Riverside Energy Park

Environmental Statement

Chapter 10: Historic Environment

VOLUME NUMBER:

06

PLANNING INSPECTORATE REFERENCE NUMBER:

EN010093

DOCUMENT REFERENCE:

6.1

November 2018 | Revision 0 | APFP Regulation 5(2)(a)

Planning Act 2008 | Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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10 Historic Environment

10.1 Introduction

10.1.1 This Chapter presents the findings of the assessment of likely significant effects of the construction and decommissioning, and operational phases of the Proposed Development in terms of the historic environment. It incorporates the results of an archaeological desk-based assessment (DBA) contained within **Appendix F.1** and a fieldwork and updated geoarchaeological deposit modelling report (**Appendix F.2**). The method statement for the watching brief and on-going geoarchaeological assessment is contained in **Appendix F.1**.

10.1.2 The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains, to late 20th century industrial and military structures. It can be divided into the following two categories:

- Archaeology - which comprises Scheduled Monument (SMs) and non-designated archaeological heritage assets; and
- Built Heritage - which comprises listed buildings (all grades), non-designated buildings of heritage interest, registered parks and gardens (all grades), conservation areas, historic battlefields and World Heritage Sites (WHS).

10.1.3 This Chapter describes the following:

- legislative and policy framework;
- assessment methodology and significance criteria used;
- summary of consultation and responses;
- a description of the topic specific reasonable worst case scenario for assessment;
- the baseline conditions and receptors at the Riverside Energy Park (REP) site and surroundings;
- an assessment of the likely significant environmental effects;
- the mitigation measures required to prevent, reduce or offset any significant adverse effects; and
- cumulative and in combination effects; and the likely residual effects after these measures have been employed.

10.1.4 This Chapter has been prepared by Orion Heritage Ltd. 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 Chapter is provided in **Appendix A.2**.

10.2 Legislation, Policy, Guidance and Standards

National Planning Policy and Strategies

National Policy Statements

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

10.2.2 Where any development may have a direct or indirect effect on designated heritage assets, there is a legislative framework to ensure the proposals are considered with due regard for their impact on the historic environment. This Section outlines the legislative framework, local and regional planning policy and policy guidance.

10.2.3 **Table 10.1** below identifies the relevant requirements of NPSs:

Table 10.1: Relevant requirements of NPSs

Requirement of NPS EN-1, Overarching National Policy Statement for Energy	Response within this ES
NPS EN-1 states that "The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, landscaped and planted or managed flora. Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called "heritage assets". A heritage asset may be any building, monument, site, place, area or landscape, or any combination of these. The sum of the heritage	The ES chapter identifies known heritage assets and assesses the potential for previously unrecorded heritage assets; it presents an assessment of significance in line with best practice. The ES chapter sets out the potential adverse effects resulting from the Proposed Development.

interests that a heritage asset holds is referred to as its significance" (Department of Energy and Climate Change 2011a, para. 5.8.2). NPS EN-1 states that "as part of the ES, the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset."	
NPS EN-1 states that designated heritage assets (i.e. a World Heritage Site; Scheduled Monument; Protected Wreck Site; Protected Military Remains, Listed Building; Registered Park and Garden; Registered Battlefield; Conservation Area; and non-designated heritage assets) which are demonstrably of equivalent significance should be considered subject to the same policy considerations. As such the Overarching National Policy Statement for Energy recognises that "*There are heritage assets with archaeological interest that are not currently designated as scheduled monuments, but which are demonstrably of equivalent significance*" (Department of Energy and Climate Change 2011a, para. 5.8.4). Potential impacts on other non-designated heritage of lesser value than designated heritage should also be considered by the Secretary of State, on the basis of "*clear*	The ES considers the significance of identified and potential heritage assets in line with best practice and guidance. No non-designated heritage assets of demonstrably national significance are identified. The ES considers the significance of identified and potential heritage assets in line with best practice and guidance. The ES has identified and assessed known and potential non-

evidence that the assets have a heritage significance that merits consideration in its decisions" (Department of Energy and Climate Change 2011a, para 5.8.6).	designated heritage assets. This includes sub-surface geoarchaeological deposit considered of Local Significance and non-designated built heritage assets.
Impacts on heritage assets specific to types of infrastructure are included in the technology-specific NPSs. The technology specific NPSs of relevance to REP are NPS EN-3 and NPS EN-5. These NPSs are part of a suite of energy infrastructure NPSs. They should be read in conjunction with NPS EN-1.	NPS EN-3 response outlined below. NPS EN-5 makes reference to archaeology and heritage in relation to the decision to use overhead rather than underground lines: the effect to buried archaeological remains is considered when considering the use of overhead as opposed to underground lines. The effect of the Proposed Development on below ground archaeological remains has been assessed within this ES and no significant effects have been identified.
Requirement of NPS EN-3, Overarching National Policy Statement for Renewable Energy Infrastructure	**Response within this ES**
NPS EN-3 outlines the impact assessment principles relevant to biomass/waste combustion plant applications. In relation to significant adverse effects to nationally recognised designations, consent for renewable energy projects should only be granted ''*Where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits*" (Department of Energy and Climate Change 2011b, para. 2.5.33).	No significant adverse effects to nationally recognised designations have been identified.

In considering the impact on the historic environment the decision maker should take into account the, "positive role that large-scale renewable projects play in the mitigation of climate change, the delivery of energy security and the urgency of meeting the national targets for renewable energy supply and emissions reductions" when determining whether the substantial public benefits of the proposed development outweighs any loss or harm to the significance of a designated heritage asset (Department of Energy and Climate Change 2011b, para. 2.5.34).	

10.2.4 It is considered that this Chapter fully addresses the requirements of the NPSs as outlined in **Table 10.1**.

10.2.5 A discussion on the following National, Regional and Local policy specific to this Chapter is located in **Appendix A.3**.

National Planning Policy and Strategies

- National Planning Policy Framework (2018); and
- Planning Practice Guidance (online resource) (PPG).

Regional Planning Policy and Strategies

- London Plan (2016); and
- London Plan Shaping Neighbourhoods: character and context supplementary planning guidance non-technical summary (2014).

Emerging Regional Planning Policy and Strategies

- Draft London Plan with Minor Suggested Changes (August 2018).

Local Planning Policy and Strategies

- London Borough of Bexley Local Development Plan (2012);
- Dartford Borough Council Development Policies Plan (2017);

- London Borough of Bexley: Bexley Growth Strategy (2017); and
- Kent Minerals and Waste Local Plan 2013-30 (2016).

Historic Environment Guidance and Standards

Historic Environment Good Practice Advice in Planning Note Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015)

10.2.6 The purpose of this document is to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and PPG. It includes a six-stage process as outlined below to approach the assembly and analysis of relevant information relating to heritage assets potentially affected by a proposed development:

- "*Understand the significance of the affected assets;*
- *Understand the impact of the proposal on that significance;*
- *Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;*
- *Look for opportunities to better reveal or enhance significance;*
- *Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change; and*
- *Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected*."

Historic Environment Good Practice Advice in Planning Note 3 (Second Edition). The Setting of Heritage Assets (Historic England 2017)

10.2.7 Historic England's (HistE) Historic Environment Good Practice Advice in Planning Note 3 was updated in 2017 and provides guidance on the management of change within the setting of heritage assets.

10.2.8 The document restates the definition of setting as outlined in Annex 2 of the NPPF. The distinction between setting and curtilage, character and context is discussed. While it is largely a visual term, setting, and thus the way in which an asset is experienced, can also be affected by noise, vibration, odour and other factors. The document makes it clear that setting is not a heritage asset, nor is it a heritage designation, though land within a setting may itself be designated. Its importance lies in what the setting contributes to the significance of a heritage asset.

10.2.9 The Good Practice Advice Note sets out a five-staged process for assessing the implications of proposed developments on setting:

- "*Step 1: Identify which heritage assets and their settings are affected*
- *Step 2: Assess the degree to which these settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated*
- *Step 3: Assess the effects of the proposed development, whether beneficial or harmful, on that significance or on the ability to appreciate it*
- *Step 4: Explore ways to maximise enhancement and avoid or minimise harm*
- *Step 5: Make and document the decision and monitor outcomes*".

Crossness Conservation Area: Area Appraisal and Management Plan, 2009

10.2.10 This document outlines the special architectural and historic interest of the Crossness Conservation Area and identifies opportunities for enhancement.

10.2.11 The special architectural or historic interest that justifies designation of Crossness Conservation Area derives from the following features:

- "*This mid-Victorian example of public health engineering is a unique industrial complex set within a landscape/location selected by the then level of engineering technology. It is South East London's most important site for industrial archaeology.*
- *The key elements that characterise the Conservation Area are: the Grade I Listed Crossness Pumping Station comprising the Beam Engine House, Boiler House and Triple Expansion House; the Grade II Listed workshops; and brick vaulted subterranean reservoir.*
- *Other significant buildings include the storm water pumping station/centrifugal engine house and the precipitation engine house/boiler house group.*
- *Use of the complex for over 140 years has resulted in layers of industrial development that represent the evolution of the site.*
- *The buildings present important engineering development, in terms of landmark building design and surviving machinery.*
- *Spaces within the site, including the River Thames location and the surrounding remnants of the original rural landscape recall the importance of the location.*

- *The site includes open spaces that have remained undisturbed for long periods, including mature trees, which contribute towards the biodiversity of the area*." (The London Borough of Bexley 2009, para. 3.1)

10.3 Consultation

10.3.1 Formal scoping responses from HistE (Historic Environment Planning Advisor) and the Environmental Services Team at Kent County Council were included in the Scoping Opinion received from the Planning Inspectorate in January 2018. The following table sets out the consultation undertaken and summarises the relevant points made and the responses.

Table 10.2: Summary of Key Consultation Responses in relation to Historic Environment

Reference	Comment	Response
SoS Scoping Opinion		
Section 4.5 – ID 1	The Scoping Report states that effects on these heritage assets are likely to be low or non-existent, given the nature of these designated remains, the nature of their setting, and the existing developments in the vicinity of the application site. It is unclear whether the Applicant is proposing to scope out an assessment of impacts to these assets from the ES. The Inspectorate does not consider that sufficient justification has been provided to justify there would be no likely significant effects. Therefore, the Inspectorate does not agree to scope out an assessment on these receptors from the ES. Historic England in their scoping consultation response, has also recommended an assessment that gives particular consideration to impacts on Crossness Conservation Area, associated listed buildings, and Lesnes Abbey Scheduled Monument.	The assessment of designated assets, including Crossness Conservation Area, associated listed buildings, and Lesnes Abbey Scheduled Monument is provided within Section 10.9 this ES. A detailed assessment of the likely effects of the Proposed Development on the setting of nearby designated assets is provided within this ES. This includes assessment of impacts on Crossness Conservation Area, associated listed buildings, and Lesnes Abbey Scheduled Monument.

Reference	Comment	Response
Section 4.5 – ID 2	The Scoping Report states that during operation, the underground electricity connection would not affect the setting of heritage assets and therefore will not be assessed within the ES. The Inspectorate agrees significant effects during operation associated with the electrical connection are unlikely and agrees that this matter can be scoped out.	In line with the scoping opinion from the Secretary of State, effects on setting of heritage assets during operation of the Electrical Connection are scoped out.
Section 4.5 – ID 3	The Scoping Report does not identify a study area for this aspect. The study area should be described and justified within the ES. The Inspectorate notes that a 1 kilometre (km) search area surrounding the site has been applied to identify a number of heritage assets and archaeological remains. The Environmental Statement (ES) should provide a robust justification of why the study area and 1 km search area is appropriate and sufficient to capture all heritage assets which could experience impacts on their setting. To support this justification, the Applicant is advised to refer to the Zone of Theoretical Visibility	The justification of the study area is provided in **Section 10.5**. The study areas used in this ES have been defined based on professional judgement, experience of potential significant direct and indirect effects likely to arise from the Proposed Development and consultation with HistE: ▪ Archaeological study area: a radius of 1 km from the Application Boundary including the various Electrical Connection route options. Within an urban environment study areas generally applied vary in size between 0.5 and 1 km. To ensure a comprehensive baseline a 1 km study area was utilised within this assessment.

Reference	Comment	Response
	(ZTV) developed for the Townscape and Visual Impact Assessment (TVIA).	▪ Geoarchaeological study area: a radius of 500 m from the boundary of the permanent works in the area adjacent / around Riverside Resource Facility (RRRF) north of Norman Road. This study area was agreed in consultation with HistE. The following study areas are used in the settings assessment: ▪ The inner study area - A radius of 1 km from the boundary of the permanent works in the area adjacent / around RRRF north of Norman Road which has been used for assessing indirect effects on all non-designated and designated heritage assets. It is considered that it is within this area that REP has the highest potential to impact upon the significance of designated and non-designated heritage assets; and ▪ The wider study area - A radius of 2.5 km from the boundary of the permanent works in the area adjacent / around RRRF north of Norman Road, which has been used for assessing indirect (primarily visual) effects on Scheduled Monuments, Grade I and Grade II* Listed Buildings, Conservation Areas and Registered Parks and Gardens.

Reference	Comment	Response
		A review of designated assets between 2.5 km and 5 km from the boundary of permanent works identified no heritage assets considered sensitive to change by the Proposed Development. The study areas were discussed in a pre-application meeting with HistE and no issues were raised. In addition, no issues were raised regarding the study areas during statutory consultation on the PEIR. The Zone of Theoretical Visibility (ZTV) developed for the TVIA has been used within this assessment.
Section 4.5 – ID 4	The ES should clearly state who has been consulted to inform the assessment. The Inspectorate advises that the local authority historic environment advisers and local studies library are consulted. This has also been requested by Historic England and Kent County Council in their responses.	Consultation was undertaken with the historic environment advisor to London Borough of Bexley and Dartford Borough Council (see relevant sections below). Local studies libraries were consulted as part of the assessment as set out in Section 10.5.8.
Section 4.5 – ID 5	Previous geo-archaeological works and data used within the assessment should be clearly referenced within the ES.	The heritage Desk Based Assessment (**Appendix F.1**) and geoarchaeological deposit model **(Appendix F.2**) includes a list of sources consulted as part of the assessment.

Reference	Comment	Response
	The Scoping Report does not propose any archaeological field surveys and evaluations, however the Inspectorate notes Historic England's consultation response which identifies the need for archaeological field surveys and evaluations, should they prove necessary. The Inspectorate recommends that the need (and if necessary, the scope) for such work is agreed with Historic England and Kent County Council.	The final Deposit Model and Desk Based Assessment were submitted to Historic England and Kent County Council. No additional pre-determination works were requested. The ES has been informed by a watching brief on intrusive geotechnical works and the production of a geoarchaeological deposit model of the REP site. Consultation regarding the scope of geoarchaeological assessment and further works was undertaken with Historic England and Kent County Council. The Archaeological Advisor to Kent County Council has agreed that a deposit model for the electrical connection and Littlebrook substation is not required. A Written Scheme of Investigation (WSI) was submitted and agreed with Historic England (**Appendix F.1**, Appendix D).
Section 4.5 – ID 6	The ES should clearly explain how the significance of effect has been determined. It should be clear how professional judgement has been applied.	Definition and justification of significance of effect is included in Methodology Section 10.5.
Section 4.5 – ID 7	The Scoping Report states that for non-designated archaeological assets, the Secretary of State's	Clarification and referencing is supplied within **Table 10.2** within this ES.

Reference	Comment	Response
	non-statutory criteria would be utilised. The Inspectorate is not clear what criteria this is referring to; this should be clarified within the ES. All guidance that has informed the assessment of effects should be identified within the ES and should be sufficient to identify and assess the likely significant effects from the Proposed Development.	The assessment of likely significant effects on cultural heritage resources of the Application Site has been conducted in line with the latest and most comprehensive guidance provided. These documents do not provide a prescriptive approach to assessment but identify principles and good practice that have been applied in the methodology for this assessment: ■ Scheduled Monuments – Identifying, protecting, conserving and investigating nationally important archaeological sites under the Ancient Monuments and Archaeological Areas Act 1979 (DCMS 2010); ■ Scheduled Monuments & nationally important but non-scheduled monuments (DCMS 2013); ■ Principles of Selection for Listing Buildings (DCMS 2010); ■ Conservation Principles – Policies and Guidance for the Sustainable

Reference	Comment	Response
		Management of the Historic Environment (English Heritage 2008); ■ Design Manual for Roads and Bridges Volume 11; Section 3; Part 2 'Cultural Heritage' (DMRB) (Highways Agency 2007); ■ Historic Environment Good Practice Advice in Planning Note Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015); ■ Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Historic England 2017); ■ Seeing the History in the View – A Method for Assessing Heritage Significance in Views (English Heritage 2011); and ■ Standard and Guidance for Historic Environment Desk-based Assessments (Institute for Archaeologists 2014) (updated in January 2017). A Methodology statement regarding assessment of effects is included in Section 10.5 and **Table 10.5.**

Reference	Comment	Response
Section 4.5 – ID 8	The Scoping Report states that archaeological resources are susceptible to a range of impacts during site preparation as well as construction related activities. The ES should clearly set out where the assessment of site preparation activities has been included within the assessment of the construction phase of the Proposed Development.	Section 10.3.2 of this ES responds to the consultation response. It states that archaeological and built heritage resources are susceptible to a range of direct impacts during site preparation as well as construction related activities, including: ■ Site clearance / site preparation activities that disturb archaeological remains; ■ Demolition or alteration of designated and non-designated built cultural heritage assets; ■ Excavation that extends into archaeological sequences, for example deep foundations, basements or re-landscaping (for example attenuation ponds) resulting in the removal of the resource; ■ Piling activities resulting in disturbance and fragmentation of the archaeological resource; and ■ Dewatering activities resulting in desiccation of waterlogged remains and deposits.

Reference	Comment	Response
		Site preparation activities will not disturb archaeological remains as the geoarchaeological deposits survive at depth. The assessment of impact, including of the Proposed Development on sub-surface archaeological remains is outlined in the desk-based assessment (**Appendix F.1**) and summarised within Section 10.9.
Section 4.5 – ID 9	This chapter of the Scoping Report has focussed primarily on land-based archaeology. The ES should also assess the potential for effects to archaeology within the marine environment.	As a result of design evolution, temporary works within the marine environment are no longer required. Consideration of potential effects upon the marine environment has therefore been scoped out of the EIA.
Historic England		
Historic England Historic Environment Planning Adviser - Scoping Response Letter (December 2017)	The assessment should address the potential effects on the setting of the following: ▪ Crossness Conservation Area and associated listed buildings ▪ Lesnes Abbey Reference to archaeological field surveys and evaluation may prove necessary and should	The setting assessment of Crossness Conservation Area and associated listed buildings, Lesnes Abbey in included within Section 10.7.13 of this ES. Reference to the possible requirement for archaeological field surveys and evaluations is included within Section 10.5.11 and 10.5.12 of this ES.

Reference	Comment	Response
	therefore be referenced with the methodology section. Local Studies Library should be consulted. Include attenuation ponds as a possible ground impact work to be included. Suggested change to table 7.6.2, to refer to significance of heritage assets in relation to direct and indirect impacts	Local studies libraries were consulted as part of the assessment provided in Section 10.5.8. A full list of primary and secondary sources used in the assessment is provided in the desk-based assessment bibliography (**Appendix F.1**). Attenuation ponds do not currently form part of the Proposed Development, however attenuation tanks are included as a possible impact within Section 10.5.22 of this ES. Table 7.6.2 within the Scoping Document is **Table 10.3** within this ES. This has been amended to refer to the significance of heritage assets in relation to direct and indirect impacts. This reflects the terminology of the NPPF (2018) in line with the consultation response.
Historic England Archaeological Advisor to London Borough of Bexley – Pre-application advice email (January 2017)	The production of a deposit model is required. In respect of the portion of the Proposed Development that falls within Bexley borough, a 500 metre (m) buffer to the REP site would be needed to provide sufficient material from which a workable deposit model could be produced.	A deposit model using historic borehole logs has been produced using a 500 m buffer (**Appendix F.1**) and informs this ES.
Historic England Archaeological Advisor to London	The methodology, study area and geoarchaeological works were discussed with Historic England. No requests to change the methodology outlined.	Prior to the publication of the PEIR a suite of documents was submitted to HistE for agreement. This included an overarching Written Scheme of Investigation for the geoarchaeological works a draft

Reference	Comment	Response
Borough of Bexley and Historic England Historic Environment Planning Adviser – Pre-application meeting 27th February 2018		Desk Based Assessment and Deposit Model. The Desk Based Assessment and Deposit Model have subsequently been updated to include the results of the watching brief of geotechnical works and a more detailed impact assessment of the Proposed Development. All updated documents have been agreed by HistE.
Historic England Archaeological Advisor to London Borough of Bexley – Pre-application advice email (4th April 2018)	In response to the monitoring of geotechnical boreholes in April 2018 Historic England requested a framework document outlining the staged approach to the assessment of the geoarchaeological resource.	A Written Scheme of Investigation (WSI) has been submitted and agreed by Historic England. It is included as an appendix within the desk-based assessment **Appendix F.1**. This outlines the staged assessment strategy for the geoarchaeological resource rather than the final assessment.
Kent County Council		
Director for Environment, Planning and Enforcement Kent County Council - Scoping Response Letter (December 2017)	Review of Kent Historic Environment Record (HER) Heritage assessment should include review of early OS maps, documentary accounts, Light Detection and Radar (LiDAR), aerial photography and any other geophysical surveys nearby.	Section 10.5.8 within this ES provides a list of sources used in the assessment which includes a review of early OS maps, documentary sources and archaeological research. The Desk Based Assessment (**Appendix F.1**) covers the entire Application Boundary and includes a bibliography of all primary and secondary sources consulted.

Reference	Comment	Response
	Geo-archaeological DBA / deposit model may be required in addition to archaeological DBA. Inclusion of a Historic Landscape Assessment.	KCC requested LiDAR, aerial photography and nearby geophysical surveys were reviewed as part of the assessment. In light of the electrical connection predominantly following existing roads and connecting to an existing sub-station, LiDAR, aerial photography, Historic Landscape Assessment and geoarchaeological deposit models have been scoped out of the assessment. No relevant geophysical surveys were identified. Prior to the publication of the PEIR the draft DBA was submitted to the archaeological advisor to KCC. The scope of the assessment was endorsed. The Desk Based Assessment has been updated to include a more detailed impact assessment and reflect slight changes to the scheme. The updated assessment has been agreed by KCC.
London Borough of Bexley		
Senior Planner – Conservation and Design Pre-application advice email (January 2017)	Consultation with the London Borough of Bexley Conservation Officer was undertaken as part of the PEIR to discuss the assessment methodology and identified heritage assets for assessment.	The list of heritage assets identified as being sensitive to change by the Proposed Development within this ES has been agreed by the London Borough of Bexley Conservation Officer. No additional heritage receptors were added or changes to the assessment methodology requested.

Reference	Comment	Response
S42 Consultation		
London Borough of Dartford		
Development Officer Dartford Borough Council – PEIR Response Letter (July 2018)	The PEIR indicates that an archaeological watching brief will be implemented along the length of the electrical connection construction route. This is likely to be acceptable where the routing is within the existing road corridor where there has already been disturbance. But as the details are not known yet and there may be a need for diversion around structures, it could be that the cabling will go into untouched land. In such cases, the Council would normally expect further archaeological investigation.	The ES Chapter and DBA has identified areas of the Electrical Connection route options where further archaeological investigations may be required see Section 10.9.18. If required, a Written Scheme of Investigation (WSI) identifying any areas where further archaeological investigations are required; the nature and extent of the investigation required; and providing details of the measures to be taken to protect, record or preserve any significant archaeological features that may be found, must be submitted to and approved by the relevant planning authority prior to commencement of the authorised development. The need for a WSI will be secured in Requirement 7 of the draft DCO (**Document Reference 3.1**). Prior to the publication of the PEIR the draft DBA was submitted to the archaeological advisor to KCC. The scope of the assessment was endorsed. The DBA has been updated to include a more detailed impact assessment and reflect slight changes to the scheme. The updated assessment has been agreed by KCC.

Reference	Comment	Response
Development Officer Dartford Borough Council – Statutory Consultation Response Letter (July 2018)	The Council will need to understand the detail of the impacts of the road closures on the traffic in the area and the routing of Fastrack, as well as the physical impacts on archaeology and biodiversity. Without the detailed information the Council is unable to comment further.	The ES Chapter and DBA has identified areas of the Electrical Connection route options where further archaeological investigations may be required see Section 10.9.18. If required, a Written Scheme of Investigation (WSI) identifying any areas where further archaeological investigations are required; the nature and extent of the investigation required; and providing details of the measures to be taken to protect, record or preserve any significant archaeological features that may be found, must be submitted to and approved by the relevant planning authority prior to commencement of the authorised development. The WSI, if required, is secured in Requirement 7 of the draft DCO (**Document Reference 3.1**). Prior to the publication of the PEIR the draft DBA was submitted to the archaeological advisor to KCC. The scope of the assessment was endorsed. The DBA has been updated to include a more detailed impact assessment and reflect slight changes to the scheme. The updated assessment has been agreed by KCC. An assessment of the impacts to traffic is included in **Chapter 6**.

Reference	Comment	Response
London Borough of Bexley		
Head of Development Management Growth and Regeneration London Borough of Bexley – Statutory Consultation Response Letter (July 2018)	There are several designated and built heritage assets in the vicinity of the REP site including the Crossness Conservation Area, the Grade I listed Crossness pumping station, two Grade II listed workshops at Crossness Pumping Station, a locally listed engine house at Crossness Sewage Treatment Work, the Grade II listed jetty at Dagenham Dock and the scheduled and grade II listed Lesnes Abbey, approximately 1.5 km south-west of the site. As per the Townscape and Visual Impact Assessment, the assessment of the impact the development will have on designated and non-designated heritage assets assumes a "worst case scenario" in terms of building and stack height. The report finds that the potential effects of the proposed development on the historic environment during construction, decommission and operation are likely to be negligible and not significant. Crossness Conservation Area, associated listed buildings and Lesnes Abbey are identified as heritage assets potentially affected by the development within table 7.5.1. While the proposed	Some of the comments refer to the Scoping Document and were addressed during the production of the PEIR. All heritage assets identified by LBB, Crossness Conservation Area, the Grade I listed Crossness pumping station, two Grade II listed workshops at Crossness Pumping Station, a locally listed engine house at Crossness Sewage Treatment Work, the Grade II listed jetty at Dagenham Dock and the scheduled and grade II listed Lesnes Abbey, have been assessed within this ES. The results of the settings assessment concluded that the effect of the Proposed Development on the historic environment were negligible – minor and not significant. Justification for these conclusions is provided within Section 10.9 of this ES. Crossness Conservation Area, associated listed buildings and Lesnes Abbey are assessed within the ES. It appears that the final comments refer to the

Reference	Comment	Response
	development is at some distance from these assets and that the local area has been predominantly industrial in character for some time, it is considered that the assessment of any effects on the setting of these assets is underplayed in the methodology as set out.	Scoping Document (table 7.5.1) rather than the PEIR. A full setting assessment of Crossness Conservation Area and Lesnes Abbey, including views, has been undertaken in this ES. Visualisations for the TVIA chapter have been consulted and cross-referenced.
	In terms of table 7.5.2, it is noted that visual impacts affecting Lesnes Abbey have been included. It is not however apparent if views affecting the Crossness conservation area and the listed buildings within it will form part of this assessment. If this is not the case they should be included.	As above, a full setting assessment of Crossness Conservation Area, including views, has been undertaken as part of this ES. Crossness Conservation Area, associated listed buildings and Lesnes Abbey, their setting and views, are assessed within the ES. Visualisations for the TVIA chapter have been consulted and cross-referenced.
	The potential effects on the setting of the conservation area should also be reflected in the assessment methodology – the conservation area is an important component of townscape character and should be explicitly referenced at paragraph 7.5.18. The London Borough of Bexley's conservation area appraisal and management plan will help establish the significance and sensitivities of these assets and should be referenced in the environmental statement.	Crossness Conservation Area Appraisal and Management Plan (London Borough of Bexley 2009) is included as a baseline source in Section 10.5.8 within this ES. A full list of primary and secondary sources used in this assessment is provided in the bibliography of the DBA (**Appendix F.1**).

Reference	Comment	Response
	The methodology for assessing setting should reflect the Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/). A stage approach should be adopted in the assessment of setting as outlined at paragraph 12 of the advice. This document should also be reflected at paragraph 7.5.31 of the scoping document.	Historic Environment Good Practice Advice in Planning Note 3 outlines a five-stage settings assessment which provides the basis for the settings assessment within this ES. 'The Setting of Heritage Assets' is included in Section 10.5.9 of this ES within a list of latest and comprehensive guidance used in the assessment. The five-stage assessment methodology is described in Section 10.10.3 of this ES. A full list of guidance documents use in this assessment is provided in the bibliography of the DBA (**Appendix F.1**).
	Paragraph 7.6.1 indicates that a desk-based assessment and a geo-archaeological statement will form part of the Historic Environment Chapter. It is recommended that this text is amended to include reference to archaeological field surveys and evaluations should they prove necessary.	In line with this statutory consultation comment Section 10.5.11 and 10.5.12 states that intrusive archaeological investigation may be required.
	Section 7.6.7 lists sources to be consulted for the archaeological desk-based assessment report. This should be extended to include Local Studies Library and any other readily accessible evidence held elsewhere. Section 7.6.13 lists the potential scope of ground impact work represented by the scheme – we would suggest the addition of possible attenuation tanks. Table 7.6.2 should also	Prior to the publication of the PEIR a draft DBA was submitted to the archaeological advisor to LBB which incorporated all of the statutory consultation scoping responses. Local studies libraries have been consulted as part of the assessment as outlined in Section 10.5.8. A full list of guidance documents used in this assessment is

Reference	Comment	Response
	be amended to refer to the significance of heritage assets in relation to direct and indirect impacts. This would reflect the terminology of the NPPF.	provided in the bibliography of the DBA (**Appendix F.1**). Attenuation tanks have been included as a possible impact within the methodology statement of this ES. Table 7.6.2 within the Scoping Document is **Table 10.3** within this ES. This has been amended to refer to the significance of heritage assets in relation to direct and indirect impacts. This would reflect the terminology of the NPPF in line with the consultation response.
Kent County Council		
Director for Environment, Planning and Enforcement Kent County Council – Statutory Consultation Response Letter (July 2018)	Only part of the REP scheme is within the Dartford area of Kent and this is largely focussed on the current road network and the connection to the Littlebrook Substation site (ECR Option 2B). KCC has reviewed the Non-Technical Summary and accompanying baseline assessment of the historic environment which includes a full Desk-Based Assessment (DBA) and a Geo-archaeological and Palaeoenvironmental Assessment. The DBA by Orion is detailed and clearly sets out the baseline details of the heritage assets and potential heritage assets which may be impacted	Prior to the publication of the PEIR the draft DBA was submitted to the archaeological advisor to KCC. The scope of the assessment was endorsed. The DBA has been updated to include a more detailed impact assessment and reflect slight changes to the scheme. The updated assessment has been agreed by KCC. The ES Chapter and DBA has identified areas of the Electrical Connection route options where further archaeological investigations may be required see

Reference	Comment	Response
	by the scheme. Within the Kent section, this includes Romano-British activity sites, Anglo Saxon burial site and Medieval or later settlement and land boundaries. There is still potential for unknown archaeological remains to survive along the route. KCC accepts the DBA and has no further comments to make on it. The Geo-archaeological and Palaeoenvironmental Assessment by Quest seems to provide a broad assessment of the wider area, but only detailed comments on the London side of the scheme. There is limited assessment of the geoarchaeological potential of the scheme where it extends through the Kent side to the Littlebrook Substation, although it is acknowledged that there are potentially significant deposits, including palaeo-land surfaces at depth. KCC considers that this assessment is acceptable, but only on the basis of the current data provided on proposed groundworks within the Kent section. The Written Scheme of Investigation (WSI) refers only to a scheme of geoarchaeological work for the London extent of the scheme and it appears to be assumed that because the impact of the scheme will be so shallow within the Kent section, there is	Section 10.9.18. Substantial groundworks (i.e. Horizontal Directional Drilling, junction pits or 10m+ sections of cable trench) will trigger the need for further archaeological work. The scope of the further works will be agreed with the Archaeological Advisors to Kent County Council and Historic England once the location and design of the cable trench is fixed. The updated DBA has been submitted and agreed by the archaeological advisor to KCC and HistE. If required, a Written Scheme of Investigation (WSI) identifying any areas where further archaeological investigations are required; the nature and extent of the investigation required; and providing details of the measures to be taken to protect, record or preserve any significant archaeological features that may be found, must be submitted to and approved by the relevant planning authority prior to commencement of the authorised development. The need for a WSI, if required, is secured in Requirement 7 of the draft DCO (**Document Reference 3.1**). The maximum depth of the cable trench will be 1.2m which has been discussed with the Archaeological Advisor to Kent County Council and the above triggers for archaeological works have been agreed.

Reference	Comment	Response
	no need to address any further geoarchaeological issues. This is acceptable on the basis that the depth of disturbance within the Kent section will not be deeper than 0.9m. Any groundworks which may extend to a depth below 0.9m will need to be informed by suitable geoarchaeological assessment and Palaeolithic assessment.	
	The assessment of the historic environment for this scheme is acceptable based on current information. However, should details of groundworks for this scheme change, there may be a need to review the baseline assessment for the Kent section of the scheme.	The maximum depth of the cable trench will be 1.2m which has been discussed with the Archaeological Advisor to Kent County Council and the above triggers for archaeological works have been agreed.]
	With regard to heritage mitigation for the Kent section, on the understanding that the groundworks for the ECR is within the existing road network and extends to a maximum depth of 0.9m, mitigation for heritage can be addressed through a formal programme of archaeological work. In view of the potential for Romano-British activity, an Anglo-Saxon burial site, a medieval settlement and historic landscape features, KCC recommends that a watching brief is not sufficient.	In line with comments from KCC the recommendation of the ES is for further works rather than a watching brief, secured as a condition of planning.

Reference	Comment	Response
	Therefore, KCC recommends that the Kent section of this scheme would be more appropriately covered by a formal programme of archaeological works which includes some advanced and targeted test pitting, followed by a programme of formal archaeological monitoring of varied intensity. This formal programme of archaeological work should be in accordance with a specification agreed with the Kent County Archaeologist. KCC considers that the DCO could include a requirement along the lines of the following: AR1. No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written specification and timetable which has been submitted to and approved by the Local Planning Authority. Reason: To ensure that features of archaeological interest are properly examined and recorded in accordance with NPPF.	
Historic England		
Historic England	The Greater London Archaeological Advisory Service (GLAAS) provides archaeological advice to boroughs in accordance with the National Planning	**Appendix F.2** has been finalised and the DBA and ES has outlined the areas of geoarchaeological

Reference	Comment	Response
Archaeological Advisor (South London) – Statutory Consultation Response Letter (July 2018)	Policy Framework and GLAAS Charter. The National Planning Policy Framework (Section 12) and the London Plan (2011, Policy 7.8) emphasise that the conservation of archaeological interest is a material consideration in the planning process. Paragraph 128 of the NPPF says that applicants should be required to submit appropriate desk-based assessments, and where appropriate undertake field evaluation, to describe the significance of heritage assets and how they would be affected by the proposed development. This information should be supplied to inform the planning decision. In May 2018 having received the attached documents from Orion Heritage, archaeological advisors to the applicant, I advised the following: Thank you for draft copies of the heritage DBA; geoarchaeological deposit model; and the stage 1 geoarchaeological specification. Having considered the submitted documents (and only the portion of the DBA that relates to the London Borough of Bexley) I will be happy to recommend their approval, when I am consulted by the borough planner, once they have been	interest and the ground disturbance of the Proposed Development. The updated deposit model and DBA has been submitted and approved by the Archaeological Advisor to London Borough of Bexley. HistE state that the excavation of the bunker and attenuation tanks may require an archaeological response, subject to the final design. The impact of the cable trench on the Palaeolithic Crayford Silts will also need consideration. HistE support the recommendation for the full geoarchaeological analysis of the identified cores and support the proposed mechanism to address the range of highlighted issues by means of a recommendation in the DCO.

Reference	Comment	Response
	forwarded as a submission of detail in pursuance of the archaeological interest.	
	It should be noted that the GLHER request along with a completed OASIS form, a shape or dwg/dxf files of any evaluation trench plans, area excavation, areas within a site targeted for observation and recording or other forms of intervention as per Historic England guidance. I therefore require the trench data file(s) as part of the report approval process.	The assessment work to date has not involved archaeological fieldwork / production of shape dwg/dxf files. It is noted that this will be a requirement of final mitigation works.
	The result of the stage 1 geoarch. monitoring of the planned geotechnical work will result in a revised/refined deposit model. The anticipated report will also need to consider the model in the context of the model of the Lower Thames Floodplain produced for publication 8 in the Archaeology Crossrail series, 2017.	The Stage 1 geoarchaeological works have been completed and submitted to the Archaeological Advisor to London Borough of Bexley. It has been agreed The Lower Thames Floodplain produced for publication 8 in the Archaeological Crossrail series will be referenced in Stage 2 of geoarchaeological works. These will be undertaken post-determination.
	As indicated in the historic deposit model report and stage 1 specification, the results will inform the potential on-going geo/archaeological interest with the site that may therefore lead to a stage 2 of geo/archaeological work. Once the detail of the major ground disturbance work is known in respect of the planned energy station, plus consideration of	The updated DBA outlines the physical impact of the Proposed Development in relation to the geoarchaeological deposits of interest. This allows HistE to make an informed decision regarding the archaeological effects and the need for further works.

Reference	Comment	Response
	secondary impacts such as attenuation tank(s), the potential form of geo/archaeological interest can then be scoped.	The potential form of geo/archaeological interest has been scoped in the updated DBA and deposit model which have been submitted to the Archaeological Advisor to London Borough of Bexley. HistE state that the excavation of the bunker and attenuation tanks may require an archaeological response, subject to the final design. HistE support the recommendation for the full geoarchaeological analysis of the identified cores and support the proposed mechanism to address the range of highlighted issues by means of a recommendation in the DCO.
Minor Refinements, Statutory Consultation		
London Borough of Bexley Head of Development Management Growth and Regeneration – Statutory Consultation Response Letter (September 2018)	The applicant has completed an extensive assessment of the potential impact on heritage assets. In line with NPPF paragraph 189, the assessment has described the significance of the assets and considered the impact of the proposal on those assets. The conclusions in the report are that the potential for new, not significant adverse effects have been identified in relation to the Historic Environment where the changes impact areas in addition to those considered within the PEIR. It is noted that the list of designated assets in Table 10.5 of the PEIR identifies a number of	

Reference	Comment	Response
	assets in LB Havering. Has LB Havering been notified and consulted? There are two heritage assets in LB Bexley, which would be the main concern in the consideration of these proposals: Crossness and Lesnes Abbey. Crossness is a conservation area and contains the Grade I Pumping House as well as a collection of Grade II listed structures. It is located approx. 0.65km west from the application site. Appendix E3 of the Supplementary Information to the PEIR considers the impact on the assets, and rightly notes that the impact is on their setting, in the sense that the proposal will be partially visible in the distance when the assets are viewed from the west. The introduction of the new development into this view is unlikely to have a significantly harmful impact for the following reasons: The intrusion is likely to be highly minimal (this is based on accepting the assessments found in Tables 9.14 and 9.15 of the PEIR which assessed townscape and visual effects); and The setting of Crossness is already highly industrial and includes a number of modern industrial buildings, including even on the TW site itself immediately to the south of the conservation area.	It is noted that the response acknowledges the introduction of the new development is unlikely to have a significantly harmful impact on the setting of Crossness Conservation Area. It is noted that the response considers it to be '*highly unlikely that the Proposed Development will have anything more than a minimal intrusion into the setting of the heritage asset, nor will it have any more than a minimal impact on views from the asset itself*'.

Reference	Comment	Response
	Lesnes Abbey is Grade II listed ruins which are designated as a Scheduled Ancient Monument. It is located approx. 1.5-2km southwest of the application site. The applicant has not provided an assessment with such a detailed level of consideration as that given to the impact on Crossness, however, given the distances involved and the existence of intervening structures, it is highly unlikely that the proposed development will have anything more than a minimal intrusion into the setting of the heritage asset, nor will it have any more than a minimal impact on views from the asset itself. The site is within an Area of High Archaeological Potential. The applicant has provided an archaeological desk-based assessment (Appendix F.2) which found that the proposed works include intrusive ground works which could have a significant impact on the local archaeology. To ensure that archaeology is protected and that where it cannot be retained in situ it will be recorded, the applicant produced a Written Scheme of Investigation (WSI) (Appendix F.1). You should engage with Historic England on the WSI and any relevant background information.	Consultation with HistE regarding the WSI, relevant background information and future works is being undertaken (see consultation section with HistE above).

10.4 Reasonable Worst Case Parameters Used for Assessment

10.4.1 In respect of the historic environment, the reasonable worst case scenario from within the Proposed Development parameters assumes a maximum stack height of up to 113 m Above Ordnance Datum (AOD).

10.4.2 The reason that this represents the reasonable worst case for REP in relation to the historic environment is that a larger stack height will increase the magnitude of visual effects (and therefore effects on setting) as REP would be more prominent and would be visible over a larger geographical area.

10.4.3 The reasonable worst case depth for the electrical connection trench is c. 1.2 m, except where there is potential for a directional drill, or localised deeper trench, to be required to pass below a specific constraint.

10.5 Assessment Methodology and Significance Criteria

Study Area

10.5.1 In order to inform the preparation of this Chapter, a heritage DBA of the REP site was undertaken (**Appendix F.1**). The DBA located designated and non-designated heritage assets and assessed the potential for previously unrecorded finds or features.

10.5.2 The following study areas have been chosen for the archaeological impact assessment. There are no strict parameters for the setting of study areas. This has been defined based on professional judgement, experience of potential significant direct and indirect effects likely to arise from the Proposed Development and consultation with HistE:

- Archaeological study area: a radius of 1 km from the Application Boundary has been used to identify designated or non-designated archaeological assets which might be directly or indirectly impacted by the Proposed Development and inform the potential for previously unrecorded archaeological remains. This includes the various Electrical Connection route options. Within an urban environment study areas generally applied vary in size between 0.5 and 1 km. To ensure a comprehensive baseline a 1 km study area was utilised within this assessment.

- Geoarchaeological study area: a radius of 500 m from the boundary of the permanent works in the area adjacent / around Riverside Resource Facility (RRRF) north of Norman Road to assess the geoarchaeological potential of the REP site. The Electrical Connection route, Temporary Construction Compounds and Littlebrook substation are currently anticipated to only involve groundworks less than 1.2 m in depth (except where there is potential for a directional drill, or localised deeper trench, to be required to pass below a specific constraint) through made ground deposits associated with the existing roads, footways or verges and as such are not likely to impact the buried Holocene sequence and are not included in the geoarchaeological assessment area.

- Since the publication of the Scoping Opinion further work has been conducted which has resulted in the removal of the need for works within the marine environment and therefore impacts to marine archaeology are scoped out (see **Table 10.2**).

10.5.3 The study area for the settings assessment is centred on the permanent works at the REP site rather than the entirety of the Application Site. In light of the Electrical Connection route being underground, significant effects during operation associated with the Electrical Connection are unlikely and were scoped out. The Inspectorate agreed with this exclusion through the Scoping Opinion (January 2018). The appearance / form of the Electrical Connection Point was not available during the production of the initial Scoping Report. It will utilise an existing sub-station at Littlebrook, near Dartford. Since this will result in no change to the mass and appearance of the sub-station, no significant effects to built heritage assets in the vicinity will result and no further assessment is considered necessary.

10.5.4 There are no fixed parameters for study areas for settings assessment. The following study areas were defined based on professional judgement and experience of potential likely significant indirect effects to arise from the Proposed Development. This followed an initial desk-based appraisal of all designated assets within 5 km of the boundary of the permanent works in the area adjacent / around RRRF north of Norman Road. This assessment was based on consideration of significance, urban positioning, topography and type of asset (for example domestic, civic, military, religious, funerary monument) and utilised GIS analysis. This resulted in no designated assets beyond 2.5 km and no grade II listed buildings beyond 1 km identified as being sensitive to change from the Proposed Development.

10.5.5 The justification for using differing study areas in relation to the various grades of listed buildings is as follows: the significance of Grade II listed buildings generally resides within their architectural interest (i.e. their form and fabric) and the positive contribution of their settings to their significance is generally limited to their immediate vicinity. For the purposes of this assessment consideration of Grade II listed buildings, where setting is generally a less sensitive part of their significance, setting has been limited to 1 km. Beyond this distance, given the nature of the surrounding townscape, it is not considered that the presence of the Proposed Development would affect the significance of these buildings.

10.5.6 The following study areas are used in the settings assessment:

- The inner study area - A radius of 1 km from the boundary of the permanent works in the area adjacent / around RRRF north of Norman Road which has been used for assessing indirect effects on all non-designated and designated heritage assets. It is considered that it is within this area that REP has the highest potential to impact upon the significance of designated and non-designated heritage assets; and

- The wider study area - A radius of 2.5 km from the boundary of the permanent works in the area adjacent / around RRRF north of Norman Road, which has been used for assessing indirect (primarily visual) effects on Scheduled Monuments, Grade I and Grade II* Listed Buildings, Conservation Areas and Registered Parks and Gardens. A review of designated assets between 2.5 km and 5 km from the boundary of permanent works identified no heritage assets considered sensitive to change by the Proposed Development. This wider settings assessment utilises Zone of Theoretical Visibility (ZTV) mapping to screen out designated assets beyond the 1 km study area that have no intervisibility with the Proposed Development.

10.5.7 The study areas were discussed in a pre-application meeting with HistE and no issues were raised. No issues were raised regarding the study areas during statutory consultation on the PEIR.

Baseline Data Collection

10.5.8 In order to inform the assessment, a heritage DBA of the Application Site was undertaken (**Appendix F.1**). The following data sources have been used in the compilation of baseline data:

- The National Heritage List for England (NHLE);
- Greater London Historic Environmental Record (GLHER);
- Areas of importance identified in local planning policy (conservation areas, archaeological priority areas);
- Heritage planning policy from London Borough of Bexley and Dartford Borough Council;
- London Borough of Bexley Archives and local history (BA);
- The Dartford Town Archive (DTA);
- The National Archives (TNA);
- The British Library (BL);
- Published/unpublished sources
- Crossness Conservation Area Appraisal and Management Plan (London Borough of Bexley 2009); and
- Site inspection and map regression exercise.

Assessment

10.5.9 The assessment of likely significant effects on cultural heritage resources of the Application Site has been conducted in line with the latest and most

comprehensive guidance provided. These documents do not provide a prescriptive approach to assessment but identify principles and good practice that have been applied in the methodology for this assessment:

- Scheduled Monuments – Identifying, protecting, conserving and investigating nationally important archaeological sites under the Ancient Monuments and Archaeological Areas Act 1979 (DCMS 2010);
- Scheduled Monuments & nationally important but non-scheduled monuments (DCMS 2013);
- Principles of Selection for Listing Buildings (DCMS 2010);
- Conservation Principles – Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage 2008);
- Design Manual for Roads and Bridges Volume 11; Section 3; Part 2 'Cultural Heritage' (DMRB) (Highways Agency 2007);
- Historic Environment Good Practice Advice in Planning Note Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015);
- Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Historic England 2017);
- Seeing the History in the View – A Method for Assessing Heritage Significance in Views (English Heritage 2011); and
- Standard and Guidance for Historic Environment Desk-based Assessments (Institute for Archaeologists 2014) (updated in January 2017).

Non-Designated Heritage Assets

10.5.10 In terms of non-designated assets, PPG states that there are two categories of non-designated sites of archaeological interest:

"(1) Those that are demonstrably of equivalent significance to scheduled monuments and are therefore considered subject to the same policies as those for designated heritage assets...

(2) Other non-designated heritage assets of archaeological interest" (Department of Communities and Local Government, 2014, Paragraph: 040 Reference ID: 18a-040-20140306).

10.5.11 The value / significance of a non-designated heritage asset may change following assessment and evaluation prior to a planning decision and move from the second to the first category.

10.5.12 PPG states that applicants should, if required, submit an appropriate desk-based assessment and, where necessary, a field evaluation.

10.5.13 Non-designated heritage assets comprise all finds or features identified on the Greater London Historic Environment Record (GLHER) and Kent Historic Environment Record (KHER), locally listed buildings identified in local planning policy, and previously unrecorded finds or features identified through an appraisal of sources (see **Paragraph 10.5.8**).

10.5.14 Assessment of cultural value, sensitivity and magnitude of impact of non-designated assets follows the same methodology outlined for designated heritage assets.

Designated Heritage Assets

10.5.15 Heritage assets and potential impacts have been assessed using best practice, including that set out in HistE's 'Good Practice Advice Note 3, The Setting of Heritage Assets' (Historic England 2017). The heritage assets which require assessment have been selected with reference to the National Heritage List for England (NHLE) database held by HistE, as well as information held by the Local Planning Authority (LPA) on Conservation Areas.

10.5.16 Not all designated heritage assets within the 2.5 km radius will require full assessment for impacts on an individual basis. Where a designated heritage asset has been excluded, a clear justification is provided, for example if the asset is sufficiently far away, and well screened from the study area. Also, not all assets require the same level of assessment. As set out in paragraph 189 of the NPPF, the level of detail is sufficient to inform the nature and degree of effect of development within the study area on the significance of the heritage asset in question.

Assessing Heritage Significance

10.5.17 The significance of a heritage asset is defined in the NPPF as "The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting." In the case of many heritage assets their importance has already been established through the designation (i.e. scheduling, listing and register) processes applied by HistE.

10.5.18 In order to assess the heritage significance of previously unrecorded or non-designated heritage assets, the criteria used by the Department of Culture, Media, and Sports publication, 'Principles for Selection of Listed Buildings' (DCMS 2010), and the Scheduled Monuments Policy Statements published by the same body (DCMS 2013), are used. The criteria for establishing significance of heritage assets for this assessment are presented in **Table 10.3** below.

Table 10.3: Determining the heritage significance of a Heritage Asset

Importance	Description
International	■ Archaeological sites or monuments of international importance, including World Heritage Sites. ■ Structures and buildings inscribed as of universal importance as World Heritage Sites. ■ Other buildings or structures of recognised international importance.
National	■ Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the DCMS's principles of selection for scheduled monuments (DCMS 2013). ■ Listed Buildings. ■ Non-designated built assets of national importance, assessed with reference to the Secretary of State's published Principles of Selection for Listing Buildings (DCMS 2010).
Regional/ County	■ Archaeological sites and remains which, while not of national importance, score well against most of the DCMS's principles of selection for scheduled monuments (DCMS 2013). ■ Conservation Areas.
Local	■ Archaeological sites that score less well against the DCMS's principles of selection for scheduled monuments (DCMS 2013). ■ Historic buildings on a 'local list'. Non-designated built assets of local significance.

None	▪ Areas in which investigative techniques have produced negligible or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

Assessing Magnitude of Impact

10.5.19 This Chapter presents the findings of the assessment of the likely effects of the Proposed Development. The nature and likelihood of the impacts of the Proposed Development is assessed in both the long and short term, on archaeological and heritage features against clearly defined criteria.

10.5.20 Significance has been assigned to effects relative to the heritage significance, its sensitivity to change and the magnitude of impact in accordance with best practice.

10.5.21 It is widely recognised that the heritage significance of an asset is not the same as its sensitivity to changes to its setting (Historic England 2017, p. 9; Lambrick 2008). Thus, in determining effects upon the setting of assets by a proposed development, both importance and sensitivity to changes to setting need to be considered. Factors considered when assessing sensitivity to change include, but are not limited to, heritage significance (**Table 10.3**), condition, type and period of asset and landscape positioning.

10.5.22 Archaeological and built heritage resources are susceptible to a range of direct impacts during site preparation as well as construction related activities, including:

- Site clearance / site preparation activities that disturb archaeological remains;
- Demolition or alteration of designated and non-designated built cultural heritage assets;
- Excavation that extends into archaeological sequences, for example deep foundations, basements or re-landscaping (for example attenuation ponds) resulting in the removal of the resource;
- Piling activities resulting in disturbance and fragmentation of the archaeological resource; and
- Dewatering activities resulting in desiccation of waterlogged remains and deposits.

10.5.23 Any such impacts are discussed and significance criteria applied; the significance of effects has been assessed using the significance criteria set out in **Table 10.5**.

10.5.24 In terms of indirect impacts on heritage, the impacts of the development include the impact on the setting of a Listed Building / Conservation Areas / Scheduled Ancient Monument / non-designated heritage asset.

10.5.25 The magnitude of the impact is a product of the extent of development impact on an asset. Impacts are rated as High, Medium, Low and Negligible/Neutral. Impacts can be direct or indirect, adverse or beneficial. The criteria for assessing the magnitude of impact are set out in **Table 10.4**.

Table 10.4: Magnitude of Impact

Magnitude	Direct Impacts	Indirect Impacts
High Adverse	Demolition of built heritage assets or demolition within a Conservation Area. Complete removal of an archaeological site.	Radical transformation of the setting of an archaeological monument. Substantially harmful change to the significance of a built heritage asset or Conservation Area due to a change in setting.
Medium Adverse	Harmful alteration (but not demolition) of a built heritage asset or alterations to a building in a Conservation Area. Removal of a major part of an archaeological site and loss of research potential / significance.	Less than substantial harm to the significance of a built heritage asset or Conservation Area due to a change in setting. Partial transformation of the significance of an archaeological site e.g. the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility or appreciation of an archaeological site.
Low Adverse	Alterations to a built heritage asset or Conservation Area resulting in minor harm. Removal of an archaeological site where a minor part of its total area is	Minor harm to the significance of an archaeological monument or built heritage asset or Conservation Area due to a change in setting.

Magnitude	Direct Impacts	Indirect Impacts
	removed but the site retains significant future research potential.	
Negligible/ Neutral	Negligible impact from changes in use, amenity or access. Negligible direct impact to the built heritage asset or Conservation Area.	Negligible perceptible change to the significance of a building, archaeological site or Conservation Area due to a change in setting.
Low Beneficial	Alterations to a built heritage asset or Conservation Area resulting in minor beneficial impacts. Land use change resulting in improved conditions for the protection of archaeological remains.	Minor enhancement to the setting of a built heritage asset or Conservation Area. Decrease in visual or noise intrusion on the setting of a building, archaeological site or monument.
Medium Beneficial	Alterations to a built heritage asset or Conservation Area resulting in moderate beneficial impacts. Land use change resulting in improved conditions for the protection of archaeological remains plus interpretation measures (heritage trails, etc.)	Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site or monument. Improvement of the wider landscape setting of a built heritage asset, Conservation Area, archaeological site or monument. Improvement of the cultural heritage amenity, access or use of a built heritage asset, archaeological site or monument. Moderate enhancement to the setting of the built heritage asset and Conservation Area.
High Beneficial	Arrest of physical damage or decay to a built heritage asset or structure.	Significant enhancement to the setting of a built heritage asset. Conservation Area or

Magnitude	Direct Impacts	Indirect Impacts
	Alteration to a built heritage asset or Conservation Area resulting in significant beneficial impact.	archaeological site, its cultural heritage amenity and access or use.

10.5.26 It is acknowledged that **Table 10.4** above primarily deals with visual factors affecting setting. Whilst the importance of visual elements of settings, e.g. views, intervisibility, prominence etc., are clear, it is also acknowledged that there are other non-visual factors which could potentially result in setting effects. Such factors could be other sensory factors, e.g. noise or odour, or could be associative. In coming to a conclusion about magnitude of change upon setting, this assessment makes reference to traffic, noise, air quality, and townscape and visual assessments, reported in this ES, as appropriate.

Significance of Effect

10.5.27 The significance of the impact of the Proposed Development on archaeological and heritage assets is determined by the heritage significance of the asset and the magnitude of impact to the asset. **Table 10.5** below presents a matrix that demonstrates how the significance of effect is established:

Table 10.5: Evaluation of Significance of Effect

		Magnitude of Impact			
		High	**Medium**	**Low**	**Negligible / Neutral**
Heritage significance / Importance of asset	**International Importance**	Substantial/ Major	Major	Major	Negligible
	National Importance	Major	Major/ Moderate	Moderate	Negligible
	Regional/County Importance	Major/ Moderate	Moderate / Minor	Minor	Negligible
	Local Importance	Minor	Minor	Negligible	Negligible
	Negligible Importance	Negligible	Negligible	Negligible	Negligible

'Substantial', 'Major' and 'Moderate' levels of effect are 'significant' in the context of the EIA Regulations. 'Minor' and 'Negligible' are not significant in the context of the EIA Regulations.

The levels of effect could potentially be positive, neutral or negative.

10.5.28 Effects with a magnitude of moderate or above are considered significant in terms of the Infrastructure EIA Regulations 2017, unless otherwise stated. However, professional judgement is also used in considering the significance of effects.

10.5.29 The judgement of the significance of effects takes into consideration the impact on the heritage asset's heritage significance (as defined in Appendix 2 of the NPPF). As part of this assessment, the impact on the contribution that the setting of a heritage asset makes to its significance is also considered. The nature of the contribution that the setting of an asset makes to its heritage significance varies from asset to asset (i.e. the setting of some assets have a greater contribution to the significance and vice versa). Consequently, where there are effects from a development on the setting of an asset that has only a limited contribution to the significance of that asset, the effect on the significance of the asset itself may be very limited or even potentially non-existent. Where a heritage asset has a setting that has a large contribution to the significance of that asset, effects on the significance of the asset itself will be greater.

10.5.30 Timescales used in this assessment are as follows:

Prehistoric

- Palaeolithic: 450,000 – 12,000 BC;
- Mesolithic: 12,000 – 4,000 BC;
- Neolithic: 4,000 – 1,800 BC;
- Bronze Age: 1,800 – 600 BC; and
- Iron Age: 600 BC – AD 43.

Historic

- Roman – AD 43 – 410;
- Saxon / Early Medieval – AD 410 – 1066;
- Medieval – 1066 – 1485;
- Post-Medieval – 1486 – 1799; and
- Modern – 1800 – Present.

10.5.31 Mitigation measures are discussed in Section 10.11. The residual effects following the implementation of these measures are then defined and significance criteria applied.

10.5.32 The following timescales are referenced within the assessment:

- Less than 1 year: Short term;
- 1 – 5 years: Medium term; and
- 5+ years: Long term.

10.6 Assumptions and Limitations

10.6.1 This assessment is based upon data obtained from publicly accessible archives as described in paragraph 10.5.8. Data was received from Greater London and Kent HER and downloaded from the HistE website in January 2018. The assessment does not contain records added after this date. The DBA was submitted and discussed with Historic England in October 2018 and no significant changes to the baseline data were highlighted.

10.6.2 The setting assessment was conducted in March 2018 – the strategy for assessing heritage assets on private property involved establishing a view point from the closest public footpath or road, which was sufficient to assess the setting of the heritage receptors.

10.7 Baseline Conditions and Receptors

10.7.1 The locations of archaeological assets and archaeological priority areas considered in the assessment are presented in **Figure 10.1,**. The locations of designated and built heritage assets within the study areas are presented in **Figure 10.2**. The baseline of the Electrical Connection is provided in **Appendix F.1**.

Non-designated assets

10.7.2 The REP site and Main Temporary Construction Compounds are located within an area of historic marshland on the southern bank of the River Thames. The Erith Marshes formed part of the alluvial floodplain of the River Thames which would have influenced archaeological and historic settlement patterns. Mesolithic, Neolithic and Bronze Age occupation has been found associated with localised high areas of gravels, with environmental data sealed in wetland deposits. The REP site and Main Temporary Construction Compound form part of the Archaeological Priority Area for Thameside (GLHER DLO36895), designated due to the rich prehistoric occupation evidence.

10.7.3 Documentary sources indicate that from the end of the 12th century, the occupants of Lesnes Abbey were responsible for draining areas of the marshland through the construction and maintenance of stretches of river wall. This led to the creation of agricultural lands, although it is unlikely to have been ‘stable’ enough for permanent habitation and as such significant archaeological evidence from this period is not considered likely. Subsequent phases of repairs and reclamation work are recorded by Elizabeth I in 1561 and William Burrel in 1606, however the area remained largely absent of large scale development until the 1950s. The exception to this is a number of

industrial sites which are recorded on 19th century mapping: Manure Works, Thames Fish, Guano & Oil Works and the 20th century Borax Works.

10.7.4 A programme of geoarchaeological fieldwork and updated deposit modelling was carried out by Quaternary Scientific (University of Reading) of the REP site (**Appendix F.2**). This integrated a total of 11 geotechnical boreholes and 5 test-pits conducted in April/May 2018. The boreholes were put down using a cable percussion rig, and three were (at least in part) monitored by Quaternary Scientific (Bore Hole (BH) 03, BH04 & BH05). A Written Scheme of Investigation for the geoarchaeological works was submitted and agreed with the Archaeological Advisor to London Borough of Bexley (**Appendix F.1, Appendix D**).

10.7.5 The geoarchaeological deposit modelling (**Appendix F.2**) has confirmed that the REP site is underlain by similar sedimentary sequences to elsewhere in the Lower Thames Valley, with Late Devensian Shepperton Gravel overlain by a tripartite sequence of Holocene Lower Alluvium, Peat and Upper Alluvium, buried beneath modern Made Ground. The Upper Alluvium is generally sterile with the Peat horizon recorded c. 3 m below current ground surface. The geoarchaeological deposits have the potential to contain further information on early prehistoric past landscapes through the assessment / analysis of paleoenvironmental remains (e.g. pollen, plant macrofossils and insects) and radio carbon dating. The deposit modelling identified two sequences of interest from the south-west of the REP site: from the locations of BH04 (where a complex arrangement of mineral-rich and organic-rich/peat deposits was observed in the Lower Alluvium) and between BH12 (where the peat was recorded at 3 m thick) and BH09/BH10 (where peat was entirely absent). The significance of these deposits is considered local; geoarchaeological deposits of significance to warrant preservation *in situ* are not expected during construction of the Proposed Development.

10.7.6 The potential for previously unrecorded archaeological remains within the REP site and Main Temporary Construction Compound is considered as follows:

- Historical sources indicate the location of the river embankment of possible medieval or post-medieval date parallel to the River Thames foreshore. No evidence of buried medieval embankments was recorded during the 2008 evaluation to support the planning application / consent of RRRF (PCA 2008) or other archaeological investigations in the area. In light of this and groundworks associated with the modern development of the site, there is considered low potential for such features to survive within the REP site.

- Low Potential for previously unrecorded *significant* activity (e.g. *in-situ* settlement, occupation, industrial etc.) dating to the Roman, early medieval, medieval or post medieval periods within the REP site and Main Temporary Construction Compound. These areas lie within the Erith Marshes which was not reclaimed until the mid-20th century. There is no evidence that significant occupation was possible prior to this; should evidence survive it is considered likely to be fragmentary and of local

significance. There is potential for foundations and footings to survive that are associated with 19th / 20th century industrial development of the REP site. Such features were identified in the 2008 evaluation, however, were highly contaminated and not investigated further.

Designated and Built Heritage Assets

10.7.7 A review of the National Heritage List for England confirmed that there are no designated heritage assets within the REP site and the Main Temporary Construction Compound. As such no designated assets will be directly impacted by development in those areas. No listed buildings or scheduled monuments are located within the proposed route of the Electrical Connection options, however a number of Conservation Areas are located along its route.

10.7.8 In light of the Electrical Connection route being below ground and utilising an existing sub-station building at Littlebrook, there are no anticipated effects to the setting of designated and non-designated built heritage assets.

10.7.9 In terms of identifying designated assets that might be sensitive to indirect impact through changes to their setting, Section 10.4 sets out the parameters used in this assessment. **Table 10.6** lists the designated and built heritage assets within the wider study area. All designated heritage assets are considered to be of high heritage significance, although their settings may not necessarily be as sensitive to change (i.e. direct physical change) as the assets themselves.

10.7.10 Of the designated and built heritage assets in the wider study area of the REP site there is one scheduled and listed monument (Lesnes Abbey (NHLE 1002025, 1359415)) located c.1.5 km south-west of the Application Boundary); one Conservation Area (Crossness Conservation Area is located c.650 m west of the Application Site); two grade I listed buildings (Crossness Pumping Station (NHLE 1064241) c.760 m to the west and Church of St Helen and St Giles (NHLE 1358505)), c. 2.5 km north-east of the Application Site; five grade II* listed buildings (Parish Church of St John the Baptist (NHLE 1188560)), c. 1.7 km south-west of the site; Rainham Hall (NHLE 1358506), c. 2.5 km north-east of the site; Forecourt Railings, gates and piers walls and vases at Rainham Hall (NHLE 1079922), c. 2.5 km north-east of the site; Lodge at Rainham Hall (NHLE 1079923), c. 2.5 km north-east of the site; and Rainham Hall (NHLE 1183554)), c. 2.5 km north-east of the site; two grade II listed workshops at Crossness Pumping Station (NHLE 1064216, 1250557), c. 770 m – 880 m to the west of the Application Site; a grade II listed jetty at Dagenham Dock (NHLE 1391706) 600 m to the north-west of the Application Site, on the northern bank of the River Thames; locally listed engine house at Crossness Sewage Treatment Works (GLHER MLO103261); and four locally listed 20th century concrete Police Boxes (GLHER MLO103263), c. 400 – 750 m west of the study. These are mapped on **Figure 10.2, Appendix F.1** and listed in **Table 10.6**.

Table 10.6: Designated and built heritage assets within study area

ID	Name	Grade	Distance from closest point of Application Boundary	Reason scoped out
N/A	Crossness Conservation Area	Conservation Area	c.650 m	Not scoped out
NHLE 1064241	Crossness Pumping Station	Grade I listed	c.760 m	Not scoped out
NHLE 1064216	Workshops at Crossness Pumping Station	Grade II listed	c. 900 m	Not scoped out
NHLE, 1250557	Workshop at Crossness Pumping Station	Grade II listed	c. 1 km	Not scoped out
NHLE 1002025	Lesnes Abbey	Scheduled	c. 1.5 km	Not scoped out
GLHER MLO103261	Engine house at Crossness Sewage Treatment Work	Locally listed	c. 800 m	Not scoped out
NHLE 1391706	Jetty at Dagenham Docks	Grade II listed	c. 600 m	Not scoped out
GLHER MLO103263	Four locally listed 20th century concrete Police Boxes	Locally listed	c. 400 – 750 m	Scale and context
NHLE 1358505	Church of St Helen and St Giles	Grade I listed	c. 2.5 km	Not visible on ZTV
NHLE 1188560	Parish Church of St John the Baptist	Grade II* listed	c. 1.7 km	Not visible on ZTV

ID	Name	Grade	Distance from closest point of Application Boundary	Reason scoped out
NHLE 1183554	Rainham Hall	Grade II* listed	c. 2.5 km	Not visible on ZTV
NHLE 1079923	Lodge at Rainham Hall	Grade II* listed	c. 2.5 km	Not visible on ZTV
NHLE 1079922	Forecourt Railings, gates and piers walls and vases at Rainham Hall	Grade II* listed	c. 2.5 km	Not visible on ZTV
NHLE 1358506	Rainham Hall	Grade II* listed	c. 2.5 km	Not visible on ZTV

Designated / Listed Building Assets that do not require detailed assessment

10.7.11 The following heritage assets are outside the ZTV, as such the Proposed Development will have no significant effect upon them, and therefore effects on the following assets are not assessed or reported in this Chapter: the grade I Church of St Helen and St Giles (NHLE 1358505), the grade II* listed buildings Parish Church of St John the Baptist (NHLE 1188560), grade II* Rainham Hall (NHLE 1358506), grade II* listed Forecourt Railings, gates and piers walls and vases at Rainham Hall (NHLE 1079922), grade II* listed Lodge at Rainham Hall (NHLE 1079923), and grade II* listed Rainham Hall (NHLE 1183554).

10.7.12 In line with the methodology statement (paragraph 10.5.21) it is widely recognised that the heritage significance of an asset is not the same as its sensitivity to changes to its setting (Historic England 2017, 9; Lambrick 2008). Based on the type and function of the four locally listed 20th century concrete Police Boxes (GLHER MLO103263), c. 400 – 750 m west of the REP site, it is clear that no harm to their heritage significance would result from the Proposed Development. No further assessment has therefore been carried out.

Designated / Listed Building Assets that do require detailed assessment

10.7.13 The following provides a summary of the assessment of the significance and setting of the identified assets. Further discussion is presented in the desk-based assessment (**Appendix F.1**).

- The Crossness Conservation Area is located c.650 m west of the nearest REP site boundary - the REP site makes a **Minor** contribution to the setting or significance of the Conservation Area: it forms part of the wider skyline of the area when viewing the Conservation Area from the west;

- Grade I listed Crossness Pumping Station (NHLE 1064241) c.760 m to the west of the Application Site - the REP site makes a **Minor** contribution to the setting or significance of this asset: it forms part of the wider skyline of the area when viewing the building complex from the west;

- Two grade II listed workshops at Crossness Pumping Station (NHLE 1064216, 1250557), c. 770m – 800m to the west of the Application Site - the REP site makes a **Minor** contribution to the setting or significance of these assets: it forms part of the wider skyline of the area when viewing the building complex from the west;

- A locally listed engine house at Crossness Sewage Treatment Work (GLHER MLO103261), c. 800m west of the REP site - the REP site makes a **Negligible** contribution to the setting or significance of these assets: it forms part of the wider skyline of the area when viewing the building complex from the west;

- The grade II listed jetty at Dagenham Docks (NHLE 1391706) 600 m to the north-west of the Application Boundary, on the northern bank of the Thames - the REP site makes a **Minor** contribution to the setting or significance of these assets: it forms part of the wider skyline of the jetty when located on the view or viewing the jetty from Dagenham; and

- The scheduled and grade II listed Lesnes Abbey (NHLE 1002025, 1359415), c. 1.5 km south-west of the REP site. The monument includes the 12th century Augustinian Abbey of St Thomas the Martyr, now known as Lesnes Abbey, surviving as upstanding stone remains and archaeological remains. It is situated on low-lying ground at the northern edge of Lesnes Abbey Woods. The principal setting of the monument comprises the associated open and wooded spaces at Lesnes Abbey Woods which is defined topographically and by the suburban development around its edges. RRRF is visible in the distant skyline, which is similarly punctuated by high rise development, industrial structures and urban development. As such the REP site makes a **Minor** contribution to the setting or significance of these scheduled and listed remains.

Baseline Evolution

10.7.14 In general terms, changes in the baseline may result from the scheduling or listing of heritage assets within the study area or the discovery of new sites within or adjacent to the Application Site. The assessment has not identified any sites which are likely to be designated within the study area. Geoarchaeological intrusive works may occur prior to the construction of REP. These works are very unlikely to alter the heritage baseline.

10.7.15 In a 'no development' scenario the baseline conditions will remain as they are.

10.7.16 A review of developments outside the Application Site but within the study area indicates that a series of schemes are expected to be constructed prior to the construction phase of the Proposed Development, a full list is provided within **Appendix A.4**.

10.7.17 The phasing of these developments means that whilst their construction would not overlap with the construction of the Proposed Development, their subsequent operation is likely to occur in tandem with the operational phase of the Proposed Development. An assessment of likely significant cumulative operational effects is provided in Section 10.10.

10.8 Embedded Mitigation

10.8.1 No significant effects to the historic environment have been identified, as such no design responses or embedded mitigation are required.

10.9 Assessment of Likely Effects

The REP Site and the Main Temporary Construction Compounds

Construction/ Decommissioning

10.9.1 **Appendix F.1** concludes that the archaeological potential of the REP site is considered Low on the basis of the likely depth of the sediments and findings from nearby sites. This assessment similarly concludes low potential for *in situ* occupation of prehistoric, Roman, early medieval, medieval and post-medieval periods. Therefore groundworks associated with the Proposed Development are not considered likely to disturb *in situ* archaeological remains.

10.9.2 The REP site is underlain by geoarchaeological deposits which are considered a non-designated heritage asset of Local significance: the sediments have the potential to contain further information on the past landscape, through the assessment/analysis of palaeoenvironmental remains (e.g. pollen, plant macrofossils and insects) and radiocarbon dating. This is based on the results of a deposit model using historic and newly excavated boreholes (**Appendix F.2**).

10.9.3 The geoarchaeological deposit model identified two sequences of particular interest in the south-west of the Application Boundary: from the locations of BH04 (where a complex arrangement of mineral-rich and organic-rich/peat deposits was observed in the Lower Alluvium) and between BH12 (where the peat was recorded at 3 m thick) and BH09/BH10 (where peat was entirely absent). The significance of these deposits is considered Local.

10.9.4 The Proposed Development involves c. 0.5 m ground reduction within the footprint of the Main REP Building and the drilling of piles. Ground reduction up to 7.15 m depth is required within the area of the bunker. The bunker measures approximately 1,453 m^2 and is located in the south-west of the REP

site. The roads and landscaping is anticipated to require raising of the existing ground level by approximately 1 m.

10.9.5 The deposit model (**Appendix F.2**) indicates that the peat horizon is located 3 m below ground level, overlain by sterile Upper Alluvium and Made Ground deposits (**Appendix F.2**, Figure 12, 13 and 14). As such physical impacts to the geoarchaeological deposits of interest are restricted to the excavation of the bunker (anticipated to require an excavation to -8 m AOD) and the pile foundations (anticipated to be required to a depth of -29 m AOD) within the main REP building. The bunker is anticipated to be located within the area which has been highlighted by QUEST of particular geoarchaeological interest (**Appendix F.2**). The loss of these geoarchaeological deposits of interest is considered a **Medium adverse** Magnitude of Impact based on the criteria set out in **Table 10.4,** due to the loss of research potential / significance. The significance of this effect is considered **Minor adverse** in line with the criteria set out in **Table 10.5** and not significant in EIA terms.

10.9.6 The impacts of the construction / decommissioning of REP on built heritage assets will be of a comparable nature to those occurring at the operational stage, albeit of a much shorter duration.

10.9.7 The construction programme is 36 months and is anticipated to utilise both tower cranes and mobile cranes. Fixed red aeronautical obstacle lighting to the jibs of the tower cranes may be provided, the precise details of which are not yet known, but will be discussed with London City Airport (LCY) and the Civil Aviation Authority (CAA).

10.9.8 Crossness Conservation Area and associated listed buildings are considered as a group, followed by the remaining individual heritage receptors:

Crossness Conservation Area, Grade I listed Crossness Pumping Station (NHLE 1064216), two grade II listed workshops at Crossness Pumping Station (NHLE 1064216, 1250557), A locally listed engine house at Crossness Sewage Treatment Work (GLHER MLO103261)

10.9.9 It is recognised that during construction there will be an increase in crane and construction activity visible to the rear skyline when appreciating these assets from the west. In terms of the effect to the significance of these assets, the effect is temporary and **Negligible - Minor** (not significant).

The grade II listed jetty at Dagenham Dock (NHLE 1391706)

10.9.10 It is recognised that during construction there will be an increase in crane and construction activity visible to the rear skyline when appreciating this asset from the west. In terms of the effect to the significance of these assets, the effect is temporary and **Negligible** (not significant).

The scheduled and grade II listed Lesnes Abbey (NHLE 1002025, 1359415)

10.9.11 It is recognised that these schemes includes the construction of tall blocks and during construction there will be in increase in crane and construction activity visible from the monument. In terms of the effect to the significance to the monument or the experience of the monument, the effect is temporary and **Negligible - Minor** (not significant).

10.9.12 It is assumed for the purposes of this assessment that the REP generating equipment would be removed once the plant had 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 to those during the construction phase.

Operation/Maintenance

10.9.13 It is anticipated that there will be no operational and maintenance impacts on buried archaeological or geological assets as impacts would occur during the construction phase as assessed above.

10.9.14 The operation of REP would potentially have indirect impacts on the setting of designated assets of national importance within the wider study area. That is, the stack may be experienced visually within the settings of designated assets and consequently may have an effect on the contribution that the settings have to the heritage significance of those assets. These assets are listed in paragraph 10.7.13.

10.9.15 REP would form part of the wider setting of these designated and built heritage assets. However, REP is considered to make a **Negligible to Minor** contribution to the significance of these monuments. The construction of REP, and the up to 113 m AOD stack, would result in a change in skyline behind the conservation area, scheduled monument and listed / locally listed assets. The Townscape and Visual Impact Assessment concludes that the residual visual effect of the Proposed Development from the edge of the conservation area will be Moderate Adverse. This is due to the Proposed Development being a moderate to large industrial element which will reduce connectivity between the marshland areas and the river and change the character and views in the area. However, these assets are located in a highly industrialised landscape which includes other stacks in the immediate vicinity and wind turbines to the north of the River Thames. Also, Crossness Power Station itself had, until the 1950s, a chimney stack of 63 m (207 ft). In heritage terms the Proposed Development does not make a significant contribution to the experience, understanding of significance to the monument; the insertion of an additional chimney stack is considered to form a slight change in the wider skyline of these assets. In terms of the loss of significance of these assets, the magnitude of impact is considered Negligible to Low adverse. The indirect effect is considered **Negligible** to **Minor** on these designated and built heritage assets and not considered to be significant, as in each case the core heritage

significance of the assets is unaffected. The timescale for this effect is long term - the life span of the Proposed Development.

10.9.16 It is recognised that the Proposed Development will be visible from the scheduled and listed Lesnes Abbey (NHLE 1002025, 1359415), c. 1.5 km south-west of the REP site. The Townscape and Visual Impact Assessment concludes that the residual visual effect of the Proposed Development will be Moderate Adverse. This is due to the Proposed Development being a large industrial element in the view from the monument and a new industrial feature on the skyline in the distant view, alongside other vertical elements. In heritage terms the Proposed Development does not make a significant contribution to the experience, understanding of significance to the monument. The indirect effect is considered **Minor** and not considered to be significant, as in each case the core heritage significance of the asset is unaffected. The timescale for this effect is long term - the life span of the Proposed Development.

10.9.17 Accurate Visual Representations have been provided to support the Townscape and Visual Impact Assessment (see **Chapter 9**) and the conclusions of the Air Quality and Noise chapters have been considered in relation to effects to designated and built heritage assets in relation to noise.

The Electrical Connection and the Cable Route Temporary Construction Compounds

Construction/Decommissioning

10.9.18 There are four Electrical Connection route options to connect REP and the Littlebrook substation near Dartford, Kent, the baseline conditions for each are outlined in the desk-based assessment (**Appendix F.1**).

10.9.19 As outlined in **Chapter 3**, the Electrical Connection would comprise a trefoil of cables (3 cables laid together to comprise a single 3-phase circuit), buried in a cable trench typically 450 mm wide and with 900 mm cover (except where there is potential for trenchless installation or a localised deeper trench to be required to pass below a specific constraint) when laid under highway footways and carriageways, with jointing pits approximately every 500 m along the route. To provide 900 mm typical cover, with c. 160 mm diameter ducts and 50 mm duct bedding, the excavation required would typically be 1.2 m deep. The proposed cable route (and backup alternatives) generally follow existing carriageway routes, however there are locations where works would be required outside of the existing carriageway (see Section 10.9.22).

10.9.20 The Electrical Connection route includes two sub-stations, one at the REP site and the other at Littlebrook. The REP Electrical Interface Point is currently assumed to occur within the onsite substation on the high voltage side. At Littlebrook substation the connection point will be fitted to existing gas insulated switchgear (GIS) which has already been constructed between Rennie Drive and Albion Road. Works around the substation will consist of

the installation and connection of 132 kV cables, however no external building works would be required.

10.9.21 The four Electrical Connection route options have been assessed. Excavation of the anticipated cable trench, c. 450 mm wide and c. 1.2 m deep, is likely to principally disturb modern made ground associated with the existing road routes. The potential for fragmentary pre-modern deposits and residual material culture cannot be ruled out entirely, however buried remains of significance that would preclude development are not expected.

10.9.22 The following sections are located away from the existing road system and have potential for previously unrecorded sub-surface archaeological remains of Local Significance: the section of Electrical Connection route 1 south of the A206 bridge over the River Cray, identified as '(5)' on **Figure 10.1**; the section of Electrical Connection route 1 by the River Darent and the Dartford Salt Marshes (6), **Figure 10.1**; the section of Electrical Connection route 1A at the junction between Norman Road and Picardy Manorway (2), **Figure 10.1** and the section of Electrical Connection route 2B (between where it leaves Electrical Connection route 1 to chainage 0.5 km – see **Figure 5.2**) which is located on a gravel path rather than public highway**.**

10.9.23 The excavation of the cable trench, including the option of a trenchless installation technique, may result in the fragmentary removal of pre-modern deposits and residual material culture of local heritage significance. This is considered a Negligible magnitude of impact and **Negligible** effect and not significant.

10.9.24 The impacts of the construction of the Electrical Connection on built heritage assets will result in the temporary presence of construction teams and associated noise along the line of the route. The predicted effects of construction activities are considered temporary and **Negligible** and not significant. No effects to designated and built heritage assets in relation to odour and noise are anticipated.

10.9.25 At the end of its operational life, it is currently anticipated that the Electrical Connection ducting will be left in situ (although the cables may be removed), such that there would be limited decommissioning works and therefore no effects upon historic receptors.

Operation/Maintenance

10.9.26 There would be no operational and maintenance impacts on buried archaeological assets.

10.9.27 No statutory designations (Listed Buildings, Conservation Areas, Scheduled Ancient Monuments or World Heritage Sites) are located within the Application Boundary. No locally listed or non-designated built heritage assets are recorded within the Application Boundary.

10.9.28 In light of the Electrical Connection route being below ground and utilising an existing sub-station at Littlebrook, there are no anticipated effects to the setting of designated and non-designated built heritage assets, through effects to their settings. The operation of the Electrical Connection is therefore not anticipated to give rise to significant adverse effects to the environment.

Summary of Assessment

Construction/Decommissioning

10.9.29 The overall effect of the Proposed Development during construction and decommissioning on the historic environment is considered **Minor** in line with the criteria set out in **Table 10.5** and not significant. This is based on the partial removal of geoarchaeological deposits associated with the construction of REP. Depending on the final Electrical Connection design there is potential for the removal of non-designated heritage assets of Local significance within the Electrical Connection route. The effect of this is considered to be **Negligible** which is not significant, and would not require mitigation. These effects would be permanent.

Operation/Maintenance

10.9.30 The overall indirect effect during operation on the historic environment is considered **Negligible** to **Minor** and not considered to be significant. This is based on the slight change to the wider setting of a number of outlying designated and built heritage assets: in each case the core of the heritage significance of the assets is unaffected. The timescale of this effect is long term.

10.10 Cumulative Assessment

Assessment Methodology

10.10.1 Construction of REP could occur simultaneously with other projects located in the vicinity of the Application Site. The 'other developments' with the most potential for simultaneous construction effects are identified in **Chapter 4**.

10.10.2 There are no strict guidelines for assessing cumulative effects. In terms of direct cumulative effects, due to the physical localised character of sub-surface archaeological remains, construction of 'other developments' will generally not result in cumulative direct impacts on designated or non-designated archaeological assets. The exception to this is archaeological deposits which extend beyond the development site which would be impacted by removal of contemporary deposits by development in the immediate vicinity. The REP site is underlain by a Holocene sequence of geoarchaeological significance which extends beyond the study site, with potential for geoarchaeological remains extending across a large part of the Thames floodplain. Whilst it is recognised that 'other developments' may also physically impact to the geoarchaeological sequence, the extent of the area of interest, depth of the deposits and type of

development impacts (generally piling), the significance of the resource will largely remain unchanged.

10.10.3 In terms of potential indirect cumulative effects, this comprises cumulative effects to the setting of non-designated and designated heritage assets during construction and operational phases. There are no strict guidelines to cumulative assessment, however Historic England's five-stage settings assessment (HistE 2017) provides a suitable framework:

Step 1: "Identify which heritage assets and their settings are affected" (HistE 2017). The assessment has identified a number of heritage receptors (listed below) which are sensitive to change by the Proposed Development. The setting of these assets is considered in relation to the 'other developments' to identify those which also have the potential to effect the significance of the assets setting. As defined in Annex 2 of the NPPF, setting is largely, but not exclusively a visual term. Its importance lies in what the setting contributes to the significance of a heritage asset.

10.10.4 A screening exercise has been undertaken, using the ZTV, GIS analysis, desk-based survey of the assets and readily available satellite imagery to identify 'other developments' which are within / have the potential to effect the setting of the identified receptors.

Step 2: "*Assess the degree to which these settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated*" (HistE 2017). Assessment of the contribution that the 'other development' and Proposed Development site makes to the significance of the identified heritage receptor. Step 2 identifies 'other development' sites which make a contribution to the significance of the identified receptors / heritage assets or allow significance to be appreciated. Value judgement of degree of contribution, negligible, minor, moderate, substantial is based on professional judgement.

Step 3: "*Assess the effects of the proposed development, whether beneficial or harmful, on that significance or on the ability to appreciate it*". This stage consideration of the type of development, for example physical footprint and height and assesses a magnitude of impact in line with **Table 10.4**.

Steps 4 and 5 are concerned with maximise enhancement, minimising harm and documenting change if significant effects are identified.

10.10.5 The study area for 'other developments' is in line with the Townscape and Visual Impact Assessment: it is considered likely that significant cumulative visual effects would not occur beyond 2.5km from REP's stack (for all types and sizes of development), or for development which is above 65m in height beyond 5 km from REP's stack. The thresholds for cumulative visual assessment therefore include all schemes within 2.5km from REP, and also energy infrastructure schemes of a minimum height of 65 m between 2.5 km to 5 km from REP's stack. A total of 123 'other developments' were identified during both consultation.

Construction/Decommissioning

10.10.6 Construction of REP and 'other developments' has the potential to affect the setting of designated assets by installation of construction cranes, increased road traffic, and noise during the construction programme.

10.10.7 The construction programme is c. 36 months and is anticipated to utilise both tower cranes and mobile cranes. Fixed red aeronautical obstacle lighting to the jibs of the tower cranes may be provided, the precise details of which are not yet known, but will be discussed with London City Airport (LCY) and the Civil Aviation Authority (CAA).

10.10.8 Crossness Conservation Area and associated listed buildings are considered as a group, followed by the remaining individual heritage receptors:

Crossness Conservation Area, Grade I listed Crossness Pumping Station (NHLE 1064216), two grade II listed workshops at Crossness Pumping Station (NHLE 1064216, 1250557), A locally listed engine house at Crossness Sewage Treatment Work (GLHER MLO103261)

10.10.9 Committed development at the Crossness Sewage Treatment Works (ID 007 – See **Appendix A.4**) is the only development within the Conservation Area within the primary setting of the associated listed buildings. This application, by the Crossness Engines Trust involves the installation of a narrow gauge railway and modification to existing industrial building. Due to the nature of the works this will not result in cumulative effects during construction. Committed developments at land part of Borax works (ID 008), Burts Wharf Crabtree Manorway (ID 010), Former Nufarm UK Crabtree Manorway North (ID 011), land adjacent Nufarm UK Ltd Crabtree Manorway North (ID 012) form part of the wider, visual setting of the assets, but are not considered to make a substantial contribution to their significance. It is recognised that during construction there will be an increase in crane and construction activity visible to the rear skyline when appreciating these assets from the west. In terms of the effect to the significance of these assets, the cumulative effect is temporary and **Negligible - Minor** (not significant).

The grade II listed jetty at Dagenham Dock (NHLE 1391706)

10.10.10 None of the 'other developments' are located within the immediate setting of the asset. None have been identified which have the potential to harm the significance or experience of the asset. No significant cumulative effects identified. Committed developments at land part of Borax works (ID 008), Burts Wharf Crabtree Manorway (ID 010), Former Nufarm UK Crabtree Manorway North (ID 011), land adjacent Nufarm UK Ltd Crabtree Manorway North (ID 012) form part of the wider, visual setting of the jetty, but are not considered to make a substantial contribution to its significance. It is recognised that during construction there will be an increase in crane and construction activity visible to the rear skyline when appreciating this asset

from the west. In terms of the effect to the significance of these assets, the cumulative effect is temporary and **Negligible** (not significant).

The scheduled and grade II listed Lesnes Abbey (NHLE 1002025, 1359415)

10.10.11 There are no 'other developments' within the immediate setting of Lesnes Abbey which is defined as the Abbey Woods. 'Other developments' at Abbey Wood (IDs 087, 088) and Peabody Developments (IDs 029, 032, 033) form part of the wider visual setting of the monument. It is recognised that these schemes include the construction of tall blocks and during construction there will be in increase in crane and construction activity visible from the monument. In terms of the effect to the significance to the monument or the experience of the monument, the cumulative effect is temporary and **Negligible - Minor** (not significant).

Operation/Maintenance

10.10.12 Construction of REP and 'other developments' has the potential to affect the setting of designated assets.

10.10.13 Crossness Conservation Area and associated listed buildings are considered as a group, followed by the remaining individual heritage receptors:

Crossness Conservation Area**,** Grade I listed Crossness Pumping Station (NHLE 1064216), two grade II listed workshops at Crossness Pumping Station (NHLE 1064216, 1250557), A locally listed engine house at Crossness Sewage Treatment Work (GLHER MLO103261)

10.10.14 Committed development at the Crossness Sewage Treatment Works (ID 007) is the only development within the Conservation Area within the primary setting of the associated listed buildings. This application, by the Crossness Engines Trust involves the installation of a narrow gauge railway and modification to existing industrial building. Due to the nature of the works this will not result in cumulative effects during operation. Committed developments at land part of Borax works (ID 008), Burts Wharf Crabtree Manorway (ID 010), Former Nufarm UK Crabtree Manorway North (ID 011), land adjacent Nufarm UK Ltd Crabtree Manorway North (ID 012) form part of the wider, visual setting of the assets, but are not considered to make a substantial contribution to their significance. It is recognised this will result in additional changes to the rear skyline when appreciating these assets from the west. However, due to the distances involved and the position of these developments to the rear of REP, in terms of the effect to the significance of these assets, the cumulative effect is long term and **Negligible** (not significant).

The grade II listed jetty at Dagenham Dock (NHLE 1391706)

10.10.15 None of the 'other developments' are located within the immediate setting of the asset. None have been identified which have the potential to harm the significance or experience of the asset. Committed developments at land part of Borax works (008), Burts Wharf Crabtree Manorway (ID 010),

Former Nufarm UK Crabtree Manorway North (ID 011), land adjacent Nufarm UK Ltd Crabtree Manorway North (ID 012) form part of the wider, visual setting of the jetty, but are not considered to make a substantial contribution to its significance. In terms of the effect to the significance of this asset, the cumulative effect is long term and **Negligible** (not significant).

The scheduled and grade II listed Lesnes Abbey (NHLE 1002025, 1359415)

10.10.16 There are no 'other developments' within the immediate setting of Lesnes Abbey which is defined as the Abbey Woods. It is recognised that the developments at Abbey Wood (IDs 087, 088) and Peabody Developments (IDs 029, 032, 033) form part of the wider visual setting of the monument. It is recognised that these schemes have tall elements will change the skyline and view from the monument. This will not result in the cumulative loss of key views or substantially alter the largely modern character of the urban setting of the monument. In terms of the effect to the significance to the monument, the cumulative effect is long term and **Minor** (not significant).

10.10.17 REP has been designed to be CHP enabled, meaning that there is the ability to supply waste 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 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 Code of Construction Practice or similar best practice working methods. It is therefore considered highly unlikely that there would be any likelihood of significant cumulative effects

10.11 Further Mitigation and Enhancement

10.11.1 In accordance with national, regional and local planning policies, any potential direct and indirect effects upon heritage assets have been considered from the outset of the Proposed Development.

Construction/Decommissioning

10.11.2 The REP site is underlain by geoarchaeological deposits which are considered non-designated heritage assets of local significance. Physical impacts to the geoarchaeological deposits of interest is restricted to the excavation of the bunker, attenuation tank(s) and the pile foundations within the main REP building.

10.11.3 The geoarchaeological deposit model identified two sequences of interest in the south-west of the Application Site: from the locations of BH04 (where a

complex arrangement of mineral-rich and organic-rich/peat deposits was observed in the Lower Alluvium) and between BH12 (where the peat was recorded at 3 m thick) and BH09/BH10 (where peat was entirely absent). These are located within the vicinity of the proposed bunker. The loss of these geoarchaeological deposits of interest is considered a medium adverse magnitude of impact due to the loss of research potential / significance. The significance of this effect is considered **Minor Adverse**.

10.11.4 To mitigate the loss of non-designated geoarchaeological deposits of Local Significance the following mitigation works will be undertaken: the production of a written scheme of investigation (WSI) which is secured in Requirement 7 of the draft DCO (**Document Reference 3.1**): excavation of two boreholes to be retained for palaeoenvironmental assessment / analysis from the locations of BH04 and between BH12 and BH09/BH10 (**Appendix F.2**, Figure 3), to ensure that features of archaeological interest are properly examined and recorded in accordance with NPPF.

10.11.5 The excavation of the cable trench may result in the fragmentary removal of pre-modern deposits and residual material culture of local heritage significance. To mitigate the loss of non-designated archaeological assets of Local Significance the following mitigation works will be undertaken if required. Substantial groundworks (i.e. Horizontal Directional Drilling, junction pits or 10 m+ sections of cable trench) in the following areas will trigger the need for further archaeological works: the section of Electrical Connection route 1 south of the A206 bridge over the River Cray, identified as '(5)' on **Figure 10.1**; the section of Electrical Connection route 1 by the River Darent and the Dartford Salt Marshes (6), **Figure 10.1**; the section of Electrical Connection route 1A at the junction between Norman Road and Picardy Manorway (2), **Figure 10.1** and the section of Electrical Connection route 2B (between where it leaves Electrical Connection route 1 to chainage 0.5 km – see **Figure 5.2**) which is located on a gravel path rather than public highways**.** If required, a Written Scheme of Investigation (WSI) identifying any areas where further archaeological investigations are required; the nature and extent of the investigation required; and providing details of the measures to be taken to protect, record or preserve any significant archaeological features that may be found, must be submitted to and approved by the relevant planning authority prior to commencement of the authorised development. The need for a WSI, if required, is secured in Requirement 7 of the draft DCO (**Document Reference 3.1**).

Operation/Maintenance

10.11.6 There are no significant impacts or effects on designated and built heritage assets therefore no mitigation measures are required.

10.12 Residual Effects and Monitoring

10.12.1 The following table sets out a summary of the significant effects arising from the Proposed Development during construction, decommissioning and

operation. The assessment of the significant effects has used the significance criteria matrices set out in **Tables 10.3-10.5**. Table 10.7 considers the overall significance of the REP DCO and takes into account possible mitigation and enhancement measures outlined in Section 10.11, in comparison to a no development scenario.

10.12.2 The implementation of the archaeological mitigation strategy will result in a **Minor** Beneficial Residual Effect**:** the resulting research will contribute to the increased knowledge and understanding of the interactions between relative sea level, human activity, vegetation succession and climate in this area of the Lower Thames Valley. The implementation of the archaeological mitigation strategy for the cable trench will result in a **Negligible** residual effect.

Summary of Residual Effects

Table 10.7: Summary of Residual Effects

	Receptor name and description	Potential mitigation	Assessment of Residual Effects
The REP DCO			
Construction	Non-designated geoarchaeological deposits of local significance within the permanent works in the area adjacent / around REP site	The collection of up to two geoarchaeological specific boreholes (BH04 and between BH12 and BH09/BH10) from the south-west of the Application Site, followed by assessment, analysis and publication. Limited additional archaeological works in the area of the bunker and attenuation tanks may also be required subject to the final design / final impact on the peat horizons. Further works to be secured through the production of a	**Minor Beneficial Effect** resulting from the research undertaken, contributing to the increased knowledge and understanding of the interactions between relative sea level, human activity, vegetation succession and climate in this area of the Lower Thames Valley

	Receptor name and description	Potential mitigation	Assessment of Residual Effects
		written scheme of investigation (WSI) once the DCO has been made.	
Construction	Non-designated heritage assets – depending on the final Electrical Connection design there is potential for the removal of non-designated heritage assets of local significance within the Electrical Connection.	Localised areas of further archaeological work may be warranted depending on the final design. It is recommended that this is secured through the production of a written scheme of investigation (WSI) once the DCO has been made and the location and design of the cable route fixed.	**Negligible Effect** – not significant
Operation	Designated and built heritage assets – effect on setting of identified receptors (see **Table 10.6**)	None	**Negligible** – **Minor** - not significant
Decommissioning	None	None	None

10.13 Summary and Conclusion

10.13.1 The potential construction, operational, maintenance and decommissioning impacts of the Proposed Development on archaeology and cultural heritage have been assessed and are reported in this ES.

10.13.2 This assessment has been informed by a Heritage DBA (**Appendix F.1**) and a geoarchaeological deposit model using historic and recently excavated borehole data (**Appendix F.2**). An overarching method statement for the Stage 1 geoarchaeological works has been completed (see **Appendix F.1**).

10.13.3 The construction of REP has the potential to affect non-designated geoarchaeological heritage assets. These remains are considered to be of local significance. Physical impacts to the geoarchaeological deposits of interest is restricted to the excavation of the bunker (anticipated to require an excavation to -8 m AOD), attenuation tank(s) and the pile foundations (anticipated to be required to a depth of -29 m AOD) within the Main REP Building. The bunker is located within the area which has been highlighted within the Deposit Model (**Appendix F.2**) as being of particular geoarchaeological interest. The loss of these geoarchaeological deposits of interest is considered a Medium Adverse Magnitude of Impact due to the loss of research potential / significance (based on criteria set out in **Table 10.4**). The significance of this effect is considered permanent **Minor** in line with the criteria set out in **Table 10.5** and **Not Significant** in EIA terms.

10.13.4 It has been agreed with Historic England that the following mitigation works will be secured through the production of a written scheme of investigation (WSI) once the DCO has been made: excavation of two boreholes are retained for palaeoenvironmental assessment / analysis from the locations of BH04 and between BH12 and BH09/BH10 (**Appendix F.2**, Figure 3). Limited additional archaeological works in the area of the bunker and attenuation tanks may also be required subject to the final design / final impact on the peat horizons. The collection of up to two geoarchaeological specific boreholes, followed by assessment, analysis and publication would result in a **Minor** Beneficial Residual Effect: the research contributing to the increased knowledge and understanding of the interactions between relative sea level, human activity, vegetation succession and climate in this area of the Lower Thames Valley.

10.13.5 The four Electrical Connection Options have been assessed. The majority of the routes are located within the existing road network. The following sections are located away from the existing road system and have potential for previously unrecorded sub-surface archaeological remains of Local Significance: the section of Electrical Connection route 1 south of the A206 bridge over the River Cray (5); the section of Electrical Connection route 1 by the River Darent and the Dartford Salt Marshes (6); the section of Electrical Connection route 1A at the junction between Norman Road and Picardy Manorway (2) and the section of Electrical Connection route 2B (between where it leaves Electrical Connection route 1 to chainage 0.5 km) which is located on a gravel path rather than public highway**.** The partial removal of potential fragmentary deposits is considered a **Negligible** Adverse Magnitude of Impact based on the criteria set out in **Table 10.4**. The significance of this effect is considered permanent **Negligible** in line with the criteria set out in **Table 10.5** and not significant in EIA terms. Substantial groundworks (i.e. Horizontal Directional Drilling, junction pits or 10 m+ sections of cable trench) within the aforementioned areas will trigger the need for further archaeological

works. If required, a Written Scheme of Investigation (WSI) identifying any areas where further archaeological investigations are required; the nature and extent of the investigation required; and providing details of the measures to be taken to protect, record or preserve any significant archaeological features that may be found, must be submitted to and approved by the relevant planning authority prior to commencement of the authorised development. The need for a WSI, if required, is secured in Requirement 7 of the draft DCO (**Document Reference 3.1**). This would result in a **Negligible** Residual Effect**.**

10.13.6 The assessment has shown that the construction and operational stages of the Proposed Development will result in no more than a **Minor** adverse impact on the significance of designated and built heritage assets within the study areas. Taking into consideration the presence of a significant number of tall industrial structures in proximity to the REP site, the potential effects will be experienced within a context where industrial structures are already present in the same area. The decommissioning of the REP site will remove any slight adverse effects that will have been introduced during its operation.

10.14 References

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Orion Heritage 2018 Riverside Energy Park, London Borough of Bexley and associated Electrical Connection Route, Dartford, Kent: Heritage Desk Based Assessment

QUEST 2018 Riverside Energy Park London Borough of Bexley: Desk-Based Deposit Modelling Report (draft)

QUEST 2018 Riverside Energy Park London Borough of Bexley: Written Scheme of Investigation

Appendix F.1 Orion Heritage 2018 Riverside Energy Park, London Borough of Bexley and associated Electrical Connection Route, Dartford, Kent: Heritage Desk Based Assessment

Appendix F.2 QUEST 2018 Riverside Energy Park London Borough of Bexley: Fieldwork and Updated Desk-Based Deposit Modelling Report (draft)