Riverside Energy Park

Environmental Permit Appendices

APPENDIX:

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NOISE ASSESSMENT

DCO APPLICATION ES CHAPTER 8

NOISE AND VIBRATION

December 2018 | Revision 0 |

CORY RIVERSIDE ENERGY

Riverside Energy Park

Environmental Statement

Chapter 8: Noise and Vibration

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8 Noise and Vibration

8.1 Introduction

8.1.1 This Chapter presents the findings of the assessment of the likely significant effects of the construction, operation (including maintenance) and decommissioning of Riverside Energy Park (REP or the Proposed Development) on the noise and vibration climate of the area surrounding the Proposed Development, taking into account relevant national, regional and local policy, guidance and regulations.

8.1.2 This Chapter describes the methods used to establish the baseline conditions which currently exist at Noise Sensitive Receptors (NSRs) closest to the Application Site, the potential direct and indirect effects of the Proposed Development arising from noise and vibration, and the mitigation measures required to prevent or reduce any significant effects. A description of the technical terminology used in this Chapter is provided in **Chapter 18**.

8.1.3 This Chapter has been prepared by Peter Brett Associates LLP (PBA). In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the Infrastructure EIA Regulations 2017), a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this Environmental Statement is provided in **Appendix A.2**.

8.2 Legislation, Policy, Guidance and Standards

Legislation

Control of Pollution Act 1974

8.2.1 The Control of Pollution Act 1974 (COPA) Section 61, sets out procedures for contractors to obtain 'prior consent' for construction works within agreed noise limits.

8.2.2 Applications for prior consent are made to the local authority. These would contain a method statement of the proposed works and the steps that would be taken to minimise and mitigate noise to acceptable levels and time periods during the construction period.

8.2.3 Section 60 of COPA describes the process that local authorities may follow to impose controls over potentially noisy demolition and construction works.

Environmental Protection Act 1990

8.2.4 Under Part III of the Environmental Protection Act 1990, local authorities have a duty to investigate noise complaints from premises (land and buildings) and

vehicles, machinery or equipment in the street. This includes noise arising from demolition and construction sites.

8.2.5 If the Environmental Health Officer (EHO) from the local authority is satisfied that the problem complained about amounts to a statutory nuisance and is prejudicial to health or a nuisance, then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice could require that the noise or nuisance must be stopped altogether or limited to certain times of the day.

8.2.6 In determining if a noise complaint amounts to a statutory nuisance, various guidance documents and existing case law can be taken into account. Subsection 80(7) of the Environmental Protection Act 1990 provides an acceptable defence against an abatement notice in respect of a statutory nuisance if it is proved that the 'best practicable means' were used to prevent, or to counteract the effects of, the nuisance. This is further set out in the Statutory Nuisance Statement (**Document Reference 5.6**).

National Planning Policy and Strategies

National Policy Statements

8.2.7 As outlined in **Chapter 2**, the relevant National Policy Statements (NPSs) provide the primary basis for decisions made by the Secretary of State on nationally significant infrastructure projects (NSIPs).

8.2.8 **Table 8.1** below identifies the relevant requirements of NPSs.

Table 8.1: Relevant requirements of NPSs

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
Section 5.11 of NPS EN-1 sets out the requirements for assessing and mitigating noise and vibration from NSIPs in the energy sector. It advises that operational noise and vibration from a proposed development and the proximity to noise sensitive receptors, quiet areas or sites designated for ecological reasons will determine the likely impact of noise.	This Chapter reports the assessment of operational noise on the nearest noise sensitive human receptors. An assessment of ecological receptors is provided in **Chapter 11**.

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
Section 5.11.4 of NPS EN-1 sets out that where noise impacts are likely, a noise assessment should be undertaken in line with details listed in the NPS EN-1: ■ A description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise; ■ Identification of noise sensitive premises and noise sensitive areas that may be affected; ■ The characteristics of the existing noise environment; ■ A prediction of how the noise environment will change with the proposed development; ■ In the shorter term such as during the construction period; ■ In the longer term during the operating life of the infrastructure; ■ At particular times of the day, evening and night as appropriate; ■ An assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and ■ Measures to be employed in mitigating noise. Operational noise and vibration should be assessed using relevant British Standards (e.g. BS 4142, BS 6472, BS	Operational noise has been assessed using BS 4142: 2014 Methods for rating and assessing industrial and commercial sound. This standard and methodology has been agreed with the Environmental Health Officer at London Borough of Bexley (LBB). The standard is the appropriate methodology for the Proposed Development. The noise generating aspects are provided in **Table 8.10** with information on assumptions and acoustics corrections provided in paragraph 8.9.21. The existing noise environment is described in **Table 8.3**. Identification of noise sensitive receptors is defined in paragraph 8.5.5. The prediction of noise during the construction period is provided in **Table 8.14**. The prediction of how the noise environment will change with the Proposed Development during the operating life of the infrastructure is provided in **Table 8.15**. This table provides an assessment for both the daytime and night-time as appropriate. Measures to be employed in mitigating noise are provided in Section 8.8.

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
8233 and BS 5228) and other guidance, including the other NPSs.	
Paragraph 5.11.8, states that the project should: "*demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission*."	The residual impact of operational noise on nearby receptors has been determined to be not significant, due to selection of plant and due to REP primarily being located in an area away from noise sensitive receptors including dwellings. Furthermore, the majority of noise generating activities are contained within buildings that reduce noise emission.
Paragraph 5.11.9, advises that development consent will not be granted unless the proposal meets the following aims: ■ "*Avoid significant impacts on health and quality of life from noise,* ■ *Mitigate and minimise other adverse impacts on health and quality of life from noise, and* ■ *Where possible, contribute to improvements to health and quality of life through the effective management and control of noise*."	The impact on noise sensitive receptors has been assessed, and responses to each bullet point in paragraph 5.11.9 of NPS EN-1 can be found in Section 8.9.
Paragraph 5.11.11 to 5.11.13 of NPS EN-1 also set out advice on mitigation and states:	Based on the assessments undertaken, mitigation measures outside of those considered typical for the construction phase

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
"The [decision maker][1] should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the [decision maker][1] may wish to impose requirements. Any such requirements should take account of the guidance set out in Circular 11/95 (see Section 4.1) or any successor to it. *Mitigation measures may include one or more of the following:* ■ *engineering: reduction of noise at point of generation and containment of noise generated;* ■ *lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural barriers, or other buildings; and* ■ *administrative: restricting activities allowed on the site; specifying acceptable noise limits; and taking into account seasonality of wildlife in nearby designated sites.* *In certain situations, and only when all other forms of noise mitigation have been exhausted, it may be appropriate for the [decision maker][1] to consider requiring noise mitigation through improved sound insulation to dwellings."*	are not considered necessary for REP. Through selection of appropriate plant and by containing the majority of the noise within the buildings, together with the separation distance between the source at REP and noise sensitive receptors no further mitigation measures are considered necessary for the operational phase.
Regarding potential noise and vibration impacts, the policy states at paragraph 2.5.53 that: *"Generic noise and vibration impacts are covered in detail in Section 5.11 of EN-1.*	Plant items associated with REP have been assessed in Section 8.9 and described in **Chapter 3**.

[1] Author's inclusion

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
In addition there are specific considerations which apply to biomass and EfW generating stations as set out below. Sources of noise and vibration may include: ■ *delivery and movement of fuel and materials;* ■ *processing waste for fuel at EfW generating stations;* ■ *the gas and steam turbines that operate continuously during normal operation; and* ■ *external noise sources such as externally-sited air-cooled condensers that operate continuously during normal operation."*	These include the sources of noise identified in paragraph 2.5.53 of NPS EN-3.
It also states at paragraph 2.5.54 that *"the ES should include a noise assessment of the impacts on amenity in case of excessive noise from the project as described in Section 5.11 in EN-1."*	Operational noise impacts are assessed in Section 8.9. BS 41424:2014 (used in the assessment of operational effects) does not specifically state the term amenity. However, it is considered that by following the guidance in the standard and adhering to the requirement of the local authority the broad concept of amenity and impacts on noise sensitive receptors has been considered.
Paragraph 2.5.58 states that: *"Noise from features include sorting and transport of material during operation of biomass or EfW generating stations is unavoidable. Similarly, noise from apparatus external to the main generating station may be*	Section 8.8 – Embedded mitigation describes the plant orientation and selection process which has been developed to reduce noise impacts as far as reasonably practicable.

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
unavoidable. This can be mitigated through careful plant selection."	
Regarding potential noise and vibration impacts, the policy covers noise and vibration at paragraphs 2.9.1 to 2.9.9. Paragraphs 2.9.1 and 2.9.2 state*:* *"Generic noise effects are covered in Section 5.11 of EN-1. In addition there are specific considerations which apply to electricity networks infrastructure as set out below.* *All high voltage transmission lines have the potential to generate noise under certain conditions."* Paragraphs 2.9.8 and 2.9.9 go on to state: *"While standard methods of assessment and interpretation using the principles of the relevant British Standards are satisfactory for dry weather conditions, they are not appropriate for assessing noise during rain, which is when overhead line noise mostly occurs, and when the background noise itself will vary according to the intensity of the rain.* *Therefore an alternative noise assessment method to deal with rain-induced noise is needed, such as the one developed by National Grid as described in report TR(T)94,1993. This follows recommendations broadly outlined in ISO 1996 (BS 7445:1991) and in that respect is consistent with BS 4142:1997."*	Whilst NPS EN-5 is noted, the operational noise and vibration impacts from the Electrical Connection have been scoped out of the assessment as agreed with the Secretary of State through the Scoping Opinion. The application of this policy is therefore not relevant to this scheme.

8.2.9 It is considered that this Chapter fully addresses the requirements of the NPSs as outlined above in **Table 8.1**.

8.2.10 The National, Regional and Local policy documents specific to this Chapter are listed below. A discussion in relation to these can be found in **Appendix A.3**.

- The National Planning Policy Framework (2018);
- National Planning Policy for Waste (2014);
- Planning Practice Guidance; and
- Noise Policy Statement for England (NPSE) (2010).

Regional Planning Policy and Strategies

- The London Plan (2016);

Emerging Regional Planning Policy and Strategies

- Draft New London Plan showing Minor Suggested Changes (2018); and
- London Environment Strategy (2018).

Local Planning Policy and Strategies

- Bexley Core Strategy (2012);
- Bexley Unitary Development Plan (2004) Saved Policies (2012);
- Dartford Borough Council Development Policies Plan and Policies Map (2017); and
- Kent Minerals and Waste Local Plan 2013-2030 (2016).

Emerging Local Planning Policy and Strategies

- Draft Bexley Local Plan; and
- Draft Dartford Borough Council Local Plan.

Noise and Vibration Guidance and Standards

British Standard 7445: 2003 Description and Measurement of Environment Noise – Part 1: Guide to Quantities and Procedures

8.2.11 BS 7445-1 (British Standards Institute (BSI), 2003) describes methods and procedures for measuring noise from all sources which contribute to the total noise climate of a community environment, individually and in combination. The results are expressed as equivalent continuous A-weighted sound pressure levels, $L_{Aeq,T}$.

8.2.12 BS 7445-1 states that sound level meters that are used should conform to Type 1 (or Type 2 as a minimum) as described in BS EN 61672:2013

Electroacoustics. Sound level meters should be calibrated according to the instructions of the manufacturer and field calibration should be undertaken at least before and after each series of measurements.

British Standard 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound

8.2.13 BS 4142 (BSI, 2014) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

8.2.14 The Standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from the 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. However, the determination of noise amounting to a nuisance is beyond the scope of the Standard.

8.2.15 The procedure contained in BS 4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.

8.2.16 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:

- Typically, the greater this difference, the greater the magnitude of impact;
- A difference of around +10 decibel (dB) or more is likely to be an indication of a significant adverse effect, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse effect, 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 effect or a significant adverse effect. 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.

8.2.17 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound;

- 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 or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
  - Façade insulation treatment;
  - Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
  - Acoustic screening.

Design Manual for Road and Bridges (2011) – Design Manual for Road and Bridges Volume 11 Section 3 Part 7 Traffic Noise and Vibration (Highways Agency, 2011)

8.2.18 The Design Manual for Roads and Bridges (DMRB) is considered as the regulatory standard for the design of a new road or improvements to an existing road. In particular, Volume 11 Section 3 Part 7 sets out the method for assessing noise associated with road traffic. DMRB provides guidance on quantifying the noise impacts generated by changes in road traffic. Whilst the Proposed Development does not incorporate the provision of a new road, the assessment has been informed by the criteria stated in DMRB. This is a standard approach for assessing off-site road traffic impacts and has been agreed with LBB and was not questioned through the Secretary of State's Scoping Opinion (**Appendix A.1**).

British Standard 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites

8.2.19 BS 5228: 2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (BSI, 2014) gives recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels.

8.2.20 BS 5228: 2009+A1:2014 also provides a method for determining the sound levels associated with demolition and construction activities; and considers the numbers and types of equipment operating, their associated Sound Power Level (L_W); and the distance to receptors, along with the effects of any screening.

8.2.21 In Annex E it also provides examples of significance and threshold levels which could be used as design criteria for construction noise. The fixed limit criteria have been applied based on BS 5228: 2009+A1:2014 which states that noise levels between 07:00 and 19:00 hours, outside the nearest window of an occupied room closest to the site boundary should not exceed:

- 70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise; and
- 75 decibels (dBA) in urban area near main roads in heavy industrial areas.

Calculation of Road Traffic Noise (CRTN)

8.2.22 CRTN (Department of Transport, Welsh Office, 1988) describes the procedures for traffic noise calculation and is suitable for environmental assessments of schemes where road traffic noise may have an impact.

8.3 Consultation

8.3.1 Consultation has been undertaken with both PINS and LBB. **Table 8.2** below summarises the consultation and where in this ES the comments have been addressed.

Table 8.2: Summary of Key Consultation Responses in Relation to Noise and Vibration

Reference	Comment	Response
Secretary of State Scoping Opinion		
Section 4.3 – ID 1	The Planning Inspectorate does not consider that noise impacts during construction of the electrical connection route can be scoped out.	An assessment of noise impacts during construction has been undertaken and is reported in Section 8.9.
Section 4.3 – ID 2	Operational vibration impacts scoped out	Noted.
Section 4.3 – ID 3	The ES should also assess impacts from noise and vibration to ecological receptors (where relevant) and should appropriately refer to the assessment of impacts on biodiversity	This assessment has been undertaken, see **Chapter 11**. Whilst the general methodology has been agreed with the Environment Agency and Natural England for the biodiversity chapter, specific references to noise did not form part of these discussions. Therefore, the assessment of noise impacts has been based on experience and professional judgement.

Reference	Comment	Response
Section 4.3 – ID 4	Assessment of any likely significant effects based on traffic model and HGV movements should be undertaken	This assessment has been undertaken, see Section 8.9.
Section 4.3 – ID 5	The assessment should clearly explain the approach to establishing the study area for operation phase	This assessment has been undertaken, see Section 8.5.
Section 4.3 – ID 6	The assessment should clearly explain the approach to establishing the study area for construction phase	This assessment has been undertaken, see Section 8.5.
Environmental Health Department at London Borough of Bexley		
Email correspondence with Environmental Health Officer at London Borough of Bexley on 16th February 2018.	Baseline sound survey locations and durations agreed	Baseline sound survey reported in paragraph 8.5.8 et seq. in accordance with the agreed details. Survey locations shown in Figure 8.1. It was agreed that no surveys associated with the connection route were required due to the agreement on meeting fixed noise limits from BS 5228.
Email correspondence with Environmental Health Officer at London Borough of Bexley on 16th February 2018.	Construction impacts associated with the REP site and Electrical Connection route will be undertaken according to guidance thresholds as defined in BS 5228-1:2009+A1:2014	The construction impacts have been assessed according to these guidance thresholds, see paragraph 8.5.23 et seq.
Email correspondence with Environmental Health Officer at London Borough	Operational noise from the Proposed Development will be assessed using methodology defined in BS 4142:2014 Methods for rating and assessing	Operational noise has been assessed using BS 4142:2014 Methods for rating and assessing industrial and commercial sound, see paragraph 8.5.39 et seq.

Reference	Comment	Response
of Bexley on 16th February 2018.	industrial and commercial sound	
Email correspondence with Environmental Health Officer at London Borough of Bexley on 16th February 2018.	Permitted core hours for construction works in the Borough in accordance with Control of Pollution Act 1974 powers are 8am to 6pm Mondays to Fridays, 8am to 1pm on Saturdays with no works on Sundays/Public Holidays.	Specific hours are not set out in the Control of Pollution Act 1974. The assessment has considered potential core construction works from 7am-7pm Monday-Friday and 7am-1pm Saturday, with the potential for quiet works to occur at any time outside this. Core construction works would also be possible where necessary outside these hours (such as continuous concrete pours) and are also considered in this assessment, see Section 8.8.
Email correspondence with Environmental Health Officer at London Borough of Bexley on 16th February 2018.	In keeping with other development in the Borough, target criteria for operational fixed plant/equipment is a rating level of 5 dB(L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.	Noted, the assessment criteria account for this requirement. See **Table 8.11**.
Section 42 Responses		
Statutory consultation response from London Borough of Bexley to the PEIR, dated 26th July 2018	Chapter 8 of the Preliminary Environmental Information Report details acceptable responses to the noise issues arising from the development proposals at the screening phase. In particular, the applicant has fully accepted the target acoustic criteria specified by the Council. The assessment concludes that the noise and vibration	Response is noted. Target criteria and methodologies agreed with LBB have been used within this assessment. Assessment conclusions are identified in Section 8.13.

Reference	Comment	Response
	associated with the construction and decommissioning and operation of the proposed development would have negligible effects on the closest dwellings. Similarly, the effects from the construction of the Electrical Connection are considered to be Negligible and not significant due to mitigation measures which would be applied. The methodologies undertaken and conclusions of these reports are considered to be acceptable.	
Environment Agency	REP will be located immediately adjacent to the Crossness Local Nature Reserve/ Erith Marshes Local Wildlife Site. Any increase in light, noise, development in the buffer or impact on the nature reserve will need to be mitigated for.	Potential noise and light effects on ecological receptors are addressed in **Chapter 11** Measures to be employed in mitigating noise, which are also applicable to ecological receptors are provided in Section 8.8.

8.4 Reasonable Worst Case Parameters Used for Assessment

8.4.1 In the absence of a detailed construction plant methodology, which is not available at this stage, a conservative scenario which considers all construction activities (see **Chapter 3**) occurring simultaneously has been assessed. This includes piling activities occurring at the REP site. The highest noise emission levels available in BS 5228 have been utilised to assess noise from piling and therefore provides a conservative assessment. These are associated with percussive piling.

8.4.2 The operational effects assessment assesses REP operating at its maximum capacity with all plant operating continuously over a 24-hour period and is therefore considered to be a conservative assessment. The design year considers two scenarios to determine the impacts from road and river:

- To determine the maximum traffic impacts a scenario with 100% of waste input transported by road has been assessed. This includes determining the impact for future year 2039 which is a design year against a baseline year of 2024; and

- For the scenario where 100% of waste is transported by river, a qualitative review of potential impacts based on additional vessel movements associated with the Proposed Development has been undertaken. This compares the current baseline number of vessels using the river against those required for the Proposed Development.

8.4.3 It is considered that the two scenarios referred to above represent the worst case in relation to these options for the purposes of the operational noise assessment.

8.5 Assessment Methodology and Significance Criteria

Study Area

8.5.1 Study areas have been defined for the assessment of operational noise and construction noise and vibration impacts associated with the REP site and the Electrical Connection. Study areas are defined by the distance from the closest relevant site boundary. The determination of suitable study areas has been based on consultation with the LBB.

8.5.2 In instances where there are no defined noise sensitive receptors within the study area a notional receptor has been considered on the boundary of the study area. As noise and vibration impacts typically reduce with increasing distance from the source, sensitive receptors located outside the study area would experience a lower level of impact to that of the notional receptor located at the boundary of the study area. As such, the reporting of impacts where a notional receptor has been assumed, can be considered to be precautionary.

8.5.3 The assessment of construction noise and vibration impacts associated with the REP site considers noise and vibration sensitive receptors within 500 m of the REP site. The 500 m study area is based on the assessment criteria which have been agreed through consultation with LBB as outlined in **Table 8.1** above.

8.5.4 The assessment of construction impacts associated with the Electrical Connection considers noise and vibration sensitive receptors up to 50 m from the areas within which the Electrical Connection would be constructed. Where the Electrical Connection route leaves the road network, such as per option 2B (as described in **Chapter 3**) a study area of 50 m has also been considered to maintain consistency in the assessment approach.

8.5.5 For the operational stage of the Proposed Development the study area includes the NSRs in the local area that are most likely to be affected by the change in noise levels caused by the operation of REP. To address the closest dwellings, operational impacts from the Proposed Development have been considered for a study area of 1 km from the boundary of REP site which includes receptors to

the south and south-east of the REP site. The NSRs considered in the assessment are detailed below. These receptor locations (see **Figure 8.1**) for representative locations where noise monitoring was undertaken) have been agreed with LBB and are as follows:

- Hackney House apartments along the A2016 – Approximately 760 m from the nearest boundary of the REP site;
- Jutland House apartments along Clydesdale Way – Approximately 860 m from the nearest boundary of the REP site; and
- Dwellings along St. Thomas Road – Approximately 1000 m from the nearest boundary of the REP site.

8.5.6 For off-site road traffic impacts the assessment considers NSRs along proposed routes to be used by the development traffic, based on the outcomes of the Transport Assessment (see **Chapter 6**). Transport scenarios up to year 2039 have been assessed and, based on these being the highest likely level of flows, have been included in the noise assessment.

8.5.7 The operational stage noise impact associated with the Electrical Connection has been scoped out through the EIA scoping process (see **Table 8.1**).

Baseline Data Collection

8.5.8 The noise survey was completed in general accordance with the guidance in BS 7445: 'Description and Measurement of Environmental Noise. Guide to Quantities and Procedures' (British Standards Institution (2003).

8.5.9 An attended environmental sound survey was undertaken to determine the existing noise climate at NSRs closest to REP site. The measurements were undertaken with RRRF operating under normal conditions and forming part of the baseline.

8.5.10 Baseline measurements along the Electrical Connection route were not required as construction impacts are assessed against noise levels identified in BS 5228 rather than a baseline noise level. Operational impacts associated with the Electrical Connection route have been scoped out as agreed with the Secretary of State through the Scoping Opinion.

8.5.11 The survey was undertaken between 25th and 27th February 2018 at three locations as detailed below. Measurement locations are considered to be representative of those at the closest NSRs to the REP site and are shown on **Figure 8.1**:

- Hackney House;
- Jutland House; and
- Dwellings along St. Thomas Road.

8.5.12 During the attended measurements, weather conditions were dry with negligible wind less than 2 m/s. The conditions were considered suitable for obtaining representative environmental noise levels.

8.5.13 At each location three sets of 15-minute measurements were undertaken over each of the following periods with one 15-minute measurement undertaken per hour (each 15-minute measurement is considered to be representative of the hour period in which it was taken):

- 25th February 10:00hrs – 13:00hrs;
- 25th February 19:00hrs – 22:00hrs;
- 26th February 01:00hrs – 04:00hrs;
- 26th February 10:00hrs – 13:00hrs;
- 26th February 19:00hrs – 22:00hrs; and
- 27th February 01:00hrs – 04:00hrs.

8.5.14 **Table 8.3** describes the survey locations and measurement periods. The dominant noise source at the measurement position is also stated. **Figure 8.1** presents the approximate locations of the sound survey positions.

Table 8.3: Sound Survey Measurement Locations and Duration

Measurement Location	Description	Dominant Noise Source
1	The microphone was located in a free field position approximately 25 m from the A2016 and 1.5 m above ground level. The measurement location was positioned such that it was representative of noise levels likely to be experienced at Hackney House apartments.	Road Traffic on A2016, Occasional Aircraft
2	The microphone was located in a free field position adjacent to Clydesdale Way and 1.5 m above ground level. The measurement location was positioned such that it was representative of noise levels likely to be experienced at Jutland House apartments.	Road Traffic on Clydesdale Way and A2016, Occasional Aircraft

Measurement Location	Description	Dominant Noise Source
3	The microphone was located in a free field position adjacent to St. Thomas Road. The measurement location was positioned such that it was representative of noise levels likely to be experienced at dwellings along St. Thomas Road.	Road Traffic on 2016, Crabtree Manorway N and Anderson Way, Occasional Aircraft

8.5.15 A large range of statistical noise parameters was acquired, however the A-weighted sound parameters $L_{Aeq, T}$ and $L_{A90, T}$, are considered to be the most relevant in the context of the assessments undertaken and detailed herein.

8.5.16 The instrumentation used to measure the environmental sound climate is presented in **Table 8.4.**

Table 8.4: Environmental Sound Survey Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
Sound Level Analyser	NTi	XL2-TA	A2A-11051-E0	14/04/2016
Calibrator	NTi	CAL200	12405	16/10/2017

8.5.17 On-site calibration checks were performed before and after all measurements with no deviation observed. The sound level meters and calibrators have valid laboratory calibration certificates, which are available upon request.

8.5.18 The manufacturer's windshields were fitted over the microphone at all times during the survey periods.

Assessment

8.5.19 The assessment considers the likely impacts from noise and vibration generated as a consequence of the construction and decommissioning of the Proposed Development. It also considers the noise and vibration generated as a consequence of the operation of the Proposed Development.

Significance Criteria

8.5.20 In accordance with the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), and Planning Practice Guidance (PPG)

(see **Appendix A.3**) for noise, Lowest Observable Adverse Effect Level (LOAEL), Significant Observable Adverse Effect Levels (SOAEL), and the No Observable Effect Limit (NOEL) have been proposed for each noise and vibration source under assessment.

8.5.21 With respect to the Infrastructure EIA Regulations 2017, the positive ('beneficial') and negative ('adverse') noise and vibration effects have been related to the significance levels. Based on the descriptions of the adverse effect levels in the PPG for noise (DCLG, 2014), recommended actions for each significance level have been provided. The noise and vibration significance criteria are presented in **Table 8.5**, drawing upon paragraph 005 Reference ID: 30-005-20140306 of the PPG. The assessment has been undertaken at the closest dwellings to the REP site, defined in Section 8.5.5 of this Chapter. Dwellings are considered to be of **High** sensitivity due to potential impacts on resting/sleeping conditions and these were agreed with LBB as the receptors to be assessed. The assessment of noise and vibration impacts on ecological receptors is reported in **Chapter 11**. The table below provides significance levels based on a receptor of high sensitivity. The receptor locations have been agreed with LBB and are identified in paragraph 8.5.5 and presented in **Figure 8.1**.

Table 8.5: Noise and Vibration Significance Criteria

Significance Level	Noise and Vibration Effect Level	Impact and Action (to be applied to potential effects)
Substantial		Noise causes extensive and regular changes in behaviour and could lead to psychological stress or physiological effects. This level is unacceptable and should be prevented.
Major	SOAEL	Noise causes a material change in behaviour and/or attitude. This level should be avoided.
Moderate		Noise can be heard and causes small changes in behaviour or attitude. Noise should be mitigated and reduced to a minimum.
Minor	LOAEL	Noise can be heard but does not cause a change in behaviour or attitude. No specific mitigation measures are required.

Significance Level	Noise and Vibration Effect Level	Impact and Action (to be applied to potential effects)
Negligible	NOEL	Noise has no effect. No specific measures required.

8.5.22 Effects which are determined as moderate or above are considered significant with regards to the EIA.

Assessing Significance

8.5.23 This section describes the methodology that has been used to determine the LOAELs and SOAELs for each noise and vibration source under consideration.

Construction Noise and Vibration (from the Proposed Development)

8.5.24 The noise levels generated by construction activities and experienced by any nearby sensitive receptors depend upon a number of variables, the most important of which are:

- the noise generated by plant or equipment used on-site, or on-site activities (i.e. the physical construction), generally expressed as sound power levels (L_w);
- the periods of operation of the construction plant on the site, known as its 'on-time';
- the distance between the noise source and the receptor; and
- the attenuation provided by ground absorption and any intervening barriers.

8.5.25 BS 5228-1: 2009+A1:2014 has been used to determine proposed LOAELs and SOAELs for construction noise and vibration. The assessment of construction noise effects at residential properties is undertaken in accordance with the guidance thresholds for the SOAEL as defined in BS 5228-1: 2009+A1:2014, Annex E and replicated below:

- 70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise; and
- 75 decibels (dBA) in urban areas near main roads in heavy industrial areas.

8.5.26 Nearby dwellings are in an urban area and therefore the upper limit of 75 dB(A) has been selected as the SOAEL. The LOAEL is defined as 5 dB below this.

8.5.27 **Table 8.6** sets out the suggested LOAEL and SOAEL applicable to construction noise impacts on residential properties. The construction time periods have been based on guidance provided within BS 5228-1: 2009+A1:2014, Annex E.

Table 8.6: Construction Noise Effect Levels for Permanent Residential Buildings

Day	Time Period, T	LOAEL $L_{pAeq, T}$ (dB)*	SOAEL $L_{pAeq, T}$ (dB)
Monday to Friday	07:00hrs – 19:00hrs	70	75
Saturday	07:00hrs – 13:00hrs	70	75

8.5.28 Construction noise levels which fall between the LOAEL and SOAEL are considered to be moderate impacts.

8.5.29 With respect to vibration during construction, the proposed LOAELs and SOAELs are provided in **Table 8.7**. For human response to construction related vibration, it is considered appropriate to assess the likely Peak Particle Velocity (PPV mm/s), as suggested in BS 5228-2:2009+ A1:2014. The onset of significant effects (above the LOAEL) is classified as 0.3mm/s PPV, the level at which construction vibration might just be perceptible in residential environments.

8.5.30 With respect to the SOAEL, the vibration level proposed is based on levels defined by BS 5228-2.

Table 8.7: Construction Vibration Effect Levels for Permanent Residential Buildings

Vibration Level PPV mm/s	Description of Effects	Effect	Adverse Effect Level
0.14	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.	Negligible	NOEL
0.3	Vibration might be just perceptible in residential environments.	Minor	LOAEL
1.0	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.	Moderate	
3.0		Moderate	
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level	Major	SOAEL

Construction Road Traffic

8.5.31 Construction traffic noise has been assessed by considering the short-term increase in traffic flows during construction works following the principles of CRTN and DMRB, Volume 11, Section 3, Part 7. The traffic flows are as modelled and reported in **Chapter 6**. The 'short term' is considered to be a period of up to 1 year.

8.5.32 The criteria for the assessment of the magnitude of impact due to construction traffic using the surrounding road network have been taken from Table 3.1 of DMRB and are provided here in **Table 8.8.**

Table 8.8: Construction Traffic Noise Effect Levels

Adverse Effect Level	Change in Noise Levels in Short-term due to Construction Traffic (dB)	Effect
SOAEL	Greater than 5	Major
	3 to 4.9	Moderate
LOAEL	1 to 2.9	Minor
NOEL	0.1 to 0.9	Negligible
	0	No Change

8.5.33 As per the transport assessment, the construction traffic considered in this noise assessment has been reviewed in relation to the year 2022.

Operational Road Traffic

8.5.34 The impact from road traffic noise, including % HGVs, on the noise climate of the surrounding area is based on the change in noise levels at NSRs due to a change in the volume of road traffic generated by the Proposed Development. Annual Average Weekday Traffic (AAWT) data have been used to inform the assessment.

8.5.35 DMRB suggests that an increase in traffic flow of 25% will result in an increase in noise level of 1 dB. Assuming other factors (such as vehicle speed and mix) remain the same, a change of 3 dB is the minimum perceptible under normal conditions and is accepted as the threshold of human perception of a change in noise levels in the long term. Additionally, an increase or decrease of 10 dB is considered to be a doubling or halving of loudness, respectively.

8.5.36 DMRB provides a magnitude scale of impact for the change in noise levels in the long-term. The proposed criteria for assessing effect levels for operational

road traffic are summarised in **Table 8.9.** The long term is assessed by comparing the future assessment year 2039 'with development' and a baseline year 2024 'without development'.

Table 8.9: Adverse Effect Levels for Existing Dwellings from REP Traffic

Effect Level	Change in Noise Levels in the Long-term due to REP traffic (dB)	Effect
SOAEL	Greater than 10	Major
	5 to 9.9	Moderate
LOAEL	3 to 4.9	Minor
NOEL	0.1 to 2.9	Negligible
	0	No Change

Operational Vessel Movements

8.5.37 The impact from vessel movements on the noise climate of the surrounding area is based on the change in noise levels at NSRs due to a change in the number of vessel movements generated by the Proposed Development.

8.5.38 In this instance the change in vessel movements on the river can be considered analogous to changes in vehicular movements on roads. Therefore, a doubling of movements is required in order for there to be a perceptible increase in the average noise levels over a typical daytime and night-time period. As described in the Navigational Risk Assessment (NRA) (**Appendix B.2**) REP is only likely to give rise to an increase in up to three additional tugs. Therefore, any impacts would be **Negligible**.

Operational Noise from the Proposed Development

8.5.39 The estimated operational noise levels for the Proposed Development have been provided by a suitably qualified contractor who has experience of operating this type of plant. The data are provided at source as a sound power level, indicative of typical plant/working practices. This information is considered to be representative of the Proposed Development.

8.5.40 The source data utilised within the acoustic model are presented in **Table 8.10** below.

Table 8.10: Summary of sound power level of noise sources

Source Area/Equipment	L_{WA} dB(A)
Stacks (body and opening)	103
Air Cooled Condenser (ACC)	104
Transformer Area	101
Tipping Hall	91
Bunker Hall	100
Flue Treatment Hall	97
Boiler Hall (Boiler Hall and Bottom ash building)	104
Steam Turbine Hall	102
Re-cooler	96
Anaerobic Digestion equipment	104

8.5.41 To undertake detailed noise calculations of the Proposed Development, the noise propagation modelling software SoundPLAN version 8.0 has been used. The noise model considers directional and screening effects to predict the noise levels at the nearest NSRs. The effects of ground and air absorption are also taken into consideration.

8.5.42 The significance of the predicted operational noise effects of REP has been assessed taking into consideration guidance within BS 4142:2014.

8.5.43 Based on BS 4142 guidance and the context of the Proposed Development, **Table 8.11** details the proposed NOEL, LOAEL and SOAEL for the noise emission criteria from industrial sources at the REP site, when determined at 1 m from the façade of any residential noise sensitive receptors.

Table 8.11: Proposed NOEL, LOAEL and SOAEL Levels associated with Industrial Noise from REP

No Observed Effect Level (NOEL)	Lowest Observed Adverse Effect Level (LOAEL)	Significant Observed Adverse Effect Level (SOAEL)
Plant noise emissions due to industrial sources at REP are 5 dB below the typical	Plant noise emissions due to industrial sources at REP are 5 dB above the typical background	Plant noise emissions due to industrial sources at REP are 10 dB or more above the typical

No Observed Effect Level (NOEL)	Lowest Observed Adverse Effect Level (LOAEL)	Significant Observed Adverse Effect Level (SOAEL)
background sound levels subject to context.	sound levels subject to context.	background sound levels subject to context.

8.6 Assumptions and Limitations

8.6.1 Precise details of the types of construction methods and plant (both fixed and mobile) likely to be used during the construction phase are yet to be confirmed. Therefore, at this stage in the design of the Proposed Development, it is not possible to state precisely where plant would operate and for how long during the working day. The assessment has therefore been based on typical plant used for construction activities. As described in Section 8.4, a conservative assessment has been undertaken assuming all construction activities would be carried out simultaneously.

8.6.2 The noise data for the operational phase of the Proposed Development are based on data provided by a suitably qualified contractor who has experience of operating this type of plant.

8.7 Baseline Conditions and Receptors

8.7.1 Full results of the environmental noise survey undertaken in February 2018 at Hackney House, Jutland House and St. Thomas Road are presented in **Appendix D.1**.

8.7.2 The dominant environmental noise sources at the NSRs are associated with vehicular movements on the A2016 and aircraft flyovers.

8.7.3 A summary of the measured A-weighted (dBA) L_{90} and L_{eq}, levels is presented in **Table 8.12** below. The measured sound levels are presented at the three NSRs closest to the REP site.

Table 8.12: Baseline Sound Survey Summary

Location	Period, T	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)*
1 – Hackney House apartments (760 m from the REP site)	Daytime (07:00 – 23:00)	60	54
	Night-time (23:00 – 07:00)	54	45
2 – Jutland House apartments (860 m from the REP site)	Daytime (07:00 – 23:00)	56	51
	Night-time (23:00 – 07:00)	51	46

Location	Period, T	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)*
3 – 1 St. Thomas Road Dwellings (1000 m from the REP site)	Daytime (07:00 – 23:00)	53	48
	Night-time (23:00 – 07:00)	48	44
*arithmetic average of measured results			

Baseline Evolution

8.7.4 **Appendix A.4** provides a full list of schemes which have been identified as being likely to be constructed prior to implementation of the Proposed Development. Where relevant, these schemes therefore form part of the 'future baseline' scenario and have been taken into account in the assessment of likely significant effects of the Proposed Development (construction and operation) presented in Section 8.9.

8.7.5 Whilst the potential for future developments in the area could give rise to higher environmental sound levels at the NSRs, it is considered unlikely that significant changes to the background sound levels would occur. A review of cumulative developments has been undertaken and these are not likely to significantly affect the background noise levels measured at the receptors assessed. Furthermore, any further developments in the vicinity are likely to increase the background noise levels and therefore use of currently measured background levels is considered to be a conservative assessment.

8.8 Embedded Mitigation

8.8.1 The site has been chosen, in part, due to its distance from noise sensitive receptors and therefore this reduces the potential effects arising from the operation of the Proposed Development.

8.8.2 Furthermore, the scheme design where feasible, has attempted to place some of the noisier elements such as the stack furthest away from the noise sensitive receptors.

8.8.3 An outline Code of Construction Practice (CoCP) (**Document Reference 7.5**) is submitted as part of the REP DCO application. In order to minimise noise from the construction activities affecting NSRs the following measures, based upon best practice guidance provided in BS 5228, would be applied as appropriate through the outline CoCP. These measures have been assumed to be present and have been incorporated into the assessments that follow:

- Core construction hours are to be 7am-7pm Monday-Friday and 7am-1pm Saturdays. Non-noisy work will be allowed outside these hours. In certain circumstances where necessary works are to be undertaken outside of the core hours;

- Ensuring the use of quiet working methods and the most suitable plant where reasonably practicable;
- Screening fixed and mobile plant to reduce noise which cannot be reduced by increasing the distance between the source and the receiver (i.e. by installing acoustic screens/enclosures);
- Orienting fixed and mobile plant that is known to emit noise strongly in one direction so that the noise is directed away from dwellings or sensitive receptors, where possible;
- Closing acoustic covers to engines when they are in use or idling; and
- Engage with local residents to keep them informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern.

8.9 Assessment of Likely Effects

The REP Site and Main Temporary Construction Compounds

Construction Traffic Noise

8.9.1 Noise resulting from traffic associated with the construction of the Proposed Development has been assessed by considering the short-term increase in traffic noise during the construction works, following the principles of CRTN and the DMRB, Volume 11, Section 3, Part 7.

8.9.2 The assessment considers the traffic flows in 2022 for both the baseline scenario and the scenario with construction traffic. Noise levels for both these scenarios have been calculated in accordance with the principles of CRTN. The difference between the two scenarios has then been determined to assess the impacts.

8.9.3 Based on the review there is unlikely to be an increase in road traffic flows resulting in a change in noise levels above more than 1dB. In view of the guidance set out in DMRB this increase in road traffic flow would result in a negligible increase in noise levels and is therefore not a significant effect.

Construction/Decommissioning Noise

8.9.4 Construction noise has the potential to cause an adverse impact at existing NSRs.

8.9.5 Precise details of the types of construction methods and plant likely to be used during the construction phase have yet to be confirmed. Therefore, at this stage it is not possible to state precisely where plant would operate and for how long during the working day.

8.9.6 Construction noise predictions have been undertaken, using the methodology outlined in BS 5228-1: 2009+A1:2014. BS 5228-1: 2009+A1:2014 which predicts noise as an equivalent continuous A- weighted sound pressure level over a period such as one hour ($L_{Aeq,1hr}$).

8.9.7 In accordance with guidance set out in BS 5228, noise levels have been calculated for a conservative situation assuming that construction activities would occur on the REP site boundary closest to each receptor. In practice, noise levels would tend to be lower due to greater separation distances and screening effects.

8.9.8 The main construction phase is likely to include site levelling/clearance, ground excavation, installation of piled foundations, concreting, building construction and road construction.

8.9.9 Details of typical construction plant noise levels at the standard reference distance of 10 m provided by BS 5228 Part 1, in the absence of noise controls such as screening and operational constraints, are given below in **Table 8.13**. It is considered that the plant identified represent the likely high noise generating activities which would be used during the construction phase. Cory has been liaising with suitably qualified contractors in developing the scheme; the EIA has therefore been informed by these discussions on likely plant and construction methodology.

Table 8.13: Typical Construction Plant Noise Levels

Plant	Typical $L_{Aeq,T}$ (dB) at 10 m (dB)
Dozer	75
Tracked Excavator	78
Dump Truck	78
Wheeled Loader	79
Percussive Piling	89
Concrete pumps	87
Wheeled mobile telescopic crane	78
Road Roller	80
Vibratory Roller	75
Asphalt Paver	75

8.9.10 In the absence of specific details on the siting of construction activities, this information has been used to derive indicative noise levels at selected distance band using the data and procedures of BS 5228, and the results are presented in **Table 8.14.**

Table 8.14: Predicted Indicative Construction Noise Levels

Activity	Predicted Indicative Construction Noise Levels, $L_{Aeq,12hour}$ in dB
	500 m from the REP site and Main Temporary Construction Compounds
Construction Site Activities	56

8.9.11 At distances of 500 m from the REP site, noise levels from construction are likely to be 56 dB $L_{Aeq,12hour}$. This is below the proposed LOAEL and therefore equates to a **Negligible** effect. The nearest dwellings to REP are over 500 m from the REP site, based upon this assessment the effect on these receptors is therefore assessed as **Negligible** and is therefore not a significant effect.

8.9.12 The activities assessed are the expected typical daily works to be undertaken as part of the construction phase. As discussed, these are considered to be the potentially high noise generating activities and would be limited to the core hours. However, in addition to these activities, there are also more fundamental activities (including concrete slip forming for the bunker) which would be undertaken outside of core construction hours. Best practicable means as advised in BS 5228:2009 would be utilised for this process to minimise the noise impact from these activities when required.

8.9.13 These construction activities (e.g. slip forming using continuous concrete pour) are commonplace for this type of project. They are required to ensure the appropriate structural integrity of the Proposed Development but would only be required for a relatively short duration (approximately two months) within the overall construction period.

8.9.14 During decommissioning, similar effects to those described for construction could result from, for example, plant removal or site reinstatement. However, it is likely that these effects would be less, given that some items may be left in situ. Therefore, based on the conservative construction effects outlined above, the findings of the assessment of the effect of noise impacts from the decommissioning phase are predicted to be **Negligible**.

Main Temporary Construction Compounds

8.9.15 The Main Temporary Construction Compounds, other than their initial preparation for use, are not likely to be utilised for major construction works such

as building construction and site levelling and are more likely to be utilised as a laydown area/parking and fabrication of parts. Therefore, based upon this assessment construction noise effects from these areas are not likely to be significant at the nearest receptor which is 150 m away.

8.9.16 In the situation where plant, identified in Table 8.13, is used in this location, noise levels at the nearest receptors are likely to be around 65 dB, $L_{Aeq,10hrs}$. This is below the LOAEL, classed as negligible and would not be a significant effect.

Construction/Decommissioning Vibration

8.9.17 Construction activities may give rise to vibration impacts on adjacent buildings. The criteria used in this assessment relate to the potential for cosmetic, not structural damage. The principal concern is generally transient vibration due to piling. Cosmetic damage is most likely to occur within 20 m of piling activities. At greater distances damage is less likely to occur. Therefore, with the nearest residential receptors over 750 m away, the predicted impact from construction vibration is **Negligible** and is therefore not a significant effect.

8.9.18 With regards to vibration impacts being perceptible at the nearest dwellings, due to the distance, the impacts are also likely to be negligible.

Operation/Maintenance

8.9.19 An assessment of the operating plant at the REP site has been undertaken in accordance with BS 4142:2014 to determine the likely noise impact on the NSRs.

8.9.20 The nearest NSRs are Hackney House, Jutland House and dwellings at St. Thomas Road.

8.9.21 The assessment of the likely future noise impact associated with the REP site is based on the following assumptions and considerations:

- The REP site operates continuously over 24 hours;
- Noise emissions from the REP site would be designed such that they do not contain tonal features and the main noise sources (i.e. air cooled condensers and noise emissions from the buildings are unlikely to create discrete or impulsive noise). Therefore, no acoustic corrections including tonality have been applied to the assessed source; and
- Assessments have been undertaken by determining the noise emission levels at 1 m from the nearest façade of each of the receptors.

8.9.22 **Table 8.15** presents the results of the BS 4142 assessment at each of the receptors.

Table 8.15: BS 4142 Assessment of Noise Emissions from Operation of REP at Nearest NSRs

Location	Period	Rating Level ($L_{Ar,Tr}$)	Background Level ($L_{A90,15mins}$)	Excess of Rating Level over Background (a negative number indicates a rating level below background)	Initial Assessment of Impact
Hackney House	Daytime	40	54	-14	Indication of the specific sound source having a **Low** impact, depending on the context
	Night-time	40	45	-5	Indication of the specific sound source having a **Low** impact, depending on the context
Jutland House	Daytime	41	51	-10	Indication of the specific sound source having a **Low** impact, depending on the context
	Night-time	41	46	-5	Indication of the specific sound source having a

Location	Period	Rating Level ($L_{Ar,Tr}$)	Background Level ($L_{A90,15mins}$)	Excess of Rating Level over Background (a negative number indicates a rating level below background)	Initial Assessment of Impact
					Low impact, depending on the context
Dwellings on St. Thomas Road	Daytime	37	48	-11	Indication of the specific sound source having a **Low** impact, depending on the context
	Night-time	37	44	-7	Indication of the specific sound source having a **Low** impact, depending on the context

Context

8.9.23 BS 4142:2014 states that context should be considered when determining the impact. The following factors should be taken into consideration:

- The absolute sound levels;
- The character and level of the residual and specific sound levels; and
- The sensitivity of the receptor and use of mitigation measures.

8.9.24 These points are considered in turn below.

Absolute Sound Levels

8.9.25 The calculated specific sound level at the façade of the nearest dwellings is relatively low, with noise levels significantly below the existing L_{Aeq} ambient noise levels.

Character and Level of Residual and Specific Sound Levels

8.9.26 With reference to **Table 8.11**, residual sound levels are generally higher than the calculated rating level at the receptors implying that the sound from REP would be secondary to other existing noise sources, predominantly road traffic.

Receptor Sensitivity

8.9.27 The nearest receptors at Hackney House and Jutland House are not considered to be more sensitive than a typical residential dwelling. As such it is not considered necessary to modify the initial numerical assessment on the basis of receptor sensitivity.

Summary of BS 4142 Assessment

8.9.28 In considering the results of the initial numerical assessment and the context detailed above, noise emission levels from REP are likely to be at least 5 dB below the background sound levels during the daytime and night-time which equates to the NOEL. The resulting noise impact would also be within the threshold agreed with LBB.

8.9.29 Based upon this, the effects from operational noise from REP are considered to be **Negligible** and Not Significant.

Road Traffic Impacts

8.9.30 The impact of the operational traffic noise on roads surrounding the development has been predicted using the guidance in CRTN.

8.9.31 The road traffic noise assessment considers the change in ambient noise levels as a result of changes in traffic flows between baseline traffic flows in 2024 and the potential future traffic flows in 2039 with the Proposed Development in operation.

8.9.32 Traffic noise predictions have been carried out to determine the change in traffic noise levels. The predicted changes in noise level will occur at noise-sensitive receptors along the road links considered. The extent of the assessed highway network has been agreed with LBB, KCC, DBC and TfL throughout the TA scoping process based on the expected highway impacts of the Proposed Development. The highway flows (including predicted future flows) were subsequently provided to feed into this noise assessment. In order to address the links where development traffic is likely to be routed, all the road links agreed

as part of the TA scoping process (see **Appendix B.1**) have been included within this assessment.

8.9.33 **Table 8.16** presents the predicted change in traffic flows that are predicted to occur in 2039 as a result of the Proposed Development.

Table 8.16: Change in Noise Level Between 2039 'With Development' and 2024 'Without Development' Scenarios

Road Link	Direction	Change in Noise Level in dB
A2016 Eastern Way (west of Yarnton Way)	Eastbound	0.7
	Westbound	0.7
Yarnton Way (south of A2016 Eastern Way)	Northbound	0.5
	Southbound	0.5
A2016 Picardy Manorway (between Norman Road and Eastern Way)	Eastbound	0.7
	Westbound	0.8
A2016 Picardy Manorway (east of Norman Road)	Eastbound	0.7
	Westbound	0.9
B253 Picardy Manorway (south of Horse Roundabout)	Northbound	0.6
	Southbound	0.5
A2016 Bronze Age Way (south of Horse Roundabout)	Eastbound	0.7
	Westbound	0.7
A206 Northend Road (north of A2000 Perry Street)	Northbound	0.8
	Southbound	0.9
A2000 Perry Street (south of A206 Thames Road)	Northbound	0.8
	Southbound	0.8
A206 Thames Road (south of Howbury Lane Roundabout)	Northbound	0.7
	Southbound	0.8

Road Link	Direction	Change in Noise Level in dB
A206 Thames Road (west of A2026 Burnham Road Roundabout)	Eastbound	0.8
	Westbound	0.7
A2026 Burnham Road (south of A206 Thames Road Roundabout)	Northbound	1.0
	Southbound	1.0
A206 Bob Dunn Way (north of A2026 Burnham Road Roundabout)	Eastbound	1.2
	Westbound	1.0

8.9.34 Based on the impacts being predicted to be below 3 dB, operational road traffic impacts are likely to be **Negligible** and are therefore not a significant effect.

Operational Vessel movements

8.9.35 A Navigational Risk Assessment (NRA) (**Appendix B.2**) has been undertaken by consultants Marico (see **Chapter 6**) which considers both the existing vessel movements undertaken by the applicant and the likely future vessel movements associated with REP. The assessment considers the likely change in the number of movements at 24 points along the River Thames. Based on the results of the NRA, the movements at the majority of the assessed points are unlikely to increase by more than 20%. Based on the predicted vessel movements the likely change in noise levels associated with increases in vessel movements are not considered to be significant from a noise perspective as the likely change in noise level is less than 3 dB which is a **Negligible** effect.

8.9.36 At Barking Creek the change in noise level is likely to be higher than at other, receptors due to the low levels of current operations at this location. However, at this location the surrounding uses are not considered to be noise sensitive due to their industrial use and therefore impacts are **Negligible** and are not considered to be significant.

The Electrical Connection and the Cable Route Temporary Construction Compounds

Construction/Decommissioning

8.9.37 Construction noise has the potential to give rise to an adverse impact at existing NSRs.

8.9.38 Precise details of the types of construction methods and plant likely to be used during the construction phase are yet to be confirmed. Therefore, at this stage in the design of the Electrical Connection and Cable Route Temporary

Construction Compounds, it is not possible to state precisely where plant would operate and for how long during the working day. However, based on indicative information obtained from the likely undertaker for the electrical connection, it is anticipated that excavation of a typical 200 m length of cable route is likely to take 7 working days. It has been assumed that the works would involve use of excavators and a dumper truck for material movement. In addition, use of directional drilling plant has also been included.

8.9.39 Noise levels have been calculated for a conservative situation assuming that plant would operate at the closest point to each receptor in the absence of mitigation. In practice, noise levels would tend to be lower due to greater separation distances and screening effects.

8.9.40 In the absence of specific details on the siting of construction activities, typical construction plant noise levels have been used to derive indicative noise levels at selected distances using the data and procedures of BS 5228. The results are presented in **Table 8.17.**

Table 8.17: Predicted Indicative Construction Noise Levels from Electrical Connection Route

Activity	**Predicted Indicative Construction Noise Levels, $L_{Aeq,1hour}$ in dB**			
	10 m from site	**20 m from site**	**30 m from site**	**50 m from site**
Construction Activities	80	74	70	66

8.9.41 At distances of 20 m or more from the construction activities, noise levels are likely to be below the SOAEL. At distances greater than 30 m from the construction activities, noise levels are likely to be below the LOAEL. Receptors along the A2106 and A206 are approximately 20 m - 30 m away from construction activities. For some receptors along route 2A the electrical connection route is approximately 10m -15m away from construction activities.

8.9.42 An outline CoCP (**Document Reference 7.5**) is submitted as part of the REP DCO application, which includes measures to minimise adverse effects where practicable. Temporary sound reducing screens/enclosures around plant and activities (where possible) could provide 10 dB of noise attenuation from construction activities.

8.9.43 With the incorporation of mitigation measures, as specified in the embedded mitigation section (Section 8.8) and included in the outline CoCP, the effects are considered to be **Negligible** and Not Significant. Furthermore, it should be noted that the impact would be temporary, typically 5-7 days per 200 m section of electrical connection route.

8.9.44 At the end of the operational life of the cable connection, it is currently anticipated that, as a minimum, the Electrical Connection ducting would be left in situ and the cables withdrawn, such that there would be limited decommissioning works and no effects anticipated.

Operation/Maintenance

8.9.45 Operational effects have been scoped out as agreed with the Secretary of State through the Scoping Opinion.

Summary of Assessment

Construction/Decommissioning

8.9.46 Based upon the findings of the assessment, noise and vibration effects associated with the construction and decommissioning phase of the Proposed Development are likely to give rise to a **Negligible** temporary effect at the defined NSRs.

8.9.47 With mitigation measures as detailed in the outline CoCP the construction effects associated with the Electrical Connection route are considered to be Not Significant.

Operation/Maintenance

8.9.48 The operation of the Electrical Connection is not anticipated to give rise to significant adverse effects on the environment with regards to noise and has been scoped out as agreed with the Secretary of State through the Scoping Opinion.

8.9.49 The noise effects from REP have been calculated to be at least 5 dB below the background sound levels at the nearest NSR's during both the daytime and night-time assessment periods. The effect is considered, on the basis of this assessment, to be **Negligible** and Not Significant.

8.10 Cumulative Assessment

Construction/Decommissioning

8.10.1 Construction and decommissioning of the Proposed Development could occur simultaneously with 'other development' located in the vicinity of the Application Site. The 'other developments' with the most potential to give rise to cumulative construction effects are identified in **Chapter 4** and **Appendix A.4**.

8.10.2 Construction phase mitigation measures are to be employed during the construction of the Proposed Development, and as such significant adverse cumulative construction effects are not anticipated to be likely. A review of the cumulative schemes within the zone of influence (ZOI) are provided below in **Table 8.18**. The construction ZOI has been based on the likelihood of impacts and noise criteria agreed with LBB. For REP, construction noise levels beyond

500 m are unlikely to cumulatively impact on receptors such that significant impacts are likely. Similarly, noise impacts beyond 50 m from the electrical connection route are unlikely to impact on receptors, particularly given the short-term nature of the connection route construction operations.

Table 8.18: Cumulative Scheme Review - Construction

Application	Cumulative Impact Review
Classicus Estates/ Quinn Estates, demolition of 116 Hazel Road and the former Slade Green F.C. clubhouse and pavilion buildings, the removal of the former Slade Green F.C. football pitch and tennis courts and erection of up to 240 residential apartments with sports hub and new football pitches, Site of former Slade Green Football Club, 116 Hazel Road	The ES concludes that noise and vibration during the construction phase would be controlled though a formal Construction Environmental Management plan or through the imposition of agreements made under the control of pollution act Section 61. Due to the mitigation measures applied for both the electrical connection and this cumulative scheme together with the short-term nature of the construction works associated with the electrical connection the cumulative impact is unlikely to result in a significant impact.
Orbit South Housing Association Ltd, Demolition of the existing buildings and construction 6 blocks of flats and 23 houses to provide 244 residential units and community facility and open space, Erith Park (Formerly Larner Road Estate) Larner Road	Within the decision notice a planning condition has been set which requires a construction methodology to be submitted and agreed with LBB. A piling method statement is also asked to be provided. Therefore, attenuation measures are to be considered as part of the construction phase. This together with the short-term nature of the construction works associated with electrical connection is unlikely to result in a significant cumulative construction impact.
Cross-boundary outline application for the demolition of existing buildings and redevelopment to provide a strategic rail freight interchange comprising a rail freight intermodal facility, warehousing, new access	The site is going through an appeal process. However, it is anticipated that the construction phase would be controlled through a CEMP. Therefore, the cumulative construction impact is unlikely to

Application	Cumulative Impact Review
arrangements from Moat Lane, associated HGV, car and cycle parking, landscaping, drainage, and associated works (within London Borough of Bexley). Creation of a new access road from the existing A206/A2026 roundabout, incorporating a bridge over the River Cray, landscaping and associated works (within Dartford Borough Council).	result in a significant impact. This together with the short-term nature of the construction works associated with electrical connection is unlikely to result in a significant cumulative construction impact.

8.10.3 It is assumed for the purposes of this assessment that the REP generating equipment would be removed once the plant has ceased operations permanently. Any decommissioning phase is assumed to be of a similar or shorter duration to construction, and therefore environmental effects are considered to be of a similar level or lower than those during the construction phase. It is assumed that the ducting for the Electrical Connection would remain in situ, but that the cables may be removed.

8.10.4 REP has been designed to be CHP Enabled, meaning that there is the ability to supply heat generated from the combustion process to a local heat off-taker. It is acknowledged that any future supply of waste heat to (e.g. district heat network scheme for a local residential area) could result in impacts to the local environment. However, given the nature of any such scheme (likely to consist mainly of a network of buried pipes) any impacts would be limited to the temporary construction phase which is unlikely to overlap with construction of REP. Given that the network would most likely serve new development in the local Thamesmead/Peabody area, impacts would likely be restricted to existing brownfield urbanised land (e.g. burying pipes in roads). Such temporary impacts would be subject to a separate planning application which is anticipated to be bound by a CoCP or similar best practice working methods. It is possible that the pipework infrastructure for any new heat network could be installed alongside other services required for the new developments as a matter of course, therefore further limiting the potential for impacts. It is therefore considered highly unlikely that there would be any likelihood of significant cumulative effects.

Operation/Maintenance

8.10.5 The operation of the Proposed Development could occur simultaneously with ‘other development’ located in the vicinity of the Application Site. Operational impacts beyond 1 km from REP, due to distance and screening, are unlikely to significantly alter the background sound levels at the nearest NSRs to REP.

Therefore, operations beyond 1 km are not likely to influence the assessment outcomes.

8.10.6 A review of operational impacts for cumulative schemes within the ZOI is provided below in **Table 8.19**.

Table 8.19: Cumulative Schemes Review - Operation

Application	Cumulative Impact Review
Savills Investment, demolition and erection of new buildings for flexible industrial use, bus depot and offices at Burts Wharf Crabtree Manorway	A planning application has been submitted for a proposed industrial, warehouse and distribution centre with ancillary offices at Crabtree Manorway, Burts Wharf. A noise assessment has been performed as part of the planning application. It is considered that there are no overlapping noise sensitive receptors of significance and therefore this application is unlikely to result in a significant cumulative impact.
MOPAC, Policing facility including storage and office space, Former Nufarm UK Crabtree Manorway North	A planning application has been approved for a proposed policing facility consisting of four individual warehouses at Crabtree Manorway, Burts Wharf. A noise assessment has been undertaken as part of the planning application. The assessment concludes that that there is a negligible impact on the nearest noise receptors. It is considered that there are no overlapping noise sensitive receptors of significance and therefore this application is unlikely to result in a significant cumulative impact.
Wrenbridge Land Ltd, erection of building for light industrial use, Land Between Bronze Age Way and Picardy Manorway	A planning application has been approved for a proposed B1(a)/B2/B8 warehouse/industrial unit at land between Bronze Age Way and Picardy Manorway. A noise assessment has been performed as part of the planning application. It is considered that there are no overlapping noise sensitive receptors

Application	Cumulative Impact Review
	of significance and therefore this application is unlikely to result in a significant cumulative impact.
Tilfen Land Ltd, construction of B1/B8 business park, Land At The Eastern Thamesmead Industrial Estate Extension	A planning application has been approved for a proposed B1/B8 business park at Land at the Eastern Thamesmead Industrial Estate Extension. A noise assessment has been undertaken as part of the planning application. The assessment concludes that the majority of the noise sensitive receptors around the development would experience negligible increases of noise. For receptors located along Yarnton Way, an increase was calculated, but this was deemed to be low. As the REP development is located 1 km from the business park and there are no overlapping noise sensitive receptors of significance, it is unlikely there would be any cumulative impacts and as such it is deemed not significant.

8.10.7 Based on the above review, as there are no overlapping noise sensitive receptors of significance, significant adverse cumulative operational effects are therefore not anticipated to be likely.

8.11 Further Mitigation and Enhancement

8.11.1 No further mitigation is considered necessary.

8.12 Residual Effects and Monitoring

Construction/Decommissioning

8.12.1 Based upon the findings of the assessment, the effect on the closest NSRs to the Proposed Development is below the proposed LOAEL and is therefore deemed **Negligible** and Not Significant.

Construction/Decommissioning Electrical Connection Route and Temporary Construction Compound

8.12.2 Based upon the findings of the assessment, with the embedded mitigation, the effects on existing NSRs in close proximity to the Electrical Connection route are below the proposed LOAEL and are therefore deemed **Negligible** and Not Significant.

Operation/Maintenance

8.12.3 Based upon the findings of the assessment, with REP in place and fully operational, the effects on the nearest dwellings remains below LOAEL and are therefore deemed **Negligible** and Not Significant.

Summary of Residual Effects

8.12.4 A summary of the residual effects is provided below in Table 8.20.

Table 8.20: Summary of Residual Effects

	Receptor name and description	Potential mitigation	Assessment of Residual Effects
REP and Electrical Connection			
Construction / decommissioning	Closest Noise Sensitive Receptors (Dwellings within 30 m of the electrical connection route)	None required as included in embedded mitigation	Effects are anticipated to be **Not Significant**
Operation	Hackney House; Jutland House; and Dwellings along St. Thomas Road.	None required	Effects are anticipated to be **Not Significant**

8.13 Summary and Conclusion

8.13.1 A baseline environmental sound survey has been undertaken during the daytime and night-time to determine the background noise levels at the nearest dwellings to the REP site. The dominant environmental noise source at the existing dwellings is due to traffic on the local road network.

8.13.2 LOAEL and SOAEL criteria have been proposed and confirmed through consultation for construction/decommissioning and operational noise, including noise generated by associated traffic movements. This includes the operational noise due to traffic generated by the Proposed Development.

8.13.3 Reasonable conservative assessments of construction/decommissioning noise have been undertaken based on the assumption that all noise generating construction plant associated with construction are operating at the same time. The assessment has concluded that the effect from construction noise and vibration associated with the Proposed Development at all dwellings would be **Negligible** and Not Significant.

8.13.4 With the use of appropriate mitigation, construction effects associated with the Electrical Connection route are considered to be **Negligible** and Not Significant.

8.13.5 An assessment of the operational noise from REP has been undertaken with the aid of noise modelling software SoundPLAN 8.0. The results of the noise modelling indicate that the rating level associated with REP would fall to the proposed NOEL and be below the background noise levels. With reference to BS 4142 this is an indication of the specific source having a low impact. Therefore, operational effects are considered to be **Negligible** and Not Significant.

8.13.6 As there are no overlapping noise sensitive receptors of significance, significant adverse cumulative operational effects are not anticipated to be likely.

8.14 References

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