moderate (Not Significant) The impact of construction noise is moderate given the predicted noise levels at the receptor; however, given the duration will be limited the effect is not significant in line with the criteria set out in Paragraph 6.4.20 .
Construction Road Traffic Noise	N/A	Negligible (Not Significant)	None required.	Negligible (Not Significant)
Operation Phase				
Operational Noise (landside receptors)	C1 - Clydesdale Way	Minor Adverse (Not Significant)	Selecting quieter ASHP fans, locating plant further away and behind	Minor Adverse (Not Significant)

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual Effect
	C5- Travelodge London Belvedere hotel	Moderate Adverse (Significant)	the water heating facility from sensitive receptors, erecting an acoustic barrier around the ASHP fans.	Minor Adverse (Not Significant)

6.12. LIMITATIONS AND ASSUMPTIONS

6.12.1. The following limitations and assumptions have been identified:

- At the time of undertaking this assessment detailed information regarding construction activities and construction plant are not available. Calculations have been based on an indicative construction schedule and plant. **Appendix 6-6: Construction Noise (Volume 3)** identifies assumptions that have been made with respect to the construction noise assessment.
- **Appendix 6-5: Operational Noise Modelling Assumptions (Volume 3)** identifies assumptions that have been made for each noise source identified within the Proposed Scheme.

6.13. REFERENCES

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